

# **ISTOCK**

PRÄZISION

Span - um Span - Spitze



**ADD-ON** zum  
Gesamtkatalog

ERWEITERUNG  
2024

# ERWEITERUNG 2024 DER KATALOG ZUM KATALOG!

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Ihr Werkzeug-Update ist da: Der Gesamtkatalog 2016 dient unseren Kunden weiterhin als verlässliche Grundlage für die Werkzeugbeschaffung. Als Ergänzung informieren unsere Erweiterungskataloge Sie regelmäßig über neue Produkte in unserem Programm. So erhalten Sie auch mit der Ausgabe 2024 das vollständige Add-on zum Gesamtkatalog mit allen Neuheiten auf über 300 Seiten. Seien Sie gespannt!



| P | M | K | N | S | H | Typ | Schaftform | Bohrtiefe | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|-----------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|-----------|--------------|------------|------|-------|-------------|--------------|

### SuperV-Bohrer ohne Innenkühlung

|  |   |  |   |   |   |   |          |    |     |     |            |           |                |       |    |
|--|---|--|---|---|---|---|----------|----|-----|-----|------------|-----------|----------------|-------|----|
|  | • |  | • | ○ | ○ | ○ | SuperV-U | HB | 3xD | VHM | TiAlN nano | DIN 6537K | 3,000 - 20,000 | 51673 | 23 |
|  | • |  |   | ○ | ○ | ○ | SuperV-S | HA | 3xD | VHM | TiAlSiN    | DIN 6537K | 3,000 - 20,000 | 51750 | 25 |
|  | • |  | • | ○ | ○ | ○ | SuperV-U | HB | 5xD | VHM | TiAlN nano | DIN 6537L | 3,000 - 20,000 | 51687 | 27 |

### SuperV-Bohrer mit Innenkühlung

|  |   |   |   |   |   |   |             |    |     |     |            |           |                |       |    |
|--|---|---|---|---|---|---|-------------|----|-----|-----|------------|-----------|----------------|-------|----|
|  | • | ○ | • | ○ | ○ | ○ | SuperV-IK-U | HB | 3xD | VHM | TiAlN nano | DIN 6537K | 3,000 - 20,000 | 51676 | 29 |
|  |   | • |   | ○ | ○ |   | SuperV-VA   | HB | 3xD | VHM | AlTiN nano | DIN 6537K | 3,000 - 20,000 | 51670 | 31 |
|  | • | ○ |   | ○ | ○ | ○ | SuperV-X    | HA | 3xD | VHM | TiAlN nano | DIN 6537K | 3,000 - 20,000 | 51784 | 33 |
|  | • |   |   | ○ | • | ○ | SuperV-S    | HA | 3xD | VHM | TiAlSiN    | DIN 6537K | 3,000 - 20,000 | 51752 | 35 |
|  | • |   |   | ○ | • | ○ | SuperV-S    | HE | 3xD | VHM | TiAlSiN    | DIN 6537K | 3,000 - 20,000 | 51753 | 37 |
|  | • | • | • | ○ | ○ | ○ | SuperV-180  | HA | 3xD | VHM | TiAlN nano | Werksnorm | 3,000 - 20,000 | 51718 | 39 |
|  |   |   |   | • |   |   | SuperV-AI   | HA | 5xD | VHM | blank      | DIN 6537L | 3,000 - 20,000 | 71791 | 41 |
|  | • | ○ | • | ○ | ○ | ○ | SuperV-IK-U | HB | 5xD | VHM | TiAlN nano | DIN 6537L | 3,000 - 20,000 | 51681 | 43 |
|  |   | • |   | ○ | ○ |   | SuperV-VA   | HB | 5xD | VHM | AlTiN nano | DIN 6537L | 3,000 - 20,000 | 51674 | 45 |
|  | • | ○ |   | ○ | ○ | ○ | SuperV-X    | HA | 5xD | VHM | TiAlN nano | DIN 6537L | 3,000 - 20,000 | 51786 | 47 |
|  | • |   |   | ○ | • | ○ | SuperV-S    | HA | 5xD | VHM | TiAlSiN    | DIN 6537L | 3,000 - 20,000 | 51754 | 49 |
|  | • |   |   | ○ | • | ○ | SuperV-S    | HE | 5xD | VHM | TiAlSiN    | DIN 6537L | 3,000 - 20,000 | 51755 | 51 |

| P | M | K | N | S | H | Typ | Schaftform | Bohrtiefe | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|-----------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|-----------|--------------|------------|------|-------|-------------|--------------|

## SuperV-Bohrer mit Innenkühlung

|  |   |   |   |   |   |   |             |    |      |     |            |           |                |       |    |
|--|---|---|---|---|---|---|-------------|----|------|-----|------------|-----------|----------------|-------|----|
|  | • | ○ | ○ | ○ | ○ | ○ | SuperV-X    | HA | 7xD  | VHM | TiAlN nano | Werksnorm | 3,000 - 20,000 | 51791 | 53 |
|  | • | ○ | ○ | ○ | ○ | ○ | SuperV-S    | HA | 7xD  | VHM | TiAlSiN    | Werksnorm | 3,000 - 16,000 | 51756 | 55 |
|  | • | ○ | ○ | ○ | ○ | ○ | SuperV-X    | HA | 12xD | VHM | TiAlN nano | Werksnorm | 3,000 - 20,000 | 51792 | 56 |
|  | • | • | • | ○ | ○ | ○ | SuperV-T    | HA | 15xD | VHM | AlTiN      | Werksnorm | 3,000 - 16,000 | 51764 | 58 |
|  | • | • | • | ○ | ○ | ○ | SuperV-T-Al | HA | 15xD | VHM | blank      | Werksnorm | 3,000 - 14,000 | 71764 | 59 |
|  | • | • | • | ○ | ○ | ○ | SuperV-T    | HA | 20xD | VHM | AlTiN      | Werksnorm | 3,000 - 16,000 | 51765 | 61 |
|  | • | • | • | ○ | ○ | ○ | SuperV-T-Al | HA | 20xD | VHM | blank      | Werksnorm | 3,000 - 14,000 | 71765 | 62 |
|  | • | • | • | ○ | ○ | ○ | SuperV-T    | HA | 25xD | VHM | AlTiN      | Werksnorm | 3,000 - 16,000 | 51766 | 64 |
|  | • | • | • | ○ | ○ | ○ | SuperV-T-Al | HA | 25xD | VHM | blank      | Werksnorm | 3,000 - 14,000 | 71766 | 65 |
|  | • | • | • | ○ | ○ | ○ | SuperV-T    | HA | 30xD | VHM | AlTiN      | Werksnorm | 3,000 - 14,000 | 51767 | 67 |
|  | • | • | • | ○ | ○ | ○ | SuperV-T    | HA | 40xD | VHM | AlTiN      | Werksnorm | 3,000 - 10,000 | 51768 | 68 |

## SuperV-M Universal-Kleinstbohrer

|  |   |   |   |   |   |   |          |    |  |     |       |           |               |       |    |
|--|---|---|---|---|---|---|----------|----|--|-----|-------|-----------|---------------|-------|----|
|  | • | • | • | ○ | ○ | ○ | SuperV-M | HA |  | VHM | AlTiN | Werksnorm | 0,100 - 3,000 | 51720 | 69 |
|--|---|---|---|---|---|---|----------|----|--|-----|-------|-----------|---------------|-------|----|

## SuperV-NX Hochleistungs-Kleinstbohrer mit Innenkühlung

|  |   |   |   |   |   |   |              |    |     |     |       |           |               |       |    |
|--|---|---|---|---|---|---|--------------|----|-----|-----|-------|-----------|---------------|-------|----|
|  | • | • | • | ○ | ○ | ○ | SuperV-IK-NX | HA | 5xD | VHM | AlTiN | Werksnorm | 1,000 - 3,000 | 51997 | 71 |
|  | • | • | • | ○ | ○ | ○ | SuperV-IK-NX | HA | 8xD | VHM | AlTiN | Werksnorm | 1,000 - 3,000 | 51998 | 72 |

| P | M | K | N | S | H | Typ | Schaftform | Bohrtiefe | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|-----------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|-----------|--------------|------------|------|-------|-------------|--------------|

### SuperV-NX Hochleistungs-Kleinstbohrer mit Innenkühlung



|   |   |   |   |   |  |              |    |      |     |       |           |               |       |    |
|---|---|---|---|---|--|--------------|----|------|-----|-------|-----------|---------------|-------|----|
| • | • | • | ○ | ○ |  | SuperV-IK-NX | HA | 15xD | VHM | AlTiN | Werksnorm | 1,000 - 3,000 | 51999 | 73 |
|---|---|---|---|---|--|--------------|----|------|-----|-------|-----------|---------------|-------|----|

### SuperV-NX U Hochleistungs-Kleinstbohrer mit Innenkühlung



|   |   |   |   |   |  |                |     |      |     |       |           |               |       |    |
|---|---|---|---|---|--|----------------|-----|------|-----|-------|-----------|---------------|-------|----|
| • | • | • | ○ | ○ |  | SuperV-IK-NX-U | ~HA | 20xD | VHM | AlTiN | Werksnorm | 1,000 - 3,000 | 51980 | 74 |
|---|---|---|---|---|--|----------------|-----|------|-----|-------|-----------|---------------|-------|----|

### SuperV-NX VA Hochleistungs-Kleinstbohrer ohne Innenkühlung



|   |   |   |   |   |  |              |    |     |     |        |           |               |       |    |
|---|---|---|---|---|--|--------------|----|-----|-----|--------|-----------|---------------|-------|----|
| ○ | • | • | ○ | • |  | SuperV-NX VA | HA | 3xD | VHM | TiSiN+ | Werksnorm | 0,500 - 3,000 | 51970 | 75 |
|---|---|---|---|---|--|--------------|----|-----|-----|--------|-----------|---------------|-------|----|

### SuperV-NX VA Hochleistungs-Kleinstbohrer mit Innenkühlung



|   |   |   |   |   |  |              |    |     |     |        |           |               |       |    |
|---|---|---|---|---|--|--------------|----|-----|-----|--------|-----------|---------------|-------|----|
| ○ | • | • | ○ | • |  | SuperV-NX VA | HA | 3xD | VHM | TiSiN+ | Werksnorm | 1,000 - 3,000 | 51971 | 76 |
|---|---|---|---|---|--|--------------|----|-----|-----|--------|-----------|---------------|-------|----|



|   |   |   |   |   |  |              |    |     |     |        |           |               |       |    |
|---|---|---|---|---|--|--------------|----|-----|-----|--------|-----------|---------------|-------|----|
| ○ | • | • | ○ | • |  | SuperV-NX VA | HA | 6xD | VHM | TiSiN+ | Werksnorm | 1,000 - 3,000 | 51972 | 77 |
|---|---|---|---|---|--|--------------|----|-----|-----|--------|-----------|---------------|-------|----|



|   |   |   |   |   |  |              |    |      |     |        |           |               |       |    |
|---|---|---|---|---|--|--------------|----|------|-----|--------|-----------|---------------|-------|----|
| ○ | • | • | ○ | • |  | SuperV-NX VA | HA | 10xD | VHM | TiSiN+ | Werksnorm | 1,000 - 3,000 | 51973 | 78 |
|---|---|---|---|---|--|--------------|----|------|-----|--------|-----------|---------------|-------|----|



|   |   |   |   |   |  |              |    |      |     |        |           |               |       |    |
|---|---|---|---|---|--|--------------|----|------|-----|--------|-----------|---------------|-------|----|
| ○ | • | • | ○ | • |  | SuperV-NX VA | HA | 15xD | VHM | TiSiN+ | Werksnorm | 1,000 - 3,000 | 51974 | 79 |
|---|---|---|---|---|--|--------------|----|------|-----|--------|-----------|---------------|-------|----|

### Spiralbohrer kurz



|   |   |   |   |   |  |   |      |      |     |            |           |                |       |    |
|---|---|---|---|---|--|---|------|------|-----|------------|-----------|----------------|-------|----|
| ○ | ○ | ○ | • | ○ |  | N | zyl. | ~5xD | VHM | TiAlN nano | Werksnorm | 1,000 - 12,000 | 51290 | 80 |
|---|---|---|---|---|--|---|------|------|-----|------------|-----------|----------------|-------|----|

### Spiralbohrer mit verstärktem Zylinderschaft



|   |   |   |   |   |  |   |    |      |     |       |           |                |       |    |
|---|---|---|---|---|--|---|----|------|-----|-------|-----------|----------------|-------|----|
| ○ | • | ○ | ○ | • |  | H | HA | ~3xD | VHM | AlTiN | DIN 6537K | 2,600 - 14,100 | 51146 | 81 |
|---|---|---|---|---|--|---|----|------|-----|-------|-----------|----------------|-------|----|

### Einlippenbohrer SuperT-NXL



|   |   |   |   |   |   |                    |        |  |    |     |           |                |       |    |
|---|---|---|---|---|---|--------------------|--------|--|----|-----|-----------|----------------|-------|----|
| • | ○ | • | ○ | ○ | ○ | SuperT-NXL TBM-SEH | GL 800 |  | HM | TiN | Werksnorm | 3,000 - 25,000 | 65030 | 82 |
|---|---|---|---|---|---|--------------------|--------|--|----|-----|-----------|----------------|-------|----|

| P | M | K | N | S | H | Typ | Schaftform | Bohrtiefe | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|-----------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|-----------|--------------|------------|------|-------|-------------|--------------|

### Einlippenbohrer SuperT-NXL



|   |   |   |   |   |   |                    |        |  |    |     |           |                |       |    |
|---|---|---|---|---|---|--------------------|--------|--|----|-----|-----------|----------------|-------|----|
| ● | ○ | ● | ○ | ○ | ○ | SuperT-NXL TBM-SEH | GL1200 |  | HM | TiN | Werksnorm | 3,000 - 25,000 | 65031 | 83 |
|---|---|---|---|---|---|--------------------|--------|--|----|-----|-----------|----------------|-------|----|



|   |   |   |   |   |   |                    |        |  |    |     |           |                |       |    |
|---|---|---|---|---|---|--------------------|--------|--|----|-----|-----------|----------------|-------|----|
| ● | ○ | ● | ○ | ○ | ○ | SuperT-NXL TBM-SEH | GL1600 |  | HM | TiN | Werksnorm | 4,000 - 25,000 | 65032 | 84 |
|---|---|---|---|---|---|--------------------|--------|--|----|-----|-----------|----------------|-------|----|



|   |   |   |   |   |   |                    |        |  |    |     |           |                |       |    |
|---|---|---|---|---|---|--------------------|--------|--|----|-----|-----------|----------------|-------|----|
| ● | ○ | ● | ○ | ○ | ○ | SuperT-NXL TBM-SEH | GL2000 |  | HM | TiN | Werksnorm | 4,000 - 32,000 | 65033 | 85 |
|---|---|---|---|---|---|--------------------|--------|--|----|-----|-----------|----------------|-------|----|

### Karosseriebohrer



|   |   |   |   |   |  |   |  |  |     |                |           |                |       |    |
|---|---|---|---|---|--|---|--|--|-----|----------------|-----------|----------------|-------|----|
| ● | ○ | ● | ○ | ○ |  | N |  |  | HSS | dampfbehandelt | Werksnorm | 2,000 - 10,000 | 71660 | 86 |
|---|---|---|---|---|--|---|--|--|-----|----------------|-----------|----------------|-------|----|

### Spiralbohrer extra kurz



|   |   |   |   |   |  |     |      |      |        |         |          |                |       |    |
|---|---|---|---|---|--|-----|------|------|--------|---------|----------|----------------|-------|----|
| ○ | ● | ○ | ○ | ● |  | V18 | zyl. | ~3xD | HSS-Co | AlTiZrN | DIN 1897 | 1,000 - 13,000 | 61131 | 87 |
|---|---|---|---|---|--|-----|------|------|--------|---------|----------|----------------|-------|----|

### Spiralbohrer kurz



|   |   |   |   |   |  |     |      |      |        |         |         |                |       |    |
|---|---|---|---|---|--|-----|------|------|--------|---------|---------|----------------|-------|----|
| ○ | ● | ○ | ○ | ● |  | V18 | zyl. | ~5xD | HSS-Co | AlTiZrN | DIN 338 | 1,000 - 13,000 | 61232 | 89 |
|---|---|---|---|---|--|-----|------|------|--------|---------|---------|----------------|-------|----|

### V16-Spiralbohrer



|   |   |   |   |   |   |     |      |      |     |            |         |                |       |    |
|---|---|---|---|---|---|-----|------|------|-----|------------|---------|----------------|-------|----|
| ● | ● | ● | ○ | ○ | ○ | V16 | zyl. | ~5xD | M42 | Bronze-VAP | DIN 338 | 1,000 - 13,000 | 71018 | 91 |
|---|---|---|---|---|---|-----|------|------|-----|------------|---------|----------------|-------|----|

### V16-Spiralbohrer-Sätze



|   |   |   |   |   |   |     |      |      |     |            |         |               |       |    |
|---|---|---|---|---|---|-----|------|------|-----|------------|---------|---------------|-------|----|
| ● | ● | ● | ○ | ○ | ○ | V16 | zyl. | ~5xD | M42 | Bronze-VAP | DIN 338 | 0,013 - 0,014 | 71019 | 93 |
|---|---|---|---|---|---|-----|------|------|-----|------------|---------|---------------|-------|----|

| P | M | K | N | S | H | Typ | Schaftform | Bohrtiefe | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
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|---|---|---|---|---|---|-----|------------|-----------|--------------|------------|------|-------|-------------|--------------|

## V16-Pocket-Satz (Spiralbohrer, Gewindebohrer und Senker)



|   |   |   |   |  |  |   |      |  |  |  |           |  |              |    |
|---|---|---|---|--|--|---|------|--|--|--|-----------|--|--------------|----|
| • | ○ | ○ | ○ |  |  | N | zyl. |  |  |  | Werksnorm |  | <b>71020</b> | 94 |
|---|---|---|---|--|--|---|------|--|--|--|-----------|--|--------------|----|

### Stangenbohrer, Länge 6 inches



|   |  |   |   |  |  |   |      |  |            |       |         |               |              |    |
|---|--|---|---|--|--|---|------|--|------------|-------|---------|---------------|--------------|----|
| • |  | • | • |  |  | N | zyl. |  | <b>HSS</b> | blank | NAS 907 | 1,500 - 8,500 | <b>71140</b> | 95 |
|---|--|---|---|--|--|---|------|--|------------|-------|---------|---------------|--------------|----|



|   |  |   |   |  |  |   |      |  |            |          |         |               |              |    |
|---|--|---|---|--|--|---|------|--|------------|----------|---------|---------------|--------------|----|
| • |  | • | • |  |  | N | zyl. |  | <b>HSS</b> | nitriert | NAS 907 | 1,500 - 8,000 | <b>71142</b> | 96 |
|---|--|---|---|--|--|---|------|--|------------|----------|---------|---------------|--------------|----|

### Stangenbohrer, Länge 12 inches



|   |  |   |   |  |  |   |      |  |            |       |         |               |              |    |
|---|--|---|---|--|--|---|------|--|------------|-------|---------|---------------|--------------|----|
| • |  | • | • |  |  | N | zyl. |  | <b>HSS</b> | blank | NAS 907 | 1,500 - 8,500 | <b>71141</b> | 97 |
|---|--|---|---|--|--|---|------|--|------------|-------|---------|---------------|--------------|----|



|   |  |   |   |  |  |   |      |  |            |          |         |               |              |    |
|---|--|---|---|--|--|---|------|--|------------|----------|---------|---------------|--------------|----|
| • |  | • | • |  |  | N | zyl. |  | <b>HSS</b> | nitriert | NAS 907 | 1,500 - 8,000 | <b>71143</b> | 98 |
|---|--|---|---|--|--|---|------|--|------------|----------|---------|---------------|--------------|----|

| P | M | K | N | S | H | Typ | Form | Toleranz-<br>klasse | Schneidstoff | Oberfläche | Norm | d1 | Katalog-Nr. | Progr.<br>Seite |
|---|---|---|---|---|---|-----|------|---------------------|--------------|------------|------|----|-------------|-----------------|
|---|---|---|---|---|---|-----|------|---------------------|--------------|------------|------|----|-------------|-----------------|

## Gewindebohrer für Metrische ISO-Gewinde

|  |   |   |   |   |   |                  |   |         |          |         |                       |          |              |     |
|--|---|---|---|---|---|------------------|---|---------|----------|---------|-----------------------|----------|--------------|-----|
|  | • | • | ○ | ○ | ○ | Produktiv N-X    | B | 6HX     | HSS-E    | AlTiZrN | ~DIN 371/<br>~DIN 376 | M2 - M42 | <b>53733</b> | 99  |
|  | • | • | ○ | ○ | ○ | Produktiv N-X LH | B | 6HX     | HSS-E    | AlTiZrN | DIN 371/<br>DIN 376   | M2 - M30 | <b>53734</b> | 100 |
|  | • | • | ○ | ○ | ○ | Produktiv N-X    | B | 6HX     | HSS-E-PM | AlTiZrN | DIN 371/<br>DIN 376   | M3 - M20 | <b>53735</b> | 101 |
|  | • | • | ○ | ○ | ○ | Produktiv N-X    | B | 6HX     | HSS-E-PM | AlTiZrN | DIN 371/<br>DIN 376   | M5 - M30 | <b>53736</b> | 102 |
|  | • | • | ○ | ○ | ○ | Produktiv N-X    | B | 6H+0,1  | HSS-E    | AlTiZrN | DIN 371/<br>DIN 376   | M2 - M30 | <b>53737</b> | 103 |
|  | • | • | ○ | ○ | ○ | Produktiv N-X    | B | 6GX     | HSS-E    | AlTiZrN | DIN 371/<br>DIN 376   | M2 - M30 | <b>53738</b> | 104 |
|  | • | • | ○ | ○ | ○ | Produktiv N-X    | B | 6HX     | HSS-E    | AlTiZrN | Werksnorm             | M3 - M20 | <b>53739</b> | 105 |
|  | • | • | ○ | ○ | ○ | Intensiv N-X     | C | 6HX     | HSS-E    | TiAlN-H | ~DIN 371/<br>~DIN 376 | M2 - M42 | <b>53746</b> | 106 |
|  | • | • | ○ | ○ | ○ | Intensiv N-X LH  | C | 6HX     | HSS-E    | TiAlN-H | DIN 371/<br>DIN 376   | M2 - M30 | <b>53747</b> | 107 |
|  | • | • | ○ | ○ | ○ | Intensiv N-X     | C | 6HX     | HSS-E-PM | TiAlN-H | DIN 371/<br>DIN 376   | M3 - M20 | <b>53748</b> | 108 |
|  | • | • | ○ | ○ | ○ | Intensiv N-X     | C | 6HX     | HSS-E-PM | TiAlN-H | DIN 371/<br>DIN 376   | M5 - M30 | <b>53749</b> | 109 |
|  | • | • | ○ | ○ | ○ | Intensiv N-X     | E | 6HX     | HSS-E    | TiAlN-H | DIN 371/<br>DIN 376   | M2 - M30 | <b>53760</b> | 110 |
|  | • | • | ○ | ○ | ○ | Intensiv N-X     | C | 6H+0,1  | HSS-E    | TiAlN-H | DIN 371/<br>DIN 376   | M2 - M30 | <b>53750</b> | 111 |
|  | • | • | ○ | ○ | ○ | Intensiv N-X     | C | 6GX     | HSS-E    | TiAlN-H | DIN 371/<br>DIN 376   | M2 - M30 | <b>53751</b> | 112 |
|  | • | • | ○ | ○ | ○ | Intensiv N-X     | C | 6HX     | HSS-E    | TiAlN-H | Werksnorm             | M3 - M20 | <b>53752</b> | 113 |
|  | • | ○ | ○ | ○ | ○ | Produktiv N      | B | ISO2/6H | HSS-E    | TiN     | DIN 371/<br>DIN 376   | M3 - M20 | <b>63033</b> | 114 |



| P | M | K | N | S | H | Typ | Form | Toleranz-klasse | Schneidstoff | Oberfläche | Norm | d1 | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------|-----------------|--------------|------------|------|----|-------------|--------------|
|---|---|---|---|---|---|-----|------|-----------------|--------------|------------|------|----|-------------|--------------|

## Gewindebohrer für Metrische ISO-Gewinde

|  |           |   |   |   |  |             |   |         |          |          |                     |           |              |     |
|--|-----------|---|---|---|--|-------------|---|---------|----------|----------|---------------------|-----------|--------------|-----|
|  | •         | • | ○ | ○ |  | H           | C | 6HX     | HSS-E    | TiCN     | DIN 376             | M16 - M39 | <b>53646</b> | 115 |
|  | •         | • | ○ | ○ |  | H           | C | 6HX     | HSS-E    | TiCN     | ~DIN 376            | M16 - M39 | <b>53647</b> | 116 |
|  | •         | ○ | ○ | ○ |  | Produktiv H | B | ISO2/6H | HSS-E    | TiCN     | DIN 371/<br>DIN 376 | M2 - M20  | <b>53642</b> | 117 |
|  | •         | ○ | ○ | ○ |  | Produktiv H | B | ISO2/6H | HSS-E-PM | TiCN     | DIN 371/<br>DIN 376 | M3 - M16  | <b>53640</b> | 118 |
|  | •         | ○ | ○ | ○ |  | Intensiv H  | C | ISO2/6H | HSS-E    | nitriert | DIN 371             | M3 - M10  | <b>73661</b> | 119 |
|  | •         | ○ | ○ | ○ |  | Intensiv H  | C | ISO2/6H | HSS-E    | nitriert | DIN 376             | M12 - M20 | <b>73664</b> | 120 |
|  | •         | ○ | ○ | ○ |  | Intensiv H  | C | ISO2/6H | HSS-E    | TiCN     | DIN 371/<br>DIN 376 | M2 - M20  | <b>53661</b> | 121 |
|  | ≤<br>1200 | ○ | ○ | ○ |  | Intensiv H  | C | ISO2/6H | HSS-E-PM | TiAlN    | DIN 371/<br>DIN 376 | M4 - M20  | <b>53664</b> | 122 |
|  |           |   | ○ |   |  | H           | D | 6HX     | HSS-E-PM | TiCN     | DIN 371/<br>DIN 376 | M3 - M16  | <b>53676</b> | 123 |

## Gewindebohrer für Metrische ISO-Feingewinde

|  |   |   |   |   |   |               |   |     |          |         |         |                          |              |     |
|--|---|---|---|---|---|---------------|---|-----|----------|---------|---------|--------------------------|--------------|-----|
|  | • | • | ○ | ○ | ○ | Produktiv N-X | B | 6HX | HSS-E    | AlTiZrN | DIN 374 | M3 x 0,35 - M24<br>x 2   | <b>53778</b> | 124 |
|  | • | • | ○ | ○ | ○ | Produktiv N-X | B | 6HX | HSS-E-PM | AlTiZrN | DIN 374 | M8 x 1 - M24<br>x 1,5    | <b>53789</b> | 125 |
|  | • | • | ○ | ○ | ○ | Produktiv N-X | B | 6HX | HSS-E-PM | AlTiZrN | DIN 374 | M8 x 1 - M24<br>x 1,5    | <b>53790</b> | 126 |
|  | • | • | ○ | ○ | ○ | Produktiv N-X | B | 6GX | HSS-E    | AlTiZrN | DIN 374 | M6 x 0,75 - M24<br>x 1,5 | <b>53779</b> | 127 |
|  | • | • | ○ | ○ | ○ | Intensiv N-X  | C | 6HX | HSS-E    | TiAlN-H | DIN 374 | M3 x 0,35 - M24<br>x 2   | <b>53780</b> | 128 |
|  | • | • | ○ | ○ | ○ | Intensiv N-X  | C | 6HX | HSS-E-PM | TiAlN-H | DIN 374 | M8 x 1 - M24<br>x 1,5    | <b>53791</b> | 129 |

| P | M | K | N | S | H | Typ | Form | Toleranz-<br>klasse | Schneidstoff | Oberfläche | Norm | d1 | Katalog-Nr. | Progr.<br>Seite |
|---|---|---|---|---|---|-----|------|---------------------|--------------|------------|------|----|-------------|-----------------|
|---|---|---|---|---|---|-----|------|---------------------|--------------|------------|------|----|-------------|-----------------|

### Gewindebohrer für Metrische ISO-Feingewinde

|  |              |   |         |          |          |         |                          |              |     |
|--|--------------|---|---------|----------|----------|---------|--------------------------|--------------|-----|
|  | Intensiv N-X | C | 6HX     | HSS-E-PM | TiAlN-H  | DIN 374 | M8 x 1 - M24<br>x 1,5    | <b>53792</b> | 130 |
|  | Intensiv N-X | E | 6HX     | HSS-E    | TiAlN-H  | DIN 374 | M6 x 0,75 - M24<br>x 1,5 | <b>53770</b> | 131 |
|  | Intensiv N-X | C | 6GX     | HSS-E    | TiAlN-H  | DIN 374 | M6 x 0,75 - M24<br>x 1,5 | <b>53781</b> | 132 |
|  | Intensiv H   | C | ISO2/6H | HSS-E    | nitriert | DIN 374 | M8 x 0,75 - M24<br>x 1,5 | <b>73647</b> | 133 |

### Gewindebohrer für UNC-Gewinde

|  |                  |   |     |       |         |                     |                |              |     |
|--|------------------|---|-----|-------|---------|---------------------|----------------|--------------|-----|
|  | Produktiv<br>N-X | B | 2BX | HSS-E | AlTiZrN | DIN 371/<br>DIN 376 | 2 - 56 - 1 - 8 | <b>53782</b> | 134 |
|  | Intensiv N-X     | C | 2BX | HSS-E | TiAlN-H | DIN 371/<br>DIN 376 | 2 - 56 - 1 - 8 | <b>53783</b> | 135 |

### Gewindebohrer für UNF-Gewinde

|  |                  |   |     |       |         |                         |                 |              |     |
|--|------------------|---|-----|-------|---------|-------------------------|-----------------|--------------|-----|
|  | Produktiv<br>N-X | B | 2BX | HSS-E | AlTiZrN | ~DIN 371/<br>~DIN 374   | 2 - 64 - 1 - 12 | <b>53784</b> | 136 |
|  | Intensiv N-X     | C | 2BX | HSS-E | TiAlN-H | ~DIN<br>371/~DIN<br>374 | 2 - 64 - 1 - 12 | <b>53785</b> | 137 |

### Gewindebohrer für BSW-Gewinde

|  |                  |   |  |       |         |          |           |              |     |
|--|------------------|---|--|-------|---------|----------|-----------|--------------|-----|
|  | Produktiv<br>N-X | B |  | HSS-E | AlTiZrN | ~DIN 371 | W1/8 - W1 | <b>53793</b> | 138 |
|  | Intensiv N-X     | C |  | HSS-E | TiAlN-H | ~DIN 371 | W1/8 - W1 | <b>53794</b> | 139 |

### Gewindebohrer für Whitworth-Rohrgewinde

|  |                  |   |  |       |         |          |                |              |     |
|--|------------------|---|--|-------|---------|----------|----------------|--------------|-----|
|  | Produktiv<br>N-X | B |  | HSS-E | AlTiZrN | DIN 5156 | Rp1/16 - Rp3/4 | <b>53795</b> | 140 |
|  | Intensiv N-X     | C |  | HSS-E | TiAlN-H | DIN 5156 | Rp1/16 - Rp3/4 | <b>53796</b> | 141 |

| P | M | K | N | S | H | Typ | Form | Toleranz-<br>klasse | Schneidstoff | Oberfläche | Norm | d1 | Katalog-Nr. | Progr.<br>Seite |
|---|---|---|---|---|---|-----|------|---------------------|--------------|------------|------|----|-------------|-----------------|
|---|---|---|---|---|---|-----|------|---------------------|--------------|------------|------|----|-------------|-----------------|

### Gewindebohrer für Whitworth-Rohrgewinde



|   |   |   |   |   |  |              |   |  |       |         |          |            |              |     |
|---|---|---|---|---|--|--------------|---|--|-------|---------|----------|------------|--------------|-----|
| • | • | ○ | ○ | ○ |  | Intensiv N-X | E |  | HSS-E | TiAlN-H | DIN 5156 | G1/16 - G1 | <b>53775</b> | 142 |
|---|---|---|---|---|--|--------------|---|--|-------|---------|----------|------------|--------------|-----|

### Gewindeformer für Metrische ISO-Gewinde



|   |   |   |   |   |  |             |   |         |          |      |                       |          |              |     |
|---|---|---|---|---|--|-------------|---|---------|----------|------|-----------------------|----------|--------------|-----|
| • | • | • | ○ | • |  | Durativ N-X | C | 4HX/6HX | HSS-E-PM | TiCN | ~DIN 371/<br>~DIN 376 | M1 - M20 | <b>53630</b> | 143 |
|---|---|---|---|---|--|-------------|---|---------|----------|------|-----------------------|----------|--------------|-----|



|   |   |   |   |   |  |             |   |     |          |      |                       |          |              |     |
|---|---|---|---|---|--|-------------|---|-----|----------|------|-----------------------|----------|--------------|-----|
| • | • | • | ○ | • |  | Durativ N-X | C | 6GX | HSS-E-PM | TiCN | ~DIN 371/<br>~DIN 376 | M2 - M20 | <b>53631</b> | 144 |
|---|---|---|---|---|--|-------------|---|-----|----------|------|-----------------------|----------|--------------|-----|

### Gewindeformer für Metrische ISO-Feingewinde



|   |   |   |   |   |  |             |   |     |          |      |          |                        |              |     |
|---|---|---|---|---|--|-------------|---|-----|----------|------|----------|------------------------|--------------|-----|
| • | • | • | ○ | • |  | Durativ N-X | C | 6HX | HSS-E-PM | TiCN | ~DIN 374 | M3 x 0,35 - M24<br>x 2 | <b>53632</b> | 145 |
|---|---|---|---|---|--|-------------|---|-----|----------|------|----------|------------------------|--------------|-----|

### Gewindeformer für UNC-Gewinde



|   |   |   |   |   |  |             |   |     |          |      |                       |                   |              |     |
|---|---|---|---|---|--|-------------|---|-----|----------|------|-----------------------|-------------------|--------------|-----|
| • | • | • | ○ | • |  | Durativ N-X | C | 2BX | HSS-E-PM | TiCN | ~DIN 371/<br>~DIN 376 | 4 - 40 - 3/4 - 10 | <b>53633</b> | 146 |
|---|---|---|---|---|--|-------------|---|-----|----------|------|-----------------------|-------------------|--------------|-----|

### Gewindeformer für UNF-Gewinde



|   |   |   |   |   |  |             |   |     |          |      |                       |                   |              |     |
|---|---|---|---|---|--|-------------|---|-----|----------|------|-----------------------|-------------------|--------------|-----|
| • | • | • | ○ | • |  | Durativ N-X | C | 2BX | HSS-E-PM | TiCN | ~DIN 371/<br>~DIN 374 | 4 - 48 - 3/4 - 16 | <b>53634</b> | 147 |
|---|---|---|---|---|--|-------------|---|-----|----------|------|-----------------------|-------------------|--------------|-----|

### Gewindeformer für Whitworth-Rohrgewinde



|   |   |   |   |   |  |             |   |  |          |      |          |             |              |     |
|---|---|---|---|---|--|-------------|---|--|----------|------|----------|-------------|--------------|-----|
| • | • | • | ○ | • |  | Durativ N-X | C |  | HSS-E-PM | TiCN | DIN 2189 | G1/8 - G1/2 | <b>53635</b> | 148 |
|---|---|---|---|---|--|-------------|---|--|----------|------|----------|-------------|--------------|-----|

### Kühlkanal-Gewindeformer für Metr. ISO-Gewinde



|   |   |   |   |   |  |             |   |     |          |      |                       |          |              |     |
|---|---|---|---|---|--|-------------|---|-----|----------|------|-----------------------|----------|--------------|-----|
| • | • | • | ○ | • |  | Durativ N-X | C | 6HX | HSS-E-PM | TiCN | ~DIN 371/<br>~DIN 376 | M5 - M20 | <b>53610</b> | 149 |
|---|---|---|---|---|--|-------------|---|-----|----------|------|-----------------------|----------|--------------|-----|



|   |   |   |   |   |  |             |   |     |          |      |                       |          |              |     |
|---|---|---|---|---|--|-------------|---|-----|----------|------|-----------------------|----------|--------------|-----|
| • | • | • | ○ | • |  | Durativ N-X | E | 6HX | HSS-E-PM | TiCN | ~DIN 371/<br>~DIN 376 | M2 - M20 | <b>53618</b> | 150 |
|---|---|---|---|---|--|-------------|---|-----|----------|------|-----------------------|----------|--------------|-----|

| P | M | K | N | S | H | Typ | Form | Toleranz-<br>klasse | Schneidstoff | Oberfläche | Norm | d1 | Katalog-Nr. | Progr.<br>Seite |
|---|---|---|---|---|---|-----|------|---------------------|--------------|------------|------|----|-------------|-----------------|
|---|---|---|---|---|---|-----|------|---------------------|--------------|------------|------|----|-------------|-----------------|

### Kühlkanal-Gewindeformer für Metr. ISO-Feingewinde

|  |  |  |  |  |  |             |   |     |          |      |          |                       |       |     |
|--|--|--|--|--|--|-------------|---|-----|----------|------|----------|-----------------------|-------|-----|
|  |  |  |  |  |  | Durativ N-X | C | 6HX | HSS-E-PM | TiCN | ~DIN 374 | M8 x 1 - M20<br>x 1,5 | 53612 | 151 |
|  |  |  |  |  |  | Durativ N-X | E | 6HX | HSS-E-PM | TiCN | ~DIN 374 | M8 x 1 - M20<br>x 1,5 | 53619 | 152 |

### Bohrgewindefräser für Metrische ISO-Gewinde

|  |  |  |  |  |  |      |        |  |     |        |           |          |       |     |
|--|--|--|--|--|--|------|--------|--|-----|--------|-----------|----------|-------|-----|
|  |  |  |  |  |  | ≤ 66 | TMD-NX |  | VHM | TiSiN+ | Werksnorm | M2 - M16 | 53948 | 153 |
|--|--|--|--|--|--|------|--------|--|-----|--------|-----------|----------|-------|-----|

### Bohrgewindefräser für UNC-/UNF-Gewinde

|  |  |  |  |  |  |      |        |  |     |        |           |                   |       |     |
|--|--|--|--|--|--|------|--------|--|-----|--------|-----------|-------------------|-------|-----|
|  |  |  |  |  |  | ≤ 66 | TMD-NX |  | VHM | TiSiN+ | Werksnorm | 1 - 72 - 1/2 - 20 | 53949 | 154 |
|--|--|--|--|--|--|------|--------|--|-----|--------|-----------|-------------------|-------|-----|

### Bohrgewindefräser für Rohrgewinde

|  |  |  |  |  |  |      |        |  |     |        |           |  |       |     |
|--|--|--|--|--|--|------|--------|--|-----|--------|-----------|--|-------|-----|
|  |  |  |  |  |  | ≤ 66 | TMD-NX |  | VHM | TiSiN+ | Werksnorm |  | 53950 | 155 |
|--|--|--|--|--|--|------|--------|--|-----|--------|-----------|--|-------|-----|

### Gewindefräser mit Senkfase für Metrische ISO-Gewinde

|  |  |  |  |  |  |  |           |  |     |       |           |                |       |     |
|--|--|--|--|--|--|--|-----------|--|-----|-------|-----------|----------------|-------|-----|
|  |  |  |  |  |  |  | TMC-NX SP |  | VHM | AlCrN | Werksnorm | M3 - M16 x 1,5 | 53890 | 156 |
|--|--|--|--|--|--|--|-----------|--|-----|-------|-----------|----------------|-------|-----|

### Gewindefräser ohne Senkfase für Metr. ISO-Gewinde

|  |  |  |  |  |  |      |        |  |     |         |           |             |       |     |
|--|--|--|--|--|--|------|--------|--|-----|---------|-----------|-------------|-------|-----|
|  |  |  |  |  |  | ≤ 55 | TM SP  |  | VHM | AlTiZrN | Werksnorm | M6 - M20    | 53860 | 157 |
|  |  |  |  |  |  | ≤ 55 | TMU SP |  | VHM | AlTiZrN | Werksnorm | > 10 - > 30 | 73830 | 158 |

### Gewindefräser ohne Senkfase für Whitworth-Rohrgewinde

|  |  |  |  |  |  |      |       |  |     |         |           |             |       |     |
|--|--|--|--|--|--|------|-------|--|-----|---------|-----------|-------------|-------|-----|
|  |  |  |  |  |  | ≤ 55 | TM SP |  | VHM | AlTiZrN | Werksnorm | G1/8 - G3/8 | 53831 | 159 |
|--|--|--|--|--|--|------|-------|--|-----|---------|-----------|-------------|-------|-----|

| P | M | K | N | S | H | Typ | Form | Toleranz-<br>klasse | Schneidstoff | Oberfläche | Norm | d1 | Katalog-Nr. | Progr.<br>Seite |
|---|---|---|---|---|---|-----|------|---------------------|--------------|------------|------|----|-------------|-----------------|
|---|---|---|---|---|---|-----|------|---------------------|--------------|------------|------|----|-------------|-----------------|

### Mehrbereichsgewindefräser für Whitworth-Rohrgewinde



|   |   |   |   |   |   |      |        |  |            |         |           |             |              |     |
|---|---|---|---|---|---|------|--------|--|------------|---------|-----------|-------------|--------------|-----|
| • | • | • | • | • | • | ≤ 55 | TMU SP |  | <b>VHM</b> | AlTiZrN | Werksnorm | ≥ 1/4 - ≥ 1 | <b>53832</b> | 160 |
|---|---|---|---|---|---|------|--------|--|------------|---------|-----------|-------------|--------------|-----|

### Mikrogewindefräser für Metrische ISO-Gewinde



|   |   |   |   |   |   |      |           |  |            |         |           |            |              |     |
|---|---|---|---|---|---|------|-----------|--|------------|---------|-----------|------------|--------------|-----|
| • | • | • | • | • | • | ≤ 55 | MTM-NX SP |  | <b>VHM</b> | AlTiZrN | Werksnorm | M1,6 - M20 | <b>53892</b> | 161 |
|---|---|---|---|---|---|------|-----------|--|------------|---------|-----------|------------|--------------|-----|



|   |   |   |   |   |   |  |       |  |            |         |           |            |              |     |
|---|---|---|---|---|---|--|-------|--|------------|---------|-----------|------------|--------------|-----|
| • | • | • | • | • | • |  | TM SP |  | <b>VHM</b> | AlTiZrN | Werksnorm | M1,6 - M16 | <b>53840</b> | 162 |
|---|---|---|---|---|---|--|-------|--|------------|---------|-----------|------------|--------------|-----|



|   |   |   |   |   |   |   |   |       |            |        |           |          |              |     |
|---|---|---|---|---|---|---|---|-------|------------|--------|-----------|----------|--------------|-----|
| • | • | • | • | • | • | ○ | • | TM SP | <b>VHM</b> | TiSiN+ | Werksnorm | M2 - M12 | <b>53850</b> | 163 |
|---|---|---|---|---|---|---|---|-------|------------|--------|-----------|----------|--------------|-----|

### Mikrogewindefräser für Whitworth-Rohrgewinde



|   |   |   |   |   |   |  |       |  |            |         |           |           |              |     |
|---|---|---|---|---|---|--|-------|--|------------|---------|-----------|-----------|--------------|-----|
| • | • | • | • | • | • |  | TM SP |  | <b>VHM</b> | AlTiZrN | Werksnorm | G1/8 - G2 | <b>53841</b> | 164 |
|---|---|---|---|---|---|--|-------|--|------------|---------|-----------|-----------|--------------|-----|

| P | M | K | N | S | H | Typ | Schaftform | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|

### SuperF-UT-Fräser Z



|   |   |   |   |   |   |             |    |     |        |           |                |       |     |
|---|---|---|---|---|---|-------------|----|-----|--------|-----------|----------------|-------|-----|
| • | • | • | • | • | • | SuperF-UT Z | HB | VHM | AlTiN+ | Werksnorm | 3,000 - 20,000 | 54577 | 165 |
|---|---|---|---|---|---|-------------|----|-----|--------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser ZS



|   |   |   |   |   |   |              |    |     |        |           |                |       |     |
|---|---|---|---|---|---|--------------|----|-----|--------|-----------|----------------|-------|-----|
| • | • | • | • | • | • | SuperF-UT ZS | HB | VHM | AlTiN+ | Werksnorm | 3,000 - 20,000 | 54578 | 166 |
|---|---|---|---|---|---|--------------|----|-----|--------|-----------|----------------|-------|-----|



|   |   |   |   |   |   |                |    |     |        |           |                |       |     |
|---|---|---|---|---|---|----------------|----|-----|--------|-----------|----------------|-------|-----|
| • | • | • | ○ | • | • | SuperF-UT ZS-r | HB | VHM | AlTiN+ | Werksnorm | 6,000 - 20,000 | 54555 | 167 |
|---|---|---|---|---|---|----------------|----|-----|--------|-----------|----------------|-------|-----|



|   |   |   |   |   |   |                |    |     |        |           |                |       |     |
|---|---|---|---|---|---|----------------|----|-----|--------|-----------|----------------|-------|-----|
| • | • | • | ○ | • | • | SuperF-UT ZS-7 | HB | VHM | AlTiN+ | Werksnorm | 6,000 - 20,000 | 54581 | 168 |
|---|---|---|---|---|---|----------------|----|-----|--------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser N-5



|   |   |   |   |   |   |               |    |     |       |           |                |       |     |
|---|---|---|---|---|---|---------------|----|-----|-------|-----------|----------------|-------|-----|
| • | • | • | • | • | • | SuperF-UT N-5 | HA | VHM | TiAlN | Werksnorm | 4,000 - 20,000 | 54583 | 169 |
|---|---|---|---|---|---|---------------|----|-----|-------|-----------|----------------|-------|-----|



|   |   |   |   |   |   |               |    |     |       |           |                |       |     |
|---|---|---|---|---|---|---------------|----|-----|-------|-----------|----------------|-------|-----|
| • | • | • | • | • | • | SuperF-UT N-5 | HB | VHM | TiAlN | Werksnorm | 4,000 - 20,000 | 54584 | 170 |
|---|---|---|---|---|---|---------------|----|-----|-------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser FS<sup>2</sup>



|   |   |   |   |   |   |                           |    |     |         |           |                |       |     |
|---|---|---|---|---|---|---------------------------|----|-----|---------|-----------|----------------|-------|-----|
| ○ | • | ○ | • | • | ○ | SuperF-UT FS <sup>2</sup> | HB | VHM | TiAlZrN | Werksnorm | 8,000 - 20,000 | 64560 | 171 |
|---|---|---|---|---|---|---------------------------|----|-----|---------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser NX-3



|   |   |   |   |   |   |                |    |     |         |           |                |       |     |
|---|---|---|---|---|---|----------------|----|-----|---------|-----------|----------------|-------|-----|
| • | • | • | • | • | • | SuperF-UT NX-3 | HA | VHM | TiAlSiN | Werksnorm | 3,000 - 20,000 | 54586 | 172 |
|---|---|---|---|---|---|----------------|----|-----|---------|-----------|----------------|-------|-----|



|   |   |   |   |   |   |                |    |     |         |           |                |       |     |
|---|---|---|---|---|---|----------------|----|-----|---------|-----------|----------------|-------|-----|
| • | • | • | • | • | • | SuperF-UT NX-3 | HB | VHM | TiAlSiN | Werksnorm | 3,000 - 20,000 | 54587 | 173 |
|---|---|---|---|---|---|----------------|----|-----|---------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser NX



|   |   |   |   |   |   |              |    |     |         |           |                |       |     |
|---|---|---|---|---|---|--------------|----|-----|---------|-----------|----------------|-------|-----|
| • | • | • | • | • | • | SuperF-UT NX | HB | VHM | TiAlSiN | DIN 6527K | 3,000 - 20,000 | 54589 | 174 |
|---|---|---|---|---|---|--------------|----|-----|---------|-----------|----------------|-------|-----|

| P | M | K | N | S | H | Typ | Schaftform | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|

### SuperF-UT-Fräser NX



|   |   |   |   |   |  |                 |    |     |         |           |                |       |     |
|---|---|---|---|---|--|-----------------|----|-----|---------|-----------|----------------|-------|-----|
| • | • | • | • | • |  | SuperF-UT NX-IK | HB | VHM | TiAlSiN | DIN 6527L | 6,000 - 25,000 | 54585 | 175 |
|---|---|---|---|---|--|-----------------|----|-----|---------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser NX Micro



|   |   |   |   |   |   |                    |      |     |        |           |               |       |     |
|---|---|---|---|---|---|--------------------|------|-----|--------|-----------|---------------|-------|-----|
| • | • | • | • | • | ○ | SuperF-UT NX Micro | zyl. | VHM | TiSiN+ | Werksnorm | 0,500 - 3,000 | 54594 | 176 |
|---|---|---|---|---|---|--------------------|------|-----|--------|-----------|---------------|-------|-----|



|   |   |   |   |   |   |                    |      |     |        |           |               |       |     |
|---|---|---|---|---|---|--------------------|------|-----|--------|-----------|---------------|-------|-----|
| • | • | • | • | • | ○ | SuperF-UT NX Micro | zyl. | VHM | TiSiN+ | Werksnorm | 0,500 - 3,000 | 54595 | 177 |
|---|---|---|---|---|---|--------------------|------|-----|--------|-----------|---------------|-------|-----|

### SuperF-UT-Fräser Ti



|   |   |   |   |   |  |              |    |     |     |           |                |       |     |
|---|---|---|---|---|--|--------------|----|-----|-----|-----------|----------------|-------|-----|
| • | • | • | • | • |  | SuperF-UT Ti | HA | VHM | ZrN | DIN 6527L | 6,000 - 20,000 | 54560 | 178 |
|---|---|---|---|---|--|--------------|----|-----|-----|-----------|----------------|-------|-----|



|   |   |   |   |   |  |              |    |     |     |           |                |       |     |
|---|---|---|---|---|--|--------------|----|-----|-----|-----------|----------------|-------|-----|
| • | • | • | • | • |  | SuperF-UT Ti | HB | VHM | ZrN | DIN 6527L | 6,000 - 20,000 | 54561 | 179 |
|---|---|---|---|---|--|--------------|----|-----|-----|-----------|----------------|-------|-----|

### SuperF-UT-Fräser H-X



|   |   |   |   |   |  |               |    |     |         |           |                |       |     |
|---|---|---|---|---|--|---------------|----|-----|---------|-----------|----------------|-------|-----|
| ○ | • | • | • | • |  | SuperF-UT H-X | HA | VHM | TiAlSiN | DIN 6527L | 3,000 - 20,000 | 54340 | 180 |
|---|---|---|---|---|--|---------------|----|-----|---------|-----------|----------------|-------|-----|



|   |   |   |   |   |  |               |    |     |         |           |                |       |     |
|---|---|---|---|---|--|---------------|----|-----|---------|-----------|----------------|-------|-----|
| ○ | • | • | • | • |  | SuperF-UT H-X | HB | VHM | TiAlSiN | DIN 6527L | 3,000 - 20,000 | 54341 | 181 |
|---|---|---|---|---|--|---------------|----|-----|---------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser S



|   |   |   |   |   |  |             |    |     |            |           |                |       |     |
|---|---|---|---|---|--|-------------|----|-----|------------|-----------|----------------|-------|-----|
| ○ | ○ | • | • | • |  | SuperF-UT S | HA | VHM | AlTiN nano | DIN 6527L | 3,000 - 20,000 | 54556 | 182 |
|---|---|---|---|---|--|-------------|----|-----|------------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser N<sup>2</sup>



|   |   |   |   |   |   |                          |    |     |         |           |                |       |     |
|---|---|---|---|---|---|--------------------------|----|-----|---------|-----------|----------------|-------|-----|
| • | • | • | • | • | ○ | SuperF-UT N <sup>2</sup> | HB | VHM | TiAlZrN | DIN 6527L | 3,000 - 25,000 | 64552 | 183 |
|---|---|---|---|---|---|--------------------------|----|-----|---------|-----------|----------------|-------|-----|

| P | M | K | N | S | H | Typ | Schaftform | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|

### SuperF-UT-Fräser NL



|   |   |   |   |   |   |              |    |     |       |           |                |       |     |
|---|---|---|---|---|---|--------------|----|-----|-------|-----------|----------------|-------|-----|
| • | ○ | • | ○ | ○ | ○ | SuperF-UT NL | HB | VHM | TiAlN | Werksnorm | 6,000 - 25,000 | 54553 | 184 |
|---|---|---|---|---|---|--------------|----|-----|-------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser N-r



|   |   |   |   |   |   |               |    |     |       |           |                |       |     |
|---|---|---|---|---|---|---------------|----|-----|-------|-----------|----------------|-------|-----|
| • | ○ | • | • | ○ | ○ | SuperF-UT N-r | HB | VHM | AlCrN | DIN 6527L | 3,000 - 20,000 | 54550 | 185 |
|---|---|---|---|---|---|---------------|----|-----|-------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser U



|   |   |   |   |   |   |             |    |     |       |           |                |       |     |
|---|---|---|---|---|---|-------------|----|-----|-------|-----------|----------------|-------|-----|
| • | • | • | • | • | ○ | SuperF-UT U | HA | VHM | AlCrN | Werksnorm | 1,000 - 20,000 | 54500 | 187 |
|---|---|---|---|---|---|-------------|----|-----|-------|-----------|----------------|-------|-----|



|   |   |   |   |   |   |             |    |     |       |           |                |       |     |
|---|---|---|---|---|---|-------------|----|-----|-------|-----------|----------------|-------|-----|
| • | • | • | • | • | ○ | SuperF-UT U | HB | VHM | AlCrN | Werksnorm | 4,000 - 20,000 | 54501 | 188 |
|---|---|---|---|---|---|-------------|----|-----|-------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser UL



|   |   |   |   |   |   |              |    |     |       |           |                |       |     |
|---|---|---|---|---|---|--------------|----|-----|-------|-----------|----------------|-------|-----|
| • | • | • | • | • | ○ | SuperF-UT UL | HA | VHM | AlCrN | Werksnorm | 1,000 - 20,000 | 54502 | 189 |
|---|---|---|---|---|---|--------------|----|-----|-------|-----------|----------------|-------|-----|



|   |   |   |   |   |   |              |    |     |       |           |                |       |     |
|---|---|---|---|---|---|--------------|----|-----|-------|-----------|----------------|-------|-----|
| • | • | • | • | • | ○ | SuperF-UT UL | HB | VHM | AlCrN | Werksnorm | 4,000 - 20,000 | 54503 | 190 |
|---|---|---|---|---|---|--------------|----|-----|-------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser VA-X<sup>2</sup>



|   |   |   |   |   |   |                             |    |     |         |           |                |       |     |
|---|---|---|---|---|---|-----------------------------|----|-----|---------|-----------|----------------|-------|-----|
| ○ | • | • | ○ | • | ○ | SuperF-UT VA-X <sup>2</sup> | HB | VHM | TiAlZrN | DIN 6527L | 3,000 - 25,000 | 64553 | 191 |
|---|---|---|---|---|---|-----------------------------|----|-----|---------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser VA-r



|   |   |   |   |   |   |                |    |     |         |           |                |       |     |
|---|---|---|---|---|---|----------------|----|-----|---------|-----------|----------------|-------|-----|
| ○ | • | • | ○ | • | ○ | SuperF-UT VA-r | HB | VHM | TiAlSiN | DIN 6527L | 3,000 - 20,000 | 54542 | 192 |
|---|---|---|---|---|---|----------------|----|-----|---------|-----------|----------------|-------|-----|

### SuperF-UT-Fräser Al



|   |   |   |   |   |   |                |    |     |       |           |                |       |     |
|---|---|---|---|---|---|----------------|----|-----|-------|-----------|----------------|-------|-----|
| • | • | • | • | • | ○ | SuperF-UT Al-L | HA | VHM | blank | Werksnorm | 5,000 - 20,000 | 74557 | 194 |
|---|---|---|---|---|---|----------------|----|-----|-------|-----------|----------------|-------|-----|



| P | M | K | N | S | H | Typ | Schaftform | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|

### SuperF-UT-Fräser Al

|  |  |  |  |  |  |                 |    |     |       |           |                |       |     |
|--|--|--|--|--|--|-----------------|----|-----|-------|-----------|----------------|-------|-----|
|  |  |  |  |  |  | SuperF-UT Al-L  | HB | VHM | blank | Werksnorm | 5,000 - 20,000 | 74556 | 195 |
|  |  |  |  |  |  | SuperF-UT Al-XL | HA | VHM | blank | Werksnorm | 6,000 - 20,000 | 74559 | 196 |
|  |  |  |  |  |  | SuperF-UT Al-XL | HB | VHM | blank | Werksnorm | 6,000 - 20,000 | 74558 | 197 |
|  |  |  |  |  |  | SuperF-UT Al-r  | HA | VHM | blank | Werksnorm | 6,000 - 25,000 | 74563 | 198 |
|  |  |  |  |  |  | SuperF-UT Al-r  | HB | VHM | blank | Werksnorm | 6,000 - 25,000 | 74562 | 199 |
|  |  |  |  |  |  | SuperF-UT Al-X  | HA | VHM | DLC   | Werksnorm | 5,000 - 20,000 | 54593 | 200 |
|  |  |  |  |  |  | SuperF-UT Al-X  | HB | VHM | DLC   | Werksnorm | 5,000 - 20,000 | 54592 | 201 |

### SuperF-UT-Fräser Z, Sätze



|  |  |  |  |  |  |             |    |     |        |           |  |       |     |
|--|--|--|--|--|--|-------------|----|-----|--------|-----------|--|-------|-----|
|  |  |  |  |  |  | SuperF-UT Z | HB | VHM | AlTiN+ | Werksnorm |  | 78882 | 202 |
|--|--|--|--|--|--|-------------|----|-----|--------|-----------|--|-------|-----|

### SuperF-UT-Fräser N<sup>2</sup>, Sätze



|  |  |  |  |  |  |                          |    |     |         |           |  |       |     |
|--|--|--|--|--|--|--------------------------|----|-----|---------|-----------|--|-------|-----|
|  |  |  |  |  |  | SuperF-UT N <sup>2</sup> | HB | VHM | TiAlZrN | DIN 6527L |  | 78883 | 203 |
|--|--|--|--|--|--|--------------------------|----|-----|---------|-----------|--|-------|-----|

| P | M | K | N | S | H | Typ | Schaftform | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|

### Kopierfräser mit Vollradius H B2

|  |   |   |   |   |   |      |    |     |                |           |                |       |     |
|--|---|---|---|---|---|------|----|-----|----------------|-----------|----------------|-------|-----|
|  | ○ | ● | ● | ○ | ● | H B2 | HA | VHM | TiSiN+/TiAlSiN | Werksnorm | 0,500 - 12,000 | 54325 | 204 |
|  | ○ | ● | ● | ○ | ● | H B2 | HA | VHM | TiSiN+/TiAlSiN | Werksnorm | 0,500 - 12,000 | 54326 | 205 |

### Kopierfräser mit Vollradius H B4

|  |   |   |   |   |   |      |    |     |                |           |                |       |     |
|--|---|---|---|---|---|------|----|-----|----------------|-----------|----------------|-------|-----|
|  | ○ | ● | ● | ○ | ● | H B4 | HA | VHM | TiSiN+/TiAlSiN | Werksnorm | 1,000 - 12,000 | 54345 | 206 |
|  | ○ | ● | ● | ○ | ● | H B4 | HA | VHM | TiSiN+/TiAlSiN | Werksnorm | 1,000 - 12,000 | 54346 | 207 |

### Kopierfräser mit Vollradius S B2

|  |   |   |   |   |   |      |    |     |                |           |                |       |     |
|--|---|---|---|---|---|------|----|-----|----------------|-----------|----------------|-------|-----|
|  | ● | ● | ● | ○ | ● | S B2 | HA | VHM | TiSiN+/TiAlSiN | Werksnorm | 0,500 - 12,000 | 54425 | 208 |
|  | ● | ● | ● | ○ | ● | S B2 | HA | VHM | TiSiN+/TiAlSiN | Werksnorm | 0,500 - 12,000 | 54426 | 209 |

### Kopierfräser mit Vollradius S B4

|  |   |   |   |   |   |      |    |     |                |           |                |       |     |
|--|---|---|---|---|---|------|----|-----|----------------|-----------|----------------|-------|-----|
|  | ● | ● | ● | ○ | ● | S B4 | HA | VHM | TiSiN+/TiAlSiN | Werksnorm | 1,000 - 12,000 | 54445 | 210 |
|  | ● | ● | ● | ○ | ● | S B4 | HA | VHM | TiSiN+/TiAlSiN | Werksnorm | 1,000 - 12,000 | 54446 | 211 |

### Kopierfräser mit Torusanschiff H T4

|  |   |   |   |   |   |     |    |     |        |           |                |       |     |
|--|---|---|---|---|---|-----|----|-----|--------|-----------|----------------|-------|-----|
|  | ○ | ● | ● | ○ | ● | HT4 | HA | VHM | TiSiN+ | Werksnorm | 1,000 - 12,000 | 54347 | 212 |
|  | ○ | ● | ● | ○ | ● | HT4 | HA | VHM | TiSiN+ | Werksnorm | 1,000 - 12,000 | 54348 | 213 |

| P | M | K | N | S | H | Typ | Schaftform | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|

### Kopierfräser mit Torusanschliiff S T2

|  |   |   |   |   |   |   |      |    |     |                |           |                |       |     |
|--|---|---|---|---|---|---|------|----|-----|----------------|-----------|----------------|-------|-----|
|  | • | • | • | ○ | • | • | S T2 | HA | VHM | TiSiN+/TiAlSiN | Werksnorm | 0,500 - 12,000 | 54427 | 214 |
|  | • | • | • | ○ | • | • | S T2 | HA | VHM | TiSiN+/TiAlSiN | Werksnorm | 0,500 - 12,000 | 54428 | 215 |

### Kopierfräser mit Torusanschliiff S T4

|  |   |   |   |   |   |   |      |    |     |                |           |                |       |     |
|--|---|---|---|---|---|---|------|----|-----|----------------|-----------|----------------|-------|-----|
|  | • | • | • | ○ | • | • | S T4 | HA | VHM | TiSiN+/TiAlSiN | Werksnorm | 1,000 - 12,000 | 54447 | 216 |
|  | • | • | • | ○ | • | • | S T4 | HA | VHM | TiSiN+/TiAlSiN | Werksnorm | 1,000 - 12,000 | 54448 | 217 |

### Hartfräser, mehrschneidig H FS6

|  |   |   |   |   |   |   |       |    |     |         |           |                |       |     |
|--|---|---|---|---|---|---|-------|----|-----|---------|-----------|----------------|-------|-----|
|  | ○ | • | • | • | • | • | H FS6 | HA | VHM | TiAlSiN | Werksnorm | 3,000 - 20,000 | 54360 | 218 |
|  | ○ | • | • | • | • | • | H FS6 | HA | VHM | TiAlSiN | Werksnorm | 3,000 - 20,000 | 54361 | 219 |
|  | ○ | • | • | • | • | • | H FS6 | HA | VHM | TiAlSiN | Werksnorm | 3,000 - 16,000 | 54362 | 220 |

### Kopierfräser mit Torusanschliiff

|  |   |   |   |   |   |   |    |    |     |         |           |                |       |     |
|--|---|---|---|---|---|---|----|----|-----|---------|-----------|----------------|-------|-----|
|  | ○ | • | • | • | • | • | H  | HA | VHM | TiAlSiN | Werksnorm | 1,000 - 16,000 | 54304 | 221 |
|  | ○ | • | • | • | • | • | H  | HA | VHM | TiAlSiN | Werksnorm | 1,000 - 16,000 | 54305 | 222 |
|  | • | • | • | ○ | • | ○ | NH | HA | VHM | TiAlSiN | Werksnorm | 0,500 - 12,000 | 54302 | 223 |

### Entgratfräser 90°

|  |   |   |   |   |   |   |            |    |     |         |           |                |       |     |
|--|---|---|---|---|---|---|------------|----|-----|---------|-----------|----------------|-------|-----|
|  | • | • | • | • | • | ○ | SuperAF-90 | HB | VHM | TiAlZrN | Werksnorm | 6,000 - 20,000 | 53399 | 224 |
|--|---|---|---|---|---|---|------------|----|-----|---------|-----------|----------------|-------|-----|

| P | M | K | N | S | H | Typ | Schaftform | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|

### Entgratfräser 90°, spiralisiert



|   |   |   |   |   |  |              |    |     |         |           |                |       |     |
|---|---|---|---|---|--|--------------|----|-----|---------|-----------|----------------|-------|-----|
| • | • | ○ | • | • |  | Super AFX-90 | HA | VHM | TiAlZrN | Werksnorm | 6,000 - 20,000 | 63399 | 225 |
|---|---|---|---|---|--|--------------|----|-----|---------|-----------|----------------|-------|-----|

| P | M | K | N | S | H | Typ | Schaftform | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|

### VHM-Hochleistungs-Kopfreibahlen

|  |  |              |    |            |            |           |                 |              |     |
|--|--|--------------|----|------------|------------|-----------|-----------------|--------------|-----|
|  |  | SuperR-HS-KS | HA | <b>VHM</b> | AlTiN nano | Werksnorm | 14,000 - 42,000 | <b>72874</b> | 226 |
|  |  | SuperR-HS-KD | HA | <b>VHM</b> | AlTiN nano | Werksnorm | 14,000 - 42,000 | <b>72875</b> | 227 |
|  |  | SuperR-HS-S  | HA | <b>VHM</b> | DLC        | Werksnorm | 4,000 - 20,000  | <b>72876</b> | 228 |
|  |  | SuperR-HS-D  | HA | <b>VHM</b> | DLC        | Werksnorm | 4,000 - 20,000  | <b>72877</b> | 229 |

### VHM NC-Maschinen-Reibahlen

|  |  |  |    |            |            |           |                |              |     |
|--|--|--|----|------------|------------|-----------|----------------|--------------|-----|
|  |  |  | HA | <b>VHM</b> | AlTiN nano | Werksnorm | 0,980 - 12,050 | <b>52920</b> | 230 |
|  |  |  | HA | <b>VHM</b> | AlTiN nano | Werksnorm | 3,000 - 20,000 | <b>52930</b> | 232 |

### Schrumpfverlängerungen

|  |  |  |     |  |       |           |  |              |     |
|--|--|--|-----|--|-------|-----------|--|--------------|-----|
|  |  |  | ~HA |  | blank | Werksnorm |  | <b>78719</b> | 233 |
|--|--|--|-----|--|-------|-----------|--|--------------|-----|

### Kegelsenker 90° V-NX

|  |  |      |           |             |       |         |                |              |     |
|--|--|------|-----------|-------------|-------|---------|----------------|--------------|-----|
|  |  | V-NX | zyl.      | <b>HSCO</b> | AlTiN | DIN 335 | 6,300 - 40,000 | <b>52348</b> | 234 |
|  |  | V-NX | 3-Flächen | <b>HSCO</b> | AlTiN | DIN 335 | 6,300 - 40,000 | <b>52350</b> | 235 |

| P | M | K | N | S | H | Typ | Schaftform | Schneidstoff | Oberfläche | Norm | d1/mm | Katalog-Nr. | Progr. Seite |
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|
|---|---|---|---|---|---|-----|------------|--------------|------------|------|-------|-------------|--------------|

## Kegelsenkersätze 90° V-NX



|   |   |   |   |   |  |      |      |             |       |         |  |              |     |
|---|---|---|---|---|--|------|------|-------------|-------|---------|--|--------------|-----|
| • | • | • | ○ | ○ |  | V-NX | zyl. | <b>HSCO</b> | AlTiN | DIN 335 |  | <b>52398</b> | 236 |
|---|---|---|---|---|--|------|------|-------------|-------|---------|--|--------------|-----|



|   |   |   |   |   |  |      |           |             |       |         |  |              |     |
|---|---|---|---|---|--|------|-----------|-------------|-------|---------|--|--------------|-----|
| • | • | • | ○ | ○ |  | V-NX | 3-Flächen | <b>HSCO</b> | AlTiN | DIN 335 |  | <b>52399</b> | 237 |
|---|---|---|---|---|--|------|-----------|-------------|-------|---------|--|--------------|-----|

## SuperV-Bohrer

### SuperV-Bohrer ohne Innenkühlung



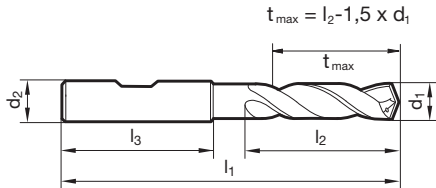
Katalog-Nr. 51673



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● |   | ● | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 240

- Flächenanschliff
- Hauptschneidenform gerade
- optimierte Schneidengeometrie



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 62,000   | 20,000   | 36,000   | 6,300    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,100    | 6,000    | 62,000   | 20,000   | 36,000   | 6,350    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,170    | 6,000    | 62,000   | 20,000   | 36,000   | 6,400    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,200    | 6,000    | 62,000   | 20,000   | 36,000   | 6,500    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,250    | 6,000    | 62,000   | 20,000   | 36,000   | 6,530    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,300    | 6,000    | 62,000   | 20,000   | 36,000   | 6,600    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,400    | 6,000    | 62,000   | 20,000   | 36,000   | 6,700    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,500    | 6,000    | 62,000   | 20,000   | 36,000   | 6,750    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,570    | 6,000    | 62,000   | 20,000   | 36,000   | 6,800    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,600    | 6,000    | 62,000   | 20,000   | 36,000   | 6,900    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,700    | 6,000    | 62,000   | 20,000   | 36,000   | 7,000    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,800    | 6,000    | 66,000   | 24,000   | 36,000   | 7,100    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,900    | 6,000    | 66,000   | 24,000   | 36,000   | 7,140    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,970    | 6,000    | 66,000   | 24,000   | 36,000   | 7,200    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,000    | 6,000    | 66,000   | 24,000   | 36,000   | 7,300    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,040    | 6,000    | 66,000   | 24,000   | 36,000   | 7,400    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,100    | 6,000    | 66,000   | 24,000   | 36,000   | 7,500    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,200    | 6,000    | 66,000   | 24,000   | 36,000   | 7,540    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,300    | 6,000    | 66,000   | 24,000   | 36,000   | 7,600    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,370    | 6,000    | 66,000   | 24,000   | 36,000   | 7,700    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,400    | 6,000    | 66,000   | 24,000   | 36,000   | 7,800    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,500    | 6,000    | 66,000   | 24,000   | 36,000   | 7,900    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,600    | 6,000    | 66,000   | 24,000   | 36,000   | 7,940    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,650    | 6,000    | 66,000   | 24,000   | 36,000   | 8,000    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,700    | 6,000    | 66,000   | 24,000   | 36,000   | 8,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,760    | 6,000    | 66,000   | 28,000   | 36,000   | 8,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,800    | 6,000    | 66,000   | 28,000   | 36,000   | 8,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,900    | 6,000    | 66,000   | 28,000   | 36,000   | 8,330    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,000    | 6,000    | 66,000   | 28,000   | 36,000   | 8,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,100    | 6,000    | 66,000   | 28,000   | 36,000   | 8,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,110    | 6,000    | 66,000   | 28,000   | 36,000   | 8,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,160    | 6,000    | 66,000   | 28,000   | 36,000   | 8,700    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,200    | 6,000    | 66,000   | 28,000   | 36,000   | 8,730    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,250    | 6,000    | 66,000   | 28,000   | 36,000   | 8,800    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,300    | 6,000    | 66,000   | 28,000   | 36,000   | 8,900    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,400    | 6,000    | 66,000   | 28,000   | 36,000   | 9,000    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,410    | 6,000    | 66,000   | 28,000   | 36,000   | 9,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,500    | 6,000    | 66,000   | 28,000   | 36,000   | 9,130    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,550    | 6,000    | 66,000   | 28,000   | 36,000   | 9,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,560    | 6,000    | 66,000   | 28,000   | 36,000   | 9,250    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,600    | 6,000    | 66,000   | 28,000   | 36,000   | 9,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,700    | 6,000    | 66,000   | 28,000   | 36,000   | 9,340    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,800    | 6,000    | 66,000   | 28,000   | 36,000   | 9,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,900    | 6,000    | 66,000   | 28,000   | 36,000   | 9,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,950    | 6,000    | 66,000   | 28,000   | 36,000   | 9,520    | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,000    | 6,000    | 66,000   | 28,000   | 36,000   | 9,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,100    | 8,000    | 79,000   | 34,000   | 36,000   | 9,700    | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,200    | 8,000    | 79,000   | 34,000   | 36,000   | 9,800    | 10,000   | 89,000   | 47,000   | 40,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 9,900    | 10,000   | 89,000   | 47,000   | 40,000   | 14,000   | 14,000   | 107,000  | 60,000   | 45,000   |
| 9,920    | 10,000   | 89,000   | 47,000   | 40,000   | 14,100   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,000   | 10,000   | 89,000   | 47,000   | 40,000   | 14,200   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,100   | 12,000   | 102,000  | 55,000   | 45,000   | 14,290   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,200   | 12,000   | 102,000  | 55,000   | 45,000   | 14,300   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,300   | 12,000   | 102,000  | 55,000   | 45,000   | 14,400   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,320   | 12,000   | 102,000  | 55,000   | 45,000   | 14,500   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,400   | 12,000   | 102,000  | 55,000   | 45,000   | 14,600   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,500   | 12,000   | 102,000  | 55,000   | 45,000   | 14,680   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,600   | 12,000   | 102,000  | 55,000   | 45,000   | 14,700   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,700   | 12,000   | 102,000  | 55,000   | 45,000   | 14,800   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,720   | 12,000   | 102,000  | 55,000   | 45,000   | 14,900   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,800   | 12,000   | 102,000  | 55,000   | 45,000   | 15,000   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,900   | 12,000   | 102,000  | 55,000   | 45,000   | 15,080   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,000   | 12,000   | 102,000  | 55,000   | 45,000   | 15,100   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,100   | 12,000   | 102,000  | 55,000   | 45,000   | 15,200   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,110   | 12,000   | 102,000  | 55,000   | 45,000   | 15,300   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,200   | 12,000   | 102,000  | 55,000   | 45,000   | 15,400   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,300   | 12,000   | 102,000  | 55,000   | 45,000   | 15,480   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,400   | 12,000   | 102,000  | 55,000   | 45,000   | 15,500   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,500   | 12,000   | 102,000  | 55,000   | 45,000   | 15,600   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,510   | 12,000   | 102,000  | 55,000   | 45,000   | 15,700   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,600   | 12,000   | 102,000  | 55,000   | 45,000   | 15,800   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,700   | 12,000   | 102,000  | 55,000   | 45,000   | 15,870   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,800   | 12,000   | 102,000  | 55,000   | 45,000   | 15,900   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,900   | 12,000   | 102,000  | 55,000   | 45,000   | 16,000   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,910   | 12,000   | 102,000  | 55,000   | 45,000   | 16,270   | 18,000   | 123,000  | 73,000   | 48,000   |
| 12,000   | 12,000   | 102,000  | 55,000   | 45,000   | 16,500   | 18,000   | 123,000  | 73,000   | 48,000   |
| 12,100   | 14,000   | 107,000  | 60,000   | 45,000   | 16,670   | 18,000   | 123,000  | 73,000   | 48,000   |
| 12,200   | 14,000   | 107,000  | 60,000   | 45,000   | 17,000   | 18,000   | 123,000  | 73,000   | 48,000   |
| 12,300   | 14,000   | 107,000  | 60,000   | 45,000   | 17,070   | 18,000   | 123,000  | 73,000   | 48,000   |
| 12,400   | 14,000   | 107,000  | 60,000   | 45,000   | 17,460   | 18,000   | 123,000  | 73,000   | 48,000   |
| 12,500   | 14,000   | 107,000  | 60,000   | 45,000   | 17,500   | 18,000   | 123,000  | 73,000   | 48,000   |
| 12,600   | 14,000   | 107,000  | 60,000   | 45,000   | 17,860   | 18,000   | 123,000  | 73,000   | 48,000   |
| 12,700   | 14,000   | 107,000  | 60,000   | 45,000   | 18,000   | 18,000   | 123,000  | 73,000   | 48,000   |
| 12,800   | 14,000   | 107,000  | 60,000   | 45,000   | 18,260   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,900   | 14,000   | 107,000  | 60,000   | 45,000   | 18,500   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,000   | 14,000   | 107,000  | 60,000   | 45,000   | 19,000   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,100   | 14,000   | 107,000  | 60,000   | 45,000   | 19,050   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,200   | 14,000   | 107,000  | 60,000   | 45,000   | 19,250   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,300   | 14,000   | 107,000  | 60,000   | 45,000   | 19,446   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,400   | 14,000   | 107,000  | 60,000   | 45,000   | 19,500   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,490   | 14,000   | 107,000  | 60,000   | 45,000   | 19,840   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,500   | 14,000   | 107,000  | 60,000   | 45,000   | 20,000   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,600   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 13,700   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 13,800   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 13,900   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |



## SuperV-Bohrer

### SuperV-Bohrer ohne Innenkühlung



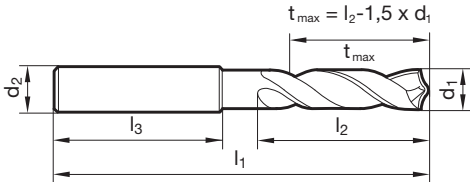
Katalog-Nr. 51750



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● |   |   |   | ○ | ○ |

Arbeitsrichtwerte  
Seite 242

- Ausspitzung  $\geq \text{Ø } 3,000$
- Kegelmantelanschliff
- Hauptschneidenform konkav
- sehr harte Beschichtung
- vier Führungsfasen



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,100    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,170    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,200    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,250    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,300    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,400    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,500    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,570    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,600    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,700    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,800    | 6,000    | 66,000   | 24,000   | 36,000   |
| 3,900    | 6,000    | 66,000   | 24,000   | 36,000   |
| 3,970    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,000    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,100    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,200    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,300    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,370    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,400    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,500    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,600    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,650    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,700    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,760    | 6,000    | 66,000   | 28,000   | 36,000   |
| 4,800    | 6,000    | 66,000   | 28,000   | 36,000   |
| 4,900    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,100    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,160    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,200    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,300    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,400    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,500    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,550    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,560    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,600    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,700    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,800    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,900    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,950    | 6,000    | 66,000   | 28,000   | 36,000   |
| 6,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 6,100    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,200    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,300    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,350    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,400    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,500    | 8,000    | 79,000   | 34,000   | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 6,600    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,700    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,750    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,800    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,900    | 8,000    | 79,000   | 34,000   | 36,000   |
| 7,000    | 8,000    | 79,000   | 34,000   | 36,000   |
| 7,100    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,140    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,200    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,300    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,400    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,500    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,540    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,600    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,700    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,800    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,900    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,940    | 8,000    | 79,000   | 41,000   | 36,000   |
| 8,000    | 8,000    | 79,000   | 41,000   | 36,000   |
| 8,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,330    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,700    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,730    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,800    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,900    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,000    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,130    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,250    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,520    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,700    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,800    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,900    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,920    | 10,000   | 89,000   | 47,000   | 40,000   |
| 10,000   | 10,000   | 89,000   | 47,000   | 40,000   |
| 10,100   | 12,000   | 102,000  | 55,000   | 45,000   |
| 10,200   | 12,000   | 102,000  | 55,000   | 45,000   |
| 10,300   | 12,000   | 102,000  | 55,000   | 45,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 10,320   | 12,000   | 102,000  | 55,000   | 45,000   | 14,290   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,400   | 12,000   | 102,000  | 55,000   | 45,000   | 14,300   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,500   | 12,000   | 102,000  | 55,000   | 45,000   | 14,500   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,600   | 12,000   | 102,000  | 55,000   | 45,000   | 14,700   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,700   | 12,000   | 102,000  | 55,000   | 45,000   | 15,000   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,800   | 12,000   | 102,000  | 55,000   | 45,000   | 15,200   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,900   | 12,000   | 102,000  | 55,000   | 45,000   | 15,300   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,000   | 12,000   | 102,000  | 55,000   | 45,000   | 15,500   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,100   | 12,000   | 102,000  | 55,000   | 45,000   | 15,700   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,110   | 12,000   | 102,000  | 55,000   | 45,000   | 16,000   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,200   | 12,000   | 102,000  | 55,000   | 45,000   | 16,300   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,300   | 12,000   | 102,000  | 55,000   | 45,000   | 16,500   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,400   | 12,000   | 102,000  | 55,000   | 45,000   | 16,900   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,500   | 12,000   | 102,000  | 55,000   | 45,000   | 17,000   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,600   | 12,000   | 102,000  | 55,000   | 45,000   | 17,300   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,700   | 12,000   | 102,000  | 55,000   | 45,000   | 17,500   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,800   | 12,000   | 102,000  | 55,000   | 45,000   | 18,000   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,900   | 12,000   | 102,000  | 55,000   | 45,000   | 18,500   | 20,000   | 131,000  | 79,000   | 50,000   |
| 11,910   | 12,000   | 102,000  | 55,000   | 45,000   | 18,900   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,000   | 12,000   | 102,000  | 55,000   | 45,000   | 19,000   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,200   | 14,000   | 107,000  | 60,000   | 45,000   | 19,050   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,500   | 14,000   | 107,000  | 60,000   | 45,000   | 19,300   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,700   | 14,000   | 107,000  | 60,000   | 45,000   | 19,500   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,800   | 14,000   | 107,000  | 60,000   | 45,000   | 20,000   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,000   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 13,300   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 13,500   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 13,700   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 14,000   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 14,200   | 16,000   | 115,000  | 65,000   | 48,000   |          |          |          |          |          |

## SuperV-Bohrer

### SuperV-Bohrer ohne Innenkühlung



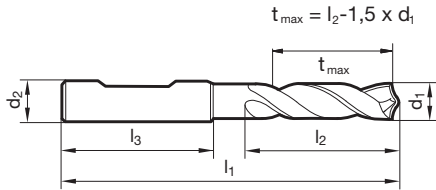
Katalog-Nr. 51687



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● |   | ● | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 240

- Flächenanschliff
- Hauptschneidenform gerade
- optimierte Schneidengeometrie



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,100    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,170    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,200    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,250    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,300    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,400    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,500    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,570    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,600    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,700    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,800    | 6,000    | 74,000   | 36,000   | 36,000   |
| 3,900    | 6,000    | 74,000   | 36,000   | 36,000   |
| 3,970    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,000    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,100    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,200    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,300    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,370    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,400    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,500    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,600    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,650    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,700    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,760    | 6,000    | 82,000   | 44,000   | 36,000   |
| 4,800    | 6,000    | 82,000   | 44,000   | 36,000   |
| 4,900    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,000    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,100    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,160    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,200    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,300    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,400    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,500    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,550    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,560    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,600    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,700    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,800    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,900    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,950    | 6,000    | 82,000   | 44,000   | 36,000   |
| 6,000    | 6,000    | 82,000   | 44,000   | 36,000   |
| 6,100    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,200    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,300    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,350    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,400    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,500    | 8,000    | 91,000   | 53,000   | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 6,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,750    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,100    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,140    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,200    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,300    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,400    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,500    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,540    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,940    | 8,000    | 91,000   | 53,000   | 36,000   |
| 8,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 8,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,330    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,730    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,000    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,130    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,250    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,520    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,920    | 10,000   | 103,000  | 61,000   | 40,000   |
| 10,000   | 10,000   | 103,000  | 61,000   | 40,000   |
| 10,100   | 12,000   | 118,000  | 71,000   | 45,000   |
| 10,200   | 12,000   | 118,000  | 71,000   | 45,000   |
| 10,300   | 12,000   | 118,000  | 71,000   | 45,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 10,320   | 12,000   | 118,000  | 71,000   | 45,000   | 13,500   | 14,000   | 124,000  | 77,000   | 45,000   |
| 10,400   | 12,000   | 118,000  | 71,000   | 45,000   | 13,700   | 14,000   | 124,000  | 77,000   | 45,000   |
| 10,500   | 12,000   | 118,000  | 71,000   | 45,000   | 14,000   | 14,000   | 124,000  | 77,000   | 45,000   |
| 10,600   | 12,000   | 118,000  | 71,000   | 45,000   | 14,200   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,700   | 12,000   | 118,000  | 71,000   | 45,000   | 14,290   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,800   | 12,000   | 118,000  | 71,000   | 45,000   | 14,500   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,900   | 12,000   | 118,000  | 71,000   | 45,000   | 14,700   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,000   | 12,000   | 118,000  | 71,000   | 45,000   | 15,000   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,100   | 12,000   | 118,000  | 71,000   | 45,000   | 15,200   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,110   | 12,000   | 118,000  | 71,000   | 45,000   | 15,500   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,200   | 12,000   | 118,000  | 71,000   | 45,000   | 15,700   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,300   | 12,000   | 118,000  | 71,000   | 45,000   | 16,000   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,400   | 12,000   | 118,000  | 71,000   | 45,000   | 16,500   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,500   | 12,000   | 118,000  | 71,000   | 45,000   | 17,000   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,600   | 12,000   | 118,000  | 71,000   | 45,000   | 17,500   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,700   | 12,000   | 118,000  | 71,000   | 45,000   | 18,000   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,800   | 12,000   | 118,000  | 71,000   | 45,000   | 18,500   | 20,000   | 153,000  | 101,000  | 50,000   |
| 11,900   | 12,000   | 118,000  | 71,000   | 45,000   | 19,000   | 20,000   | 153,000  | 101,000  | 50,000   |
| 11,910   | 12,000   | 118,000  | 71,000   | 45,000   | 19,500   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,000   | 12,000   | 118,000  | 71,000   | 45,000   | 20,000   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,200   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 12,500   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 12,700   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 13,000   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



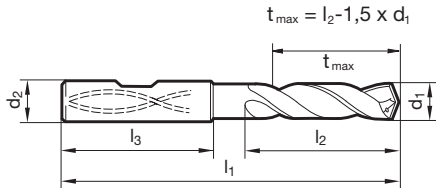
Katalog-Nr. 51676



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ○ | ● | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 240

- Flächenanschliff
- Hauptschneidenform gerade
- optimierte Schneidengeometrie



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,100    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,170    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,200    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,250    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,300    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,400    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,500    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,570    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,600    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,700    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,800    | 6,000    | 66,000   | 24,000   | 36,000   |
| 3,900    | 6,000    | 66,000   | 24,000   | 36,000   |
| 3,970    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,000    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,040    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,100    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,200    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,300    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,370    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,400    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,500    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,600    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,650    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,700    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,760    | 6,000    | 66,000   | 28,000   | 36,000   |
| 4,800    | 6,000    | 66,000   | 28,000   | 36,000   |
| 4,900    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,100    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,110    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,160    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,200    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,250    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,300    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,400    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,410    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,500    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,550    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,560    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,600    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,650    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,700    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,750    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,800    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,900    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,950    | 6,000    | 66,000   | 28,000   | 36,000   |
| 6,000    | 6,000    | 66,000   | 28,000   | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 6,100    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,200    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,300    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,350    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,400    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,500    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,530    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,600    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,700    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,750    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,800    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,900    | 8,000    | 79,000   | 34,000   | 36,000   |
| 7,000    | 8,000    | 79,000   | 34,000   | 36,000   |
| 7,100    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,140    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,200    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,300    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,400    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,450    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,500    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,540    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,600    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,700    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,800    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,900    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,940    | 8,000    | 79,000   | 41,000   | 36,000   |
| 8,000    | 8,000    | 79,000   | 41,000   | 36,000   |
| 8,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,330    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,550    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,700    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,730    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,800    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,900    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,000    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,130    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,250    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,340    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,500    | 10,000   | 89,000   | 47,000   | 40,000   |



## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



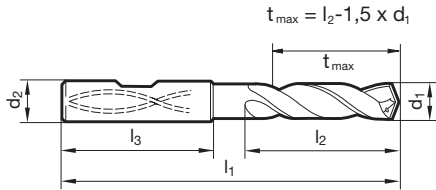
Katalog-Nr. 51670



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
|   | • |   |   | ○ |   |

Arbeitsrichtwerte  
Seite 240

- Flächenanschliff
- Hauptschneidenform gerade
- optimierte Schneidengeometrie
- besonders geeignet für rostfreie Stähle



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,100    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,170    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,200    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,250    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,300    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,400    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,500    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,570    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,600    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,700    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,800    | 6,000    | 66,000   | 24,000   | 36,000   |
| 3,900    | 6,000    | 66,000   | 24,000   | 36,000   |
| 3,970    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,000    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,100    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,200    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,300    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,370    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,400    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,500    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,600    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,650    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,700    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,760    | 6,000    | 66,000   | 28,000   | 36,000   |
| 4,800    | 6,000    | 66,000   | 28,000   | 36,000   |
| 4,900    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,100    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,160    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,200    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,300    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,400    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,500    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,550    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,560    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,600    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,700    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,800    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,900    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,950    | 6,000    | 66,000   | 28,000   | 36,000   |
| 6,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 6,100    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,200    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,300    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,350    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,400    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,500    | 8,000    | 79,000   | 34,000   | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 6,600    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,700    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,750    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,800    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,900    | 8,000    | 79,000   | 34,000   | 36,000   |
| 7,000    | 8,000    | 79,000   | 34,000   | 36,000   |
| 7,100    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,140    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,200    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,300    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,400    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,500    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,540    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,600    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,700    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,800    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,900    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,940    | 8,000    | 79,000   | 41,000   | 36,000   |
| 8,000    | 8,000    | 79,000   | 41,000   | 36,000   |
| 8,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,330    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,700    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,730    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,800    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,900    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,000    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,130    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,250    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,520    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,700    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,800    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,900    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,920    | 10,000   | 89,000   | 47,000   | 40,000   |
| 10,000   | 10,000   | 89,000   | 47,000   | 40,000   |
| 10,100   | 12,000   | 102,000  | 55,000   | 45,000   |
| 10,200   | 12,000   | 102,000  | 55,000   | 45,000   |
| 10,300   | 12,000   | 102,000  | 55,000   | 45,000   |

| d1<br>mm      | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm      | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|---------------|----------|----------|----------|----------|---------------|----------|----------|----------|----------|
| <b>10,320</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>13,500</b> | 14,000   | 107,000  | 60,000   | 45,000   |
| <b>10,400</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>13,700</b> | 14,000   | 107,000  | 60,000   | 45,000   |
| <b>10,500</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>14,000</b> | 14,000   | 107,000  | 60,000   | 45,000   |
| <b>10,600</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>14,200</b> | 16,000   | 115,000  | 65,000   | 48,000   |
| <b>10,700</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>14,290</b> | 16,000   | 115,000  | 65,000   | 48,000   |
| <b>10,800</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>14,500</b> | 16,000   | 115,000  | 65,000   | 48,000   |
| <b>10,900</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>14,700</b> | 16,000   | 115,000  | 65,000   | 48,000   |
| <b>11,000</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>15,000</b> | 16,000   | 115,000  | 65,000   | 48,000   |
| <b>11,100</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>15,200</b> | 16,000   | 115,000  | 65,000   | 48,000   |
| <b>11,110</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>15,500</b> | 16,000   | 115,000  | 65,000   | 48,000   |
| <b>11,200</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>15,700</b> | 16,000   | 115,000  | 65,000   | 48,000   |
| <b>11,300</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>16,000</b> | 16,000   | 115,000  | 65,000   | 48,000   |
| <b>11,400</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>16,500</b> | 18,000   | 123,000  | 73,000   | 48,000   |
| <b>11,500</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>17,000</b> | 18,000   | 123,000  | 73,000   | 48,000   |
| <b>11,600</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>17,500</b> | 18,000   | 123,000  | 73,000   | 48,000   |
| <b>11,700</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>18,000</b> | 18,000   | 123,000  | 73,000   | 48,000   |
| <b>11,800</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>18,500</b> | 20,000   | 131,000  | 79,000   | 50,000   |
| <b>11,900</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>19,000</b> | 20,000   | 131,000  | 79,000   | 50,000   |
| <b>11,910</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>19,500</b> | 20,000   | 131,000  | 79,000   | 50,000   |
| <b>12,000</b> | 12,000   | 102,000  | 55,000   | 45,000   | <b>20,000</b> | 20,000   | 131,000  | 79,000   | 50,000   |
| <b>12,200</b> | 14,000   | 107,000  | 60,000   | 45,000   |               |          |          |          |          |
| <b>12,500</b> | 14,000   | 107,000  | 60,000   | 45,000   |               |          |          |          |          |
| <b>12,700</b> | 14,000   | 107,000  | 60,000   | 45,000   |               |          |          |          |          |
| <b>13,000</b> | 14,000   | 107,000  | 60,000   | 45,000   |               |          |          |          |          |



## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



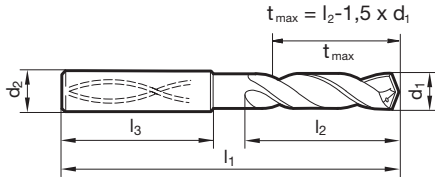
Katalog-Nr. 51784



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ○ | ○ | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 244

- Kegelmantelanschliff
- Hauptschneidenform konkav
- optimierte Schneidengeometrie
- vier Führungsfasen



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,100    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,170    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,200    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,250    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,300    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,400    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,500    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,570    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,600    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,700    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,800    | 6,000    | 66,000   | 24,000   | 36,000   |
| 3,900    | 6,000    | 66,000   | 24,000   | 36,000   |
| 3,970    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,000    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,040    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,100    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,200    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,300    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,370    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,400    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,500    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,600    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,650    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,700    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,760    | 6,000    | 66,000   | 28,000   | 36,000   |
| 4,800    | 6,000    | 66,000   | 28,000   | 36,000   |
| 4,900    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,100    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,110    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,160    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,200    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,300    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,400    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,410    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,500    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,550    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,560    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,600    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,700    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,800    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,900    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,950    | 6,000    | 66,000   | 28,000   | 36,000   |
| 6,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 6,100    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,200    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,300    | 8,000    | 79,000   | 34,000   | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 6,350    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,400    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,500    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,530    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,550    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,600    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,700    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,750    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,800    | 8,000    | 79,000   | 34,000   | 36,000   |
| 6,900    | 8,000    | 79,000   | 34,000   | 36,000   |
| 7,000    | 8,000    | 79,000   | 34,000   | 36,000   |
| 7,100    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,140    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,200    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,300    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,400    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,500    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,540    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,550    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,600    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,650    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,700    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,800    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,900    | 8,000    | 79,000   | 41,000   | 36,000   |
| 7,940    | 8,000    | 79,000   | 41,000   | 36,000   |
| 8,000    | 8,000    | 79,000   | 41,000   | 36,000   |
| 8,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,330    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,700    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,730    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,800    | 10,000   | 89,000   | 47,000   | 40,000   |
| 8,900    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,000    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,130    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,250    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,340    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,520    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,550    | 10,000   | 89,000   | 47,000   | 40,000   |



## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



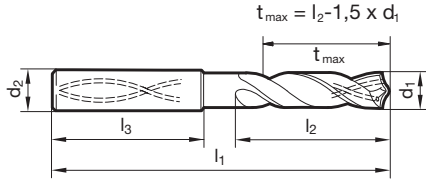
Katalog-Nr. 51752



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● |   |   |   | ● | ○ |

Arbeitsrichtwerte  
Seite 242

- Ausspitzung  $\geq \text{Ø } 3,000$
- Kegelmantelanschliff
- Hauptschneidenform konkav
- sehr harte Beschichtung
- vier Führungsfasen



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 62,000   | 20,000   | 36,000   | 6,600    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,100    | 6,000    | 62,000   | 20,000   | 36,000   | 6,700    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,170    | 6,000    | 62,000   | 20,000   | 36,000   | 6,750    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,200    | 6,000    | 62,000   | 20,000   | 36,000   | 6,800    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,250    | 6,000    | 62,000   | 20,000   | 36,000   | 6,900    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,300    | 6,000    | 62,000   | 20,000   | 36,000   | 7,000    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,400    | 6,000    | 62,000   | 20,000   | 36,000   | 7,100    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,500    | 6,000    | 62,000   | 20,000   | 36,000   | 7,140    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,570    | 6,000    | 62,000   | 20,000   | 36,000   | 7,200    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,600    | 6,000    | 62,000   | 20,000   | 36,000   | 7,300    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,700    | 6,000    | 62,000   | 20,000   | 36,000   | 7,400    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,800    | 6,000    | 66,000   | 24,000   | 36,000   | 7,500    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,900    | 6,000    | 66,000   | 24,000   | 36,000   | 7,540    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,970    | 6,000    | 66,000   | 24,000   | 36,000   | 7,600    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,000    | 6,000    | 66,000   | 24,000   | 36,000   | 7,700    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,100    | 6,000    | 66,000   | 24,000   | 36,000   | 7,800    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,200    | 6,000    | 66,000   | 24,000   | 36,000   | 7,900    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,300    | 6,000    | 66,000   | 24,000   | 36,000   | 7,940    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,370    | 6,000    | 66,000   | 24,000   | 36,000   | 8,000    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,400    | 6,000    | 66,000   | 24,000   | 36,000   | 8,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,500    | 6,000    | 66,000   | 24,000   | 36,000   | 8,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,600    | 6,000    | 66,000   | 24,000   | 36,000   | 8,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,650    | 6,000    | 66,000   | 24,000   | 36,000   | 8,330    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,700    | 6,000    | 66,000   | 24,000   | 36,000   | 8,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,760    | 6,000    | 66,000   | 28,000   | 36,000   | 8,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,800    | 6,000    | 66,000   | 28,000   | 36,000   | 8,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,900    | 6,000    | 66,000   | 28,000   | 36,000   | 8,700    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,000    | 6,000    | 66,000   | 28,000   | 36,000   | 8,730    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,100    | 6,000    | 66,000   | 28,000   | 36,000   | 8,800    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,160    | 6,000    | 66,000   | 28,000   | 36,000   | 8,900    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,200    | 6,000    | 66,000   | 28,000   | 36,000   | 9,000    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,300    | 6,000    | 66,000   | 28,000   | 36,000   | 9,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,400    | 6,000    | 66,000   | 28,000   | 36,000   | 9,130    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,500    | 6,000    | 66,000   | 28,000   | 36,000   | 9,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,550    | 6,000    | 66,000   | 28,000   | 36,000   | 9,250    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,560    | 6,000    | 66,000   | 28,000   | 36,000   | 9,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,600    | 6,000    | 66,000   | 28,000   | 36,000   | 9,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,700    | 6,000    | 66,000   | 28,000   | 36,000   | 9,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,800    | 6,000    | 66,000   | 28,000   | 36,000   | 9,520    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,900    | 6,000    | 66,000   | 28,000   | 36,000   | 9,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,950    | 6,000    | 66,000   | 28,000   | 36,000   | 9,700    | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,000    | 6,000    | 66,000   | 28,000   | 36,000   | 9,800    | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,100    | 8,000    | 79,000   | 34,000   | 36,000   | 9,900    | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,200    | 8,000    | 79,000   | 34,000   | 36,000   | 9,920    | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,300    | 8,000    | 79,000   | 34,000   | 36,000   | 10,000   | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,350    | 8,000    | 79,000   | 34,000   | 36,000   | 10,100   | 12,000   | 102,000  | 55,000   | 45,000   |
| 6,400    | 8,000    | 79,000   | 34,000   | 36,000   | 10,200   | 12,000   | 102,000  | 55,000   | 45,000   |
| 6,500    | 8,000    | 79,000   | 34,000   | 36,000   | 10,300   | 12,000   | 102,000  | 55,000   | 45,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 10,320   | 12,000   | 102,000  | 55,000   | 45,000   | 13,500   | 14,000   | 107,000  | 60,000   | 45,000   |
| 10,400   | 12,000   | 102,000  | 55,000   | 45,000   | 13,700   | 14,000   | 107,000  | 60,000   | 45,000   |
| 10,500   | 12,000   | 102,000  | 55,000   | 45,000   | 14,000   | 14,000   | 107,000  | 60,000   | 45,000   |
| 10,600   | 12,000   | 102,000  | 55,000   | 45,000   | 14,200   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,700   | 12,000   | 102,000  | 55,000   | 45,000   | 14,290   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,720   | 12,000   | 102,000  | 55,000   | 45,000   | 14,300   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,800   | 12,000   | 102,000  | 55,000   | 45,000   | 14,500   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,900   | 12,000   | 102,000  | 55,000   | 45,000   | 14,700   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,000   | 12,000   | 102,000  | 55,000   | 45,000   | 15,000   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,100   | 12,000   | 102,000  | 55,000   | 45,000   | 15,200   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,110   | 12,000   | 102,000  | 55,000   | 45,000   | 15,300   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,200   | 12,000   | 102,000  | 55,000   | 45,000   | 15,500   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,300   | 12,000   | 102,000  | 55,000   | 45,000   | 15,700   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,400   | 12,000   | 102,000  | 55,000   | 45,000   | 15,870   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,500   | 12,000   | 102,000  | 55,000   | 45,000   | 16,000   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,510   | 12,000   | 102,000  | 55,000   | 45,000   | 16,300   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,600   | 12,000   | 102,000  | 55,000   | 45,000   | 16,500   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,700   | 12,000   | 102,000  | 55,000   | 45,000   | 16,900   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,800   | 12,000   | 102,000  | 55,000   | 45,000   | 17,000   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,900   | 12,000   | 102,000  | 55,000   | 45,000   | 17,300   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,910   | 12,000   | 102,000  | 55,000   | 45,000   | 17,500   | 18,000   | 123,000  | 73,000   | 48,000   |
| 12,000   | 12,000   | 102,000  | 55,000   | 45,000   | 18,000   | 18,000   | 123,000  | 73,000   | 48,000   |
| 12,200   | 14,000   | 107,000  | 60,000   | 45,000   | 18,500   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,300   | 14,000   | 107,000  | 60,000   | 45,000   | 18,900   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,500   | 14,000   | 107,000  | 60,000   | 45,000   | 19,000   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,700   | 14,000   | 107,000  | 60,000   | 45,000   | 19,050   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,800   | 14,000   | 107,000  | 60,000   | 45,000   | 19,300   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,000   | 14,000   | 107,000  | 60,000   | 45,000   | 19,500   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,300   | 14,000   | 107,000  | 60,000   | 45,000   | 20,000   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,490   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



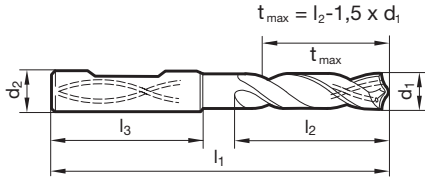
Katalog-Nr. 51753



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|---|---|---|---|---|---|
| P | M | K | N | S | H |
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Arbeitsrichtwerte  
Seite 242

- Ausspitzung  $\geq \text{Ø } 3,000$
- Kegelmantelanschliff
- Hauptschneidenform konkav
- sehr harte Beschichtung
- vier Führungsfasen



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 62,000   | 20,000   | 36,000   | 6,600    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,100    | 6,000    | 62,000   | 20,000   | 36,000   | 6,700    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,170    | 6,000    | 62,000   | 20,000   | 36,000   | 6,750    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,200    | 6,000    | 62,000   | 20,000   | 36,000   | 6,800    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,250    | 6,000    | 62,000   | 20,000   | 36,000   | 6,900    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,300    | 6,000    | 62,000   | 20,000   | 36,000   | 7,000    | 8,000    | 79,000   | 34,000   | 36,000   |
| 3,400    | 6,000    | 62,000   | 20,000   | 36,000   | 7,100    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,500    | 6,000    | 62,000   | 20,000   | 36,000   | 7,140    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,570    | 6,000    | 62,000   | 20,000   | 36,000   | 7,200    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,600    | 6,000    | 62,000   | 20,000   | 36,000   | 7,300    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,700    | 6,000    | 62,000   | 20,000   | 36,000   | 7,400    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,800    | 6,000    | 66,000   | 24,000   | 36,000   | 7,500    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,900    | 6,000    | 66,000   | 24,000   | 36,000   | 7,540    | 8,000    | 79,000   | 41,000   | 36,000   |
| 3,970    | 6,000    | 66,000   | 24,000   | 36,000   | 7,600    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,000    | 6,000    | 66,000   | 24,000   | 36,000   | 7,700    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,100    | 6,000    | 66,000   | 24,000   | 36,000   | 7,800    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,200    | 6,000    | 66,000   | 24,000   | 36,000   | 7,900    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,300    | 6,000    | 66,000   | 24,000   | 36,000   | 7,940    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,370    | 6,000    | 66,000   | 24,000   | 36,000   | 8,000    | 8,000    | 79,000   | 41,000   | 36,000   |
| 4,400    | 6,000    | 66,000   | 24,000   | 36,000   | 8,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,500    | 6,000    | 66,000   | 24,000   | 36,000   | 8,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,600    | 6,000    | 66,000   | 24,000   | 36,000   | 8,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,650    | 6,000    | 66,000   | 24,000   | 36,000   | 8,330    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,700    | 6,000    | 66,000   | 24,000   | 36,000   | 8,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,760    | 6,000    | 66,000   | 28,000   | 36,000   | 8,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,800    | 6,000    | 66,000   | 28,000   | 36,000   | 8,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 4,900    | 6,000    | 66,000   | 28,000   | 36,000   | 8,700    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,000    | 6,000    | 66,000   | 28,000   | 36,000   | 8,730    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,100    | 6,000    | 66,000   | 28,000   | 36,000   | 8,800    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,160    | 6,000    | 66,000   | 28,000   | 36,000   | 8,900    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,200    | 6,000    | 66,000   | 28,000   | 36,000   | 9,000    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,300    | 6,000    | 66,000   | 28,000   | 36,000   | 9,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,400    | 6,000    | 66,000   | 28,000   | 36,000   | 9,130    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,500    | 6,000    | 66,000   | 28,000   | 36,000   | 9,200    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,550    | 6,000    | 66,000   | 28,000   | 36,000   | 9,250    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,560    | 6,000    | 66,000   | 28,000   | 36,000   | 9,300    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,600    | 6,000    | 66,000   | 28,000   | 36,000   | 9,400    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,700    | 6,000    | 66,000   | 28,000   | 36,000   | 9,500    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,800    | 6,000    | 66,000   | 28,000   | 36,000   | 9,520    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,900    | 6,000    | 66,000   | 28,000   | 36,000   | 9,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 5,950    | 6,000    | 66,000   | 28,000   | 36,000   | 9,700    | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,000    | 6,000    | 66,000   | 28,000   | 36,000   | 9,800    | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,100    | 8,000    | 79,000   | 34,000   | 36,000   | 9,900    | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,200    | 8,000    | 79,000   | 34,000   | 36,000   | 9,920    | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,300    | 8,000    | 79,000   | 34,000   | 36,000   | 10,000   | 10,000   | 89,000   | 47,000   | 40,000   |
| 6,350    | 8,000    | 79,000   | 34,000   | 36,000   | 10,100   | 12,000   | 102,000  | 55,000   | 45,000   |
| 6,400    | 8,000    | 79,000   | 34,000   | 36,000   | 10,200   | 12,000   | 102,000  | 55,000   | 45,000   |
| 6,500    | 8,000    | 79,000   | 34,000   | 36,000   | 10,300   | 12,000   | 102,000  | 55,000   | 45,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 10,320   | 12,000   | 102,000  | 55,000   | 45,000   | 14,290   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,400   | 12,000   | 102,000  | 55,000   | 45,000   | 14,300   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,500   | 12,000   | 102,000  | 55,000   | 45,000   | 14,500   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,600   | 12,000   | 102,000  | 55,000   | 45,000   | 14,700   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,700   | 12,000   | 102,000  | 55,000   | 45,000   | 15,000   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,800   | 12,000   | 102,000  | 55,000   | 45,000   | 15,200   | 16,000   | 115,000  | 65,000   | 48,000   |
| 10,900   | 12,000   | 102,000  | 55,000   | 45,000   | 15,300   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,000   | 12,000   | 102,000  | 55,000   | 45,000   | 15,500   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,100   | 12,000   | 102,000  | 55,000   | 45,000   | 15,700   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,110   | 12,000   | 102,000  | 55,000   | 45,000   | 16,000   | 16,000   | 115,000  | 65,000   | 48,000   |
| 11,200   | 12,000   | 102,000  | 55,000   | 45,000   | 16,300   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,300   | 12,000   | 102,000  | 55,000   | 45,000   | 16,500   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,400   | 12,000   | 102,000  | 55,000   | 45,000   | 16,900   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,500   | 12,000   | 102,000  | 55,000   | 45,000   | 17,000   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,600   | 12,000   | 102,000  | 55,000   | 45,000   | 17,300   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,700   | 12,000   | 102,000  | 55,000   | 45,000   | 17,500   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,800   | 12,000   | 102,000  | 55,000   | 45,000   | 18,000   | 18,000   | 123,000  | 73,000   | 48,000   |
| 11,900   | 12,000   | 102,000  | 55,000   | 45,000   | 18,500   | 20,000   | 131,000  | 79,000   | 50,000   |
| 11,910   | 12,000   | 102,000  | 55,000   | 45,000   | 18,900   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,000   | 12,000   | 102,000  | 55,000   | 45,000   | 19,000   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,200   | 14,000   | 107,000  | 60,000   | 45,000   | 19,050   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,500   | 14,000   | 107,000  | 60,000   | 45,000   | 19,300   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,700   | 14,000   | 107,000  | 60,000   | 45,000   | 19,500   | 20,000   | 131,000  | 79,000   | 50,000   |
| 12,800   | 14,000   | 107,000  | 60,000   | 45,000   | 20,000   | 20,000   | 131,000  | 79,000   | 50,000   |
| 13,000   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 13,300   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 13,500   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 13,700   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 14,000   | 14,000   | 107,000  | 60,000   | 45,000   |          |          |          |          |          |
| 14,200   | 16,000   | 115,000  | 65,000   | 48,000   |          |          |          |          |          |

## SuperV-Bohrer

### Pilotbohrer mit Kühlkanälen



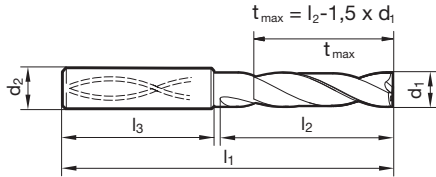
Katalog-Nr. 51718



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 244

- 180° Spitzenanschliff für ebenen Bohrungsgrund
- zum Pilotieren, Bohren, Anspiegeln
- geringe Gratbildung
- Pilotieren in allen Lagen und Werkstoffen



| d1    |       | d2    | l1     | l2     | l3     | d1    |       | d2     | l1     | l2     | l3     |
|-------|-------|-------|--------|--------|--------|-------|-------|--------|--------|--------|--------|
| mm    | inch  | mm    | mm     | mm     | mm     | mm    | inch  | mm     | mm     | mm     | mm     |
| 3,000 |       | 6,000 | 61,000 | 16,000 | 36,000 | 6,350 | 1/4   | 8,000  | 78,000 | 31,000 | 36,000 |
| 3,100 |       | 6,000 | 61,000 | 16,000 | 36,000 | 6,400 |       | 8,000  | 78,000 | 31,000 | 36,000 |
| 3,170 | 1/8   | 6,000 | 61,000 | 16,000 | 36,000 | 6,500 |       | 8,000  | 78,000 | 31,000 | 36,000 |
| 3,200 |       | 6,000 | 61,000 | 16,000 | 36,000 | 6,530 |       | 8,000  | 78,000 | 31,000 | 36,000 |
| 3,250 |       | 6,000 | 61,000 | 16,000 | 36,000 | 6,550 |       | 8,000  | 78,000 | 31,000 | 36,000 |
| 3,300 |       | 6,000 | 61,000 | 16,000 | 36,000 | 6,600 |       | 8,000  | 78,000 | 31,000 | 36,000 |
| 3,400 |       | 6,000 | 61,000 | 16,000 | 36,000 | 6,700 |       | 8,000  | 78,000 | 31,000 | 36,000 |
| 3,500 |       | 6,000 | 61,000 | 16,000 | 36,000 | 6,750 | 17/64 | 8,000  | 78,000 | 31,000 | 36,000 |
| 3,570 | 9/64  | 6,000 | 61,000 | 16,000 | 36,000 | 6,800 |       | 8,000  | 78,000 | 31,000 | 36,000 |
| 3,600 |       | 6,000 | 61,000 | 16,000 | 36,000 | 6,900 |       | 8,000  | 78,000 | 31,000 | 36,000 |
| 3,700 |       | 6,000 | 61,000 | 16,000 | 36,000 | 7,000 |       | 8,000  | 78,000 | 31,000 | 36,000 |
| 3,800 |       | 6,000 | 65,000 | 18,000 | 36,000 | 7,100 |       | 8,000  | 78,000 | 35,000 | 36,000 |
| 3,900 |       | 6,000 | 65,000 | 18,000 | 36,000 | 7,140 | 9/32  | 8,000  | 78,000 | 35,000 | 36,000 |
| 3,970 | 5/32  | 6,000 | 65,000 | 18,000 | 36,000 | 7,200 |       | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,000 |       | 6,000 | 65,000 | 18,000 | 36,000 | 7,300 |       | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,040 |       | 6,000 | 65,000 | 18,000 | 36,000 | 7,400 |       | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,100 |       | 6,000 | 65,000 | 18,000 | 36,000 | 7,500 |       | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,200 |       | 6,000 | 65,000 | 18,000 | 36,000 | 7,540 | 19/64 | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,300 |       | 6,000 | 65,000 | 21,000 | 36,000 | 7,550 |       | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,370 | 11/64 | 6,000 | 65,000 | 21,000 | 36,000 | 7,600 |       | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,400 |       | 6,000 | 65,000 | 21,000 | 36,000 | 7,650 |       | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,500 |       | 6,000 | 65,000 | 21,000 | 36,000 | 7,700 |       | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,600 |       | 6,000 | 65,000 | 21,000 | 36,000 | 7,800 |       | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,650 |       | 6,000 | 65,000 | 21,000 | 36,000 | 7,900 |       | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,700 |       | 6,000 | 65,000 | 21,000 | 36,000 | 7,940 | 5/16  | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,760 | 3/16  | 6,000 | 65,000 | 26,000 | 36,000 | 8,000 |       | 8,000  | 78,000 | 35,000 | 36,000 |
| 4,800 |       | 6,000 | 65,000 | 26,000 | 36,000 | 8,100 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 4,900 |       | 6,000 | 65,000 | 26,000 | 36,000 | 8,200 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,000 |       | 6,000 | 65,000 | 26,000 | 36,000 | 8,300 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,100 |       | 6,000 | 65,000 | 26,000 | 36,000 | 8,330 | 21/64 | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,110 |       | 6,000 | 65,000 | 26,000 | 36,000 | 8,400 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,160 | 13/64 | 6,000 | 65,000 | 26,000 | 36,000 | 8,500 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,200 |       | 6,000 | 65,000 | 26,000 | 36,000 | 8,600 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,300 |       | 6,000 | 65,000 | 26,000 | 36,000 | 8,700 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,400 |       | 6,000 | 65,000 | 26,000 | 36,000 | 8,730 | 11/32 | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,410 |       | 6,000 | 65,000 | 26,000 | 36,000 | 8,800 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,500 |       | 6,000 | 65,000 | 26,000 | 36,000 | 8,900 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,550 |       | 6,000 | 65,000 | 26,000 | 36,000 | 9,000 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,560 | 7/32  | 6,000 | 65,000 | 26,000 | 36,000 | 9,100 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,600 |       | 6,000 | 65,000 | 26,000 | 36,000 | 9,130 | 23/64 | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,700 |       | 6,000 | 65,000 | 26,000 | 36,000 | 9,200 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,800 |       | 6,000 | 65,000 | 26,000 | 36,000 | 9,250 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,900 |       | 6,000 | 65,000 | 26,000 | 36,000 | 9,300 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 5,950 | 15/64 | 6,000 | 65,000 | 26,000 | 36,000 | 9,340 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 6,000 |       | 6,000 | 65,000 | 26,000 | 36,000 | 9,400 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 6,100 |       | 8,000 | 78,000 | 31,000 | 36,000 | 9,500 |       | 10,000 | 87,000 | 43,000 | 40,000 |
| 6,200 |       | 8,000 | 78,000 | 31,000 | 36,000 | 9,520 | 3/8   | 10,000 | 87,000 | 43,000 | 40,000 |
| 6,300 |       | 8,000 | 78,000 | 31,000 | 36,000 | 9,550 |       | 10,000 | 87,000 | 43,000 | 40,000 |

| d1<br>mm | inch  | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | inch  | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|-------|----------|----------|----------|----------|----------|-------|----------|----------|----------|----------|
| 9,600    |       | 10,000   | 87,000   | 43,000   | 40,000   | 14,600   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 9,700    |       | 10,000   | 87,000   | 43,000   | 40,000   | 14,680   | 37/64 | 16,000   | 112,000  | 62,000   | 48,000   |
| 9,800    |       | 10,000   | 87,000   | 43,000   | 40,000   | 14,700   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 9,900    |       | 10,000   | 87,000   | 43,000   | 40,000   | 14,800   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 9,920    | 25/64 | 10,000   | 87,000   | 43,000   | 40,000   | 14,900   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 10,000   |       | 10,000   | 87,000   | 43,000   | 40,000   | 15,000   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 10,100   |       | 12,000   | 100,000  | 52,000   | 45,000   | 15,080   | 19/32 | 16,000   | 112,000  | 62,000   | 48,000   |
| 10,200   |       | 12,000   | 100,000  | 52,000   | 45,000   | 15,100   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 10,300   |       | 12,000   | 100,000  | 52,000   | 45,000   | 15,200   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 10,320   | 13/32 | 12,000   | 100,000  | 52,000   | 45,000   | 15,300   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 10,400   |       | 12,000   | 100,000  | 52,000   | 45,000   | 15,400   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 10,500   |       | 12,000   | 100,000  | 52,000   | 45,000   | 15,480   | 39/64 | 16,000   | 112,000  | 62,000   | 48,000   |
| 10,600   |       | 12,000   | 100,000  | 52,000   | 45,000   | 15,500   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 10,700   |       | 12,000   | 100,000  | 52,000   | 45,000   | 15,550   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 10,720   | 27/64 | 12,000   | 100,000  | 52,000   | 45,000   | 15,600   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 10,800   |       | 12,000   | 100,000  | 52,000   | 45,000   | 15,700   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 10,900   |       | 12,000   | 100,000  | 52,000   | 45,000   | 15,800   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 11,000   |       | 12,000   | 100,000  | 52,000   | 45,000   | 15,870   | 5/8   | 16,000   | 112,000  | 62,000   | 48,000   |
| 11,100   |       | 12,000   | 100,000  | 52,000   | 45,000   | 15,900   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 11,110   | 7/16  | 12,000   | 100,000  | 52,000   | 45,000   | 16,000   |       | 16,000   | 112,000  | 62,000   | 48,000   |
| 11,200   |       | 12,000   | 100,000  | 52,000   | 45,000   | 16,270   | 41/64 | 18,000   | 120,000  | 70,000   | 48,000   |
| 11,300   |       | 12,000   | 100,000  | 52,000   | 45,000   | 16,300   |       | 18,000   | 120,000  | 70,000   | 48,000   |
| 11,400   |       | 12,000   | 100,000  | 52,000   | 45,000   | 16,500   |       | 18,000   | 120,000  | 70,000   | 48,000   |
| 11,500   |       | 12,000   | 100,000  | 52,000   | 45,000   | 16,670   | 21/32 | 18,000   | 120,000  | 70,000   | 48,000   |
| 11,510   | 29/64 | 12,000   | 100,000  | 52,000   | 45,000   | 16,700   |       | 18,000   | 120,000  | 70,000   | 48,000   |
| 11,550   |       | 12,000   | 100,000  | 52,000   | 45,000   | 16,900   |       | 18,000   | 120,000  | 70,000   | 48,000   |
| 11,600   |       | 12,000   | 100,000  | 52,000   | 45,000   | 17,000   |       | 18,000   | 120,000  | 70,000   | 48,000   |
| 11,700   |       | 12,000   | 100,000  | 52,000   | 45,000   | 17,070   | 43/64 | 18,000   | 120,000  | 70,000   | 48,000   |
| 11,800   |       | 12,000   | 100,000  | 52,000   | 45,000   | 17,460   | 11/16 | 18,000   | 120,000  | 70,000   | 48,000   |
| 11,900   |       | 12,000   | 100,000  | 52,000   | 45,000   | 17,500   |       | 18,000   | 120,000  | 70,000   | 48,000   |
| 11,910   | 15/32 | 12,000   | 100,000  | 52,000   | 45,000   | 17,550   |       | 18,000   | 120,000  | 70,000   | 48,000   |
| 12,000   |       | 12,000   | 100,000  | 52,000   | 45,000   | 17,700   |       | 18,000   | 120,000  | 70,000   | 48,000   |
| 12,100   |       | 14,000   | 104,000  | 57,000   | 45,000   | 17,860   | 45/64 | 18,000   | 120,000  | 70,000   | 48,000   |
| 12,200   |       | 14,000   | 104,000  | 57,000   | 45,000   | 18,000   |       | 18,000   | 120,000  | 70,000   | 48,000   |
| 12,300   | 31/64 | 14,000   | 104,000  | 57,000   | 45,000   | 18,260   | 23/32 | 20,000   | 128,000  | 76,000   | 50,000   |
| 12,400   |       | 14,000   | 104,000  | 57,000   | 45,000   | 18,500   |       | 20,000   | 128,000  | 76,000   | 50,000   |
| 12,500   |       | 14,000   | 104,000  | 57,000   | 45,000   | 18,700   |       | 20,000   | 128,000  | 76,000   | 50,000   |
| 12,600   |       | 14,000   | 104,000  | 57,000   | 45,000   | 18,900   |       | 20,000   | 128,000  | 76,000   | 50,000   |
| 12,700   | 1/2   | 14,000   | 104,000  | 57,000   | 45,000   | 19,000   |       | 20,000   | 128,000  | 76,000   | 50,000   |
| 12,800   |       | 14,000   | 104,000  | 57,000   | 45,000   | 19,050   | 3/4   | 20,000   | 128,000  | 76,000   | 50,000   |
| 12,900   |       | 14,000   | 104,000  | 57,000   | 45,000   | 19,250   |       | 20,000   | 128,000  | 76,000   | 50,000   |
| 13,000   |       | 14,000   | 104,000  | 57,000   | 45,000   | 19,300   |       | 20,000   | 128,000  | 76,000   | 50,000   |
| 13,100   | 33/64 | 14,000   | 104,000  | 57,000   | 45,000   | 19,450   | 49/64 | 20,000   | 128,000  | 76,000   | 50,000   |
| 13,200   |       | 14,000   | 104,000  | 57,000   | 45,000   | 19,500   |       | 20,000   | 128,000  | 76,000   | 50,000   |
| 13,300   |       | 14,000   | 104,000  | 57,000   | 45,000   | 19,550   |       | 20,000   | 128,000  | 76,000   | 50,000   |
| 13,400   |       | 14,000   | 104,000  | 57,000   | 45,000   | 19,700   |       | 20,000   | 128,000  | 76,000   | 50,000   |
| 13,490   | 17/32 | 14,000   | 104,000  | 57,000   | 45,000   | 19,800   |       | 20,000   | 128,000  | 76,000   | 50,000   |
| 13,500   |       | 14,000   | 104,000  | 57,000   | 45,000   | 19,840   | 25/32 | 20,000   | 128,000  | 76,000   | 50,000   |
| 13,600   |       | 14,000   | 104,000  | 57,000   | 45,000   | 20,000   |       | 20,000   | 128,000  | 76,000   | 50,000   |
| 13,700   |       | 14,000   | 104,000  | 57,000   | 45,000   |          |       |          |          |          |          |
| 13,800   |       | 14,000   | 104,000  | 57,000   | 45,000   |          |       |          |          |          |          |
| 13,890   | 35/64 | 14,000   | 104,000  | 57,000   | 45,000   |          |       |          |          |          |          |
| 13,900   |       | 14,000   | 104,000  | 57,000   | 45,000   |          |       |          |          |          |          |
| 14,000   |       | 14,000   | 104,000  | 57,000   | 45,000   |          |       |          |          |          |          |
| 14,100   |       | 16,000   | 112,000  | 62,000   | 48,000   |          |       |          |          |          |          |
| 14,200   |       | 16,000   | 112,000  | 62,000   | 48,000   |          |       |          |          |          |          |
| 14,290   | 9/16  | 16,000   | 112,000  | 62,000   | 48,000   |          |       |          |          |          |          |
| 14,300   |       | 16,000   | 112,000  | 62,000   | 48,000   |          |       |          |          |          |          |
| 14,400   |       | 16,000   | 112,000  | 62,000   | 48,000   |          |       |          |          |          |          |
| 14,500   |       | 16,000   | 112,000  | 62,000   | 48,000   |          |       |          |          |          |          |



## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



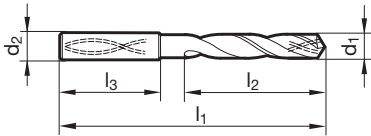
Katalog-Nr. 71791



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
|   |   |   | • |   |   |

Arbeitsrichtwerte  
Seite 240

- Kegelmantelanschliff
- Hauptschneidenform leicht konkav
- optimierte Schneidengeometrie
- scharfes Schnittverhalten



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 66,000   | 28,000   | 36,000   | 6,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,100    | 6,000    | 66,000   | 28,000   | 36,000   | 6,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,170    | 6,000    | 66,000   | 28,000   | 36,000   | 6,750    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,200    | 6,000    | 66,000   | 28,000   | 36,000   | 6,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,250    | 6,000    | 66,000   | 28,000   | 36,000   | 6,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,300    | 6,000    | 66,000   | 28,000   | 36,000   | 7,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,400    | 6,000    | 66,000   | 28,000   | 36,000   | 7,100    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,500    | 6,000    | 66,000   | 28,000   | 36,000   | 7,140    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,570    | 6,000    | 66,000   | 28,000   | 36,000   | 7,200    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,600    | 6,000    | 66,000   | 28,000   | 36,000   | 7,300    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,700    | 6,000    | 66,000   | 28,000   | 36,000   | 7,400    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,800    | 6,000    | 74,000   | 36,000   | 36,000   | 7,500    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,900    | 6,000    | 74,000   | 36,000   | 36,000   | 7,540    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,970    | 6,000    | 74,000   | 36,000   | 36,000   | 7,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,000    | 6,000    | 74,000   | 36,000   | 36,000   | 7,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,100    | 6,000    | 74,000   | 36,000   | 36,000   | 7,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,200    | 6,000    | 74,000   | 36,000   | 36,000   | 7,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,300    | 6,000    | 74,000   | 36,000   | 36,000   | 7,940    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,370    | 6,000    | 74,000   | 36,000   | 36,000   | 8,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,400    | 6,000    | 74,000   | 36,000   | 36,000   | 8,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,500    | 6,000    | 74,000   | 36,000   | 36,000   | 8,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,600    | 6,000    | 74,000   | 36,000   | 36,000   | 8,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,650    | 6,000    | 74,000   | 36,000   | 36,000   | 8,330    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,700    | 6,000    | 74,000   | 36,000   | 36,000   | 8,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,760    | 6,000    | 82,000   | 44,000   | 36,000   | 8,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,800    | 6,000    | 82,000   | 44,000   | 36,000   | 8,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,900    | 6,000    | 82,000   | 44,000   | 36,000   | 8,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,000    | 6,000    | 82,000   | 44,000   | 36,000   | 8,730    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,100    | 6,000    | 82,000   | 44,000   | 36,000   | 8,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,160    | 6,000    | 82,000   | 44,000   | 36,000   | 8,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,200    | 6,000    | 82,000   | 44,000   | 36,000   | 9,000    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,300    | 6,000    | 82,000   | 44,000   | 36,000   | 9,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,400    | 6,000    | 82,000   | 44,000   | 36,000   | 9,130    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,500    | 6,000    | 82,000   | 44,000   | 36,000   | 9,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,550    | 6,000    | 82,000   | 44,000   | 36,000   | 9,250    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,560    | 6,000    | 82,000   | 44,000   | 36,000   | 9,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,600    | 6,000    | 82,000   | 44,000   | 36,000   | 9,340    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,700    | 6,000    | 82,000   | 44,000   | 36,000   | 9,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,800    | 6,000    | 82,000   | 44,000   | 36,000   | 9,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,900    | 6,000    | 82,000   | 44,000   | 36,000   | 9,520    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,950    | 6,000    | 82,000   | 44,000   | 36,000   | 9,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,000    | 6,000    | 82,000   | 44,000   | 36,000   | 9,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,100    | 8,000    | 91,000   | 53,000   | 36,000   | 9,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,200    | 8,000    | 91,000   | 53,000   | 36,000   | 9,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,300    | 8,000    | 91,000   | 53,000   | 36,000   | 9,920    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,350    | 8,000    | 91,000   | 53,000   | 36,000   | 10,000   | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,400    | 8,000    | 91,000   | 53,000   | 36,000   | 10,100   | 12,000   | 118,000  | 71,000   | 45,000   |
| 6,500    | 8,000    | 91,000   | 53,000   | 36,000   | 10,200   | 12,000   | 118,000  | 71,000   | 45,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 10,300   | 12,000   | 118,000  | 71,000   | 45,000   | 14,100   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,320   | 12,000   | 118,000  | 71,000   | 45,000   | 14,200   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,400   | 12,000   | 118,000  | 71,000   | 45,000   | 14,290   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,500   | 12,000   | 118,000  | 71,000   | 45,000   | 14,300   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,600   | 12,000   | 118,000  | 71,000   | 45,000   | 14,400   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,700   | 12,000   | 118,000  | 71,000   | 45,000   | 14,500   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,800   | 12,000   | 118,000  | 71,000   | 45,000   | 14,700   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,900   | 12,000   | 118,000  | 71,000   | 45,000   | 14,800   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,000   | 12,000   | 118,000  | 71,000   | 45,000   | 15,000   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,100   | 12,000   | 118,000  | 71,000   | 45,000   | 15,100   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,110   | 12,000   | 118,000  | 71,000   | 45,000   | 15,200   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,200   | 12,000   | 118,000  | 71,000   | 45,000   | 15,300   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,300   | 12,000   | 118,000  | 71,000   | 45,000   | 15,500   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,400   | 12,000   | 118,000  | 71,000   | 45,000   | 15,700   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,500   | 12,000   | 118,000  | 71,000   | 45,000   | 15,800   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,600   | 12,000   | 118,000  | 71,000   | 45,000   | 16,000   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,700   | 12,000   | 118,000  | 71,000   | 45,000   | 16,500   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,800   | 12,000   | 118,000  | 71,000   | 45,000   | 16,700   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,900   | 12,000   | 118,000  | 71,000   | 45,000   | 16,900   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,910   | 12,000   | 118,000  | 71,000   | 45,000   | 17,000   | 18,000   | 143,000  | 93,000   | 48,000   |
| 12,000   | 12,000   | 118,000  | 71,000   | 45,000   | 17,500   | 18,000   | 143,000  | 93,000   | 48,000   |
| 12,100   | 14,000   | 124,000  | 77,000   | 45,000   | 17,700   | 18,000   | 143,000  | 93,000   | 48,000   |
| 12,200   | 14,000   | 124,000  | 77,000   | 45,000   | 18,000   | 18,000   | 143,000  | 93,000   | 48,000   |
| 12,500   | 14,000   | 124,000  | 77,000   | 45,000   | 18,500   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,600   | 14,000   | 124,000  | 77,000   | 45,000   | 18,900   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,700   | 14,000   | 124,000  | 77,000   | 45,000   | 19,000   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,800   | 14,000   | 124,000  | 77,000   | 45,000   | 19,050   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,900   | 14,000   | 124,000  | 77,000   | 45,000   | 19,300   | 20,000   | 153,000  | 101,000  | 50,000   |
| 13,000   | 14,000   | 124,000  | 77,000   | 45,000   | 19,500   | 20,000   | 153,000  | 101,000  | 50,000   |
| 13,100   | 14,000   | 124,000  | 77,000   | 45,000   | 20,000   | 20,000   | 153,000  | 101,000  | 50,000   |
| 13,300   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 13,400   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 13,500   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 13,700   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 13,800   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 14,000   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



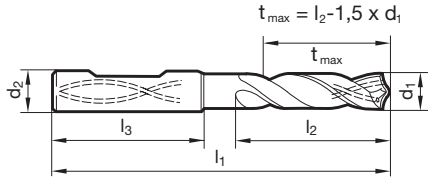
Katalog-Nr. 51681



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ○ | ● | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 240

- Flächenanschliff
- Hauptschneidenform gerade
- optimierte Schneidengeometrie



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 66,000   | 28,000   | 36,000   | 6,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,100    | 6,000    | 66,000   | 28,000   | 36,000   | 6,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,170    | 6,000    | 66,000   | 28,000   | 36,000   | 6,750    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,200    | 6,000    | 66,000   | 28,000   | 36,000   | 6,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,250    | 6,000    | 66,000   | 28,000   | 36,000   | 6,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,300    | 6,000    | 66,000   | 28,000   | 36,000   | 7,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,400    | 6,000    | 66,000   | 28,000   | 36,000   | 7,100    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,500    | 6,000    | 66,000   | 28,000   | 36,000   | 7,140    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,570    | 6,000    | 66,000   | 28,000   | 36,000   | 7,200    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,600    | 6,000    | 66,000   | 28,000   | 36,000   | 7,300    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,700    | 6,000    | 66,000   | 28,000   | 36,000   | 7,400    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,800    | 6,000    | 74,000   | 36,000   | 36,000   | 7,500    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,900    | 6,000    | 74,000   | 36,000   | 36,000   | 7,540    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,970    | 6,000    | 74,000   | 36,000   | 36,000   | 7,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,000    | 6,000    | 74,000   | 36,000   | 36,000   | 7,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,100    | 6,000    | 74,000   | 36,000   | 36,000   | 7,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,200    | 6,000    | 74,000   | 36,000   | 36,000   | 7,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,300    | 6,000    | 74,000   | 36,000   | 36,000   | 7,940    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,370    | 6,000    | 74,000   | 36,000   | 36,000   | 8,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,400    | 6,000    | 74,000   | 36,000   | 36,000   | 8,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,500    | 6,000    | 74,000   | 36,000   | 36,000   | 8,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,600    | 6,000    | 74,000   | 36,000   | 36,000   | 8,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,650    | 6,000    | 74,000   | 36,000   | 36,000   | 8,330    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,700    | 6,000    | 74,000   | 36,000   | 36,000   | 8,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,760    | 6,000    | 82,000   | 44,000   | 36,000   | 8,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,800    | 6,000    | 82,000   | 44,000   | 36,000   | 8,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,900    | 6,000    | 82,000   | 44,000   | 36,000   | 8,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,000    | 6,000    | 82,000   | 44,000   | 36,000   | 8,730    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,100    | 6,000    | 82,000   | 44,000   | 36,000   | 8,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,160    | 6,000    | 82,000   | 44,000   | 36,000   | 8,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,200    | 6,000    | 82,000   | 44,000   | 36,000   | 9,000    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,300    | 6,000    | 82,000   | 44,000   | 36,000   | 9,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,400    | 6,000    | 82,000   | 44,000   | 36,000   | 9,130    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,500    | 6,000    | 82,000   | 44,000   | 36,000   | 9,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,550    | 6,000    | 82,000   | 44,000   | 36,000   | 9,250    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,560    | 6,000    | 82,000   | 44,000   | 36,000   | 9,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,600    | 6,000    | 82,000   | 44,000   | 36,000   | 9,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,700    | 6,000    | 82,000   | 44,000   | 36,000   | 9,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,800    | 6,000    | 82,000   | 44,000   | 36,000   | 9,520    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,900    | 6,000    | 82,000   | 44,000   | 36,000   | 9,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,950    | 6,000    | 82,000   | 44,000   | 36,000   | 9,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,000    | 6,000    | 82,000   | 44,000   | 36,000   | 9,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,100    | 8,000    | 91,000   | 53,000   | 36,000   | 9,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,200    | 8,000    | 91,000   | 53,000   | 36,000   | 9,920    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,300    | 8,000    | 91,000   | 53,000   | 36,000   | 10,000   | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,350    | 8,000    | 91,000   | 53,000   | 36,000   | 10,100   | 12,000   | 118,000  | 71,000   | 45,000   |
| 6,400    | 8,000    | 91,000   | 53,000   | 36,000   | 10,200   | 12,000   | 118,000  | 71,000   | 45,000   |
| 6,500    | 8,000    | 91,000   | 53,000   | 36,000   | 10,300   | 12,000   | 118,000  | 71,000   | 45,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 10,320   | 12,000   | 118,000  | 71,000   | 45,000   | 13,500   | 14,000   | 124,000  | 77,000   | 45,000   |
| 10,400   | 12,000   | 118,000  | 71,000   | 45,000   | 13,700   | 14,000   | 124,000  | 77,000   | 45,000   |
| 10,500   | 12,000   | 118,000  | 71,000   | 45,000   | 14,000   | 14,000   | 124,000  | 77,000   | 45,000   |
| 10,600   | 12,000   | 118,000  | 71,000   | 45,000   | 14,200   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,700   | 12,000   | 118,000  | 71,000   | 45,000   | 14,290   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,800   | 12,000   | 118,000  | 71,000   | 45,000   | 14,500   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,900   | 12,000   | 118,000  | 71,000   | 45,000   | 14,700   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,000   | 12,000   | 118,000  | 71,000   | 45,000   | 15,000   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,100   | 12,000   | 118,000  | 71,000   | 45,000   | 15,200   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,110   | 12,000   | 118,000  | 71,000   | 45,000   | 15,500   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,200   | 12,000   | 118,000  | 71,000   | 45,000   | 15,700   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,300   | 12,000   | 118,000  | 71,000   | 45,000   | 16,000   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,400   | 12,000   | 118,000  | 71,000   | 45,000   | 16,500   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,500   | 12,000   | 118,000  | 71,000   | 45,000   | 17,000   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,600   | 12,000   | 118,000  | 71,000   | 45,000   | 17,500   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,700   | 12,000   | 118,000  | 71,000   | 45,000   | 18,000   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,800   | 12,000   | 118,000  | 71,000   | 45,000   | 18,500   | 20,000   | 153,000  | 101,000  | 50,000   |
| 11,900   | 12,000   | 118,000  | 71,000   | 45,000   | 19,000   | 20,000   | 153,000  | 101,000  | 50,000   |
| 11,910   | 12,000   | 118,000  | 71,000   | 45,000   | 19,050   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,000   | 12,000   | 118,000  | 71,000   | 45,000   | 19,500   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,200   | 14,000   | 124,000  | 77,000   | 45,000   | 20,000   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,500   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 12,700   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 13,000   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



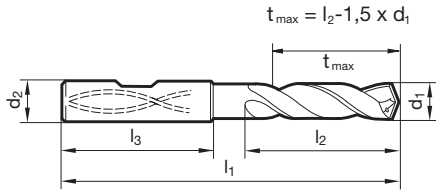
Katalog-Nr. 51674



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
|   | • |   |   | ○ |   |

Arbeitsrichtwerte  
Seite 240

- Flächenanschliff
- Hauptschneidenform gerade
- optimierte Schneidengeometrie
- besonders geeignet für rostfreie Stähle



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,100    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,170    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,200    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,250    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,300    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,400    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,500    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,570    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,600    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,700    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,800    | 6,000    | 74,000   | 36,000   | 36,000   |
| 3,900    | 6,000    | 74,000   | 36,000   | 36,000   |
| 3,970    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,000    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,100    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,200    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,300    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,370    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,400    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,500    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,600    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,650    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,700    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,760    | 6,000    | 82,000   | 44,000   | 36,000   |
| 4,800    | 6,000    | 82,000   | 44,000   | 36,000   |
| 4,900    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,000    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,100    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,160    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,200    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,300    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,400    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,500    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,550    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,560    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,600    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,700    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,800    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,900    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,950    | 6,000    | 82,000   | 44,000   | 36,000   |
| 6,000    | 6,000    | 82,000   | 44,000   | 36,000   |
| 6,100    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,200    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,300    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,350    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,400    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,500    | 8,000    | 91,000   | 53,000   | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 6,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,750    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,100    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,140    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,200    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,300    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,400    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,500    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,540    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,940    | 8,000    | 91,000   | 53,000   | 36,000   |
| 8,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 8,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,330    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,730    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,000    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,130    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,250    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,520    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,920    | 10,000   | 103,000  | 61,000   | 40,000   |
| 10,000   | 10,000   | 103,000  | 61,000   | 40,000   |
| 10,100   | 12,000   | 118,000  | 71,000   | 45,000   |
| 10,200   | 12,000   | 118,000  | 71,000   | 45,000   |
| 10,300   | 12,000   | 118,000  | 71,000   | 45,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 10,320   | 12,000   | 118,000  | 71,000   | 45,000   | 13,500   | 14,000   | 124,000  | 77,000   | 45,000   |
| 10,400   | 12,000   | 118,000  | 71,000   | 45,000   | 13,700   | 14,000   | 124,000  | 77,000   | 45,000   |
| 10,500   | 12,000   | 118,000  | 71,000   | 45,000   | 14,000   | 14,000   | 124,000  | 77,000   | 45,000   |
| 10,600   | 12,000   | 118,000  | 71,000   | 45,000   | 14,200   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,700   | 12,000   | 118,000  | 71,000   | 45,000   | 14,290   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,800   | 12,000   | 118,000  | 71,000   | 45,000   | 14,500   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,900   | 12,000   | 118,000  | 71,000   | 45,000   | 14,700   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,000   | 12,000   | 118,000  | 71,000   | 45,000   | 15,000   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,100   | 12,000   | 118,000  | 71,000   | 45,000   | 15,200   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,110   | 12,000   | 118,000  | 71,000   | 45,000   | 15,500   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,200   | 12,000   | 118,000  | 71,000   | 45,000   | 15,700   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,300   | 12,000   | 118,000  | 71,000   | 45,000   | 16,000   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,400   | 12,000   | 118,000  | 71,000   | 45,000   | 16,500   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,500   | 12,000   | 118,000  | 71,000   | 45,000   | 17,000   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,600   | 12,000   | 118,000  | 71,000   | 45,000   | 17,500   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,700   | 12,000   | 118,000  | 71,000   | 45,000   | 18,000   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,800   | 12,000   | 118,000  | 71,000   | 45,000   | 18,500   | 20,000   | 153,000  | 101,000  | 50,000   |
| 11,900   | 12,000   | 118,000  | 71,000   | 45,000   | 19,000   | 20,000   | 153,000  | 101,000  | 50,000   |
| 11,910   | 12,000   | 118,000  | 71,000   | 45,000   | 19,500   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,000   | 12,000   | 118,000  | 71,000   | 45,000   | 20,000   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,200   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 12,500   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 12,700   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 13,000   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



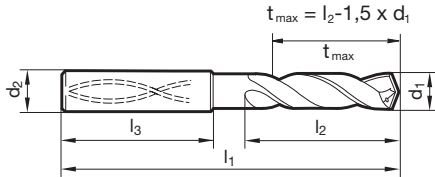
Katalog-Nr. 51786



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ○ | ○ | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 244

- Kegelmantelanschliff
- Hauptschneidenform konkav
- optimierte Schneidengeometrie
- vier Führungsfasen



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,100    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,170    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,200    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,250    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,300    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,400    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,500    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,570    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,600    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,700    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,800    | 6,000    | 74,000   | 36,000   | 36,000   |
| 3,900    | 6,000    | 74,000   | 36,000   | 36,000   |
| 3,970    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,000    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,040    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,100    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,200    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,300    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,370    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,400    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,500    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,600    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,650    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,700    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,760    | 6,000    | 82,000   | 44,000   | 36,000   |
| 4,800    | 6,000    | 82,000   | 44,000   | 36,000   |
| 4,900    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,000    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,100    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,110    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,160    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,200    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,300    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,400    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,410    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,500    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,550    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,560    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,600    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,700    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,800    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,900    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,950    | 6,000    | 82,000   | 44,000   | 36,000   |
| 6,000    | 6,000    | 82,000   | 44,000   | 36,000   |
| 6,100    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,200    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,300    | 8,000    | 91,000   | 53,000   | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 6,350    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,400    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,500    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,530    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,550    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,750    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,100    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,140    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,200    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,300    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,400    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,500    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,540    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,550    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,650    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,940    | 8,000    | 91,000   | 53,000   | 36,000   |
| 8,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 8,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,330    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,730    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,000    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,130    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,250    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,340    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,520    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,550    | 10,000   | 103,000  | 61,000   | 40,000   |





## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



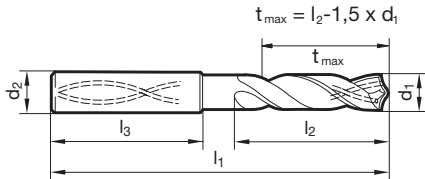
Katalog-Nr. 51754



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● |   |   |   | ● | ○ |

Arbeitsrichtwerte  
Seite 242

- Ausspitzung  $\geq \text{Ø } 3,000$
- Kegelmantelanschliff
- Hauptschneidenform konkav
- sehr harte Beschichtung
- vier Führungsfasen



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,100    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,170    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,200    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,250    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,300    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,400    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,500    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,570    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,600    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,700    | 6,000    | 66,000   | 28,000   | 36,000   |
| 3,800    | 6,000    | 74,000   | 36,000   | 36,000   |
| 3,900    | 6,000    | 74,000   | 36,000   | 36,000   |
| 3,970    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,000    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,100    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,200    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,300    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,370    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,400    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,500    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,600    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,650    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,700    | 6,000    | 74,000   | 36,000   | 36,000   |
| 4,760    | 6,000    | 82,000   | 44,000   | 36,000   |
| 4,800    | 6,000    | 82,000   | 44,000   | 36,000   |
| 4,900    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,000    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,100    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,160    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,200    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,300    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,400    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,500    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,550    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,560    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,600    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,700    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,800    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,900    | 6,000    | 82,000   | 44,000   | 36,000   |
| 5,950    | 6,000    | 82,000   | 44,000   | 36,000   |
| 6,000    | 6,000    | 82,000   | 44,000   | 36,000   |
| 6,100    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,200    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,300    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,350    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,400    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,500    | 8,000    | 91,000   | 53,000   | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 6,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,750    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 6,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,100    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,140    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,200    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,300    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,400    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,500    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,540    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 7,940    | 8,000    | 91,000   | 53,000   | 36,000   |
| 8,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 8,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,330    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,730    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 8,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,000    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,130    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,250    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,520    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 9,920    | 10,000   | 103,000  | 61,000   | 40,000   |
| 10,000   | 10,000   | 103,000  | 61,000   | 40,000   |
| 10,100   | 12,000   | 118,000  | 71,000   | 45,000   |
| 10,200   | 12,000   | 118,000  | 71,000   | 45,000   |
| 10,300   | 12,000   | 118,000  | 71,000   | 45,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 10,320   | 12,000   | 118,000  | 71,000   | 45,000   | 13,500   | 14,000   | 124,000  | 77,000   | 45,000   |
| 10,400   | 12,000   | 118,000  | 71,000   | 45,000   | 13,700   | 14,000   | 124,000  | 77,000   | 45,000   |
| 10,500   | 12,000   | 118,000  | 71,000   | 45,000   | 14,000   | 14,000   | 124,000  | 77,000   | 45,000   |
| 10,600   | 12,000   | 118,000  | 71,000   | 45,000   | 14,200   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,700   | 12,000   | 118,000  | 71,000   | 45,000   | 14,290   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,720   | 12,000   | 118,000  | 71,000   | 45,000   | 14,300   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,800   | 12,000   | 118,000  | 71,000   | 45,000   | 14,500   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,900   | 12,000   | 118,000  | 71,000   | 45,000   | 14,700   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,000   | 12,000   | 118,000  | 71,000   | 45,000   | 15,000   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,100   | 12,000   | 118,000  | 71,000   | 45,000   | 15,200   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,110   | 12,000   | 118,000  | 71,000   | 45,000   | 15,300   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,200   | 12,000   | 118,000  | 71,000   | 45,000   | 15,500   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,300   | 12,000   | 118,000  | 71,000   | 45,000   | 15,700   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,400   | 12,000   | 118,000  | 71,000   | 45,000   | 15,870   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,500   | 12,000   | 118,000  | 71,000   | 45,000   | 16,000   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,510   | 12,000   | 118,000  | 71,000   | 45,000   | 16,300   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,600   | 12,000   | 118,000  | 71,000   | 45,000   | 16,500   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,700   | 12,000   | 118,000  | 71,000   | 45,000   | 16,900   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,800   | 12,000   | 118,000  | 71,000   | 45,000   | 17,000   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,900   | 12,000   | 118,000  | 71,000   | 45,000   | 17,300   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,910   | 12,000   | 118,000  | 71,000   | 45,000   | 17,500   | 18,000   | 143,000  | 93,000   | 48,000   |
| 12,000   | 12,000   | 118,000  | 71,000   | 45,000   | 18,000   | 18,000   | 143,000  | 93,000   | 48,000   |
| 12,200   | 14,000   | 124,000  | 77,000   | 45,000   | 18,500   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,300   | 14,000   | 124,000  | 77,000   | 45,000   | 18,900   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,500   | 14,000   | 124,000  | 77,000   | 45,000   | 19,000   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,700   | 14,000   | 124,000  | 77,000   | 45,000   | 19,050   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,800   | 14,000   | 124,000  | 77,000   | 45,000   | 19,300   | 20,000   | 153,000  | 101,000  | 50,000   |
| 13,000   | 14,000   | 124,000  | 77,000   | 45,000   | 19,500   | 20,000   | 153,000  | 101,000  | 50,000   |
| 13,300   | 14,000   | 124,000  | 77,000   | 45,000   | 20,000   | 20,000   | 153,000  | 101,000  | 50,000   |
| 13,490   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



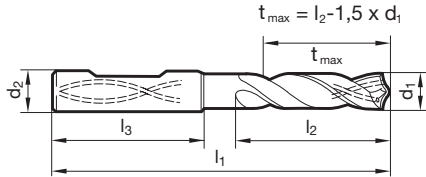
Katalog-Nr. 51755



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● |   |   |   | ● | ○ |

Arbeitsrichtwerte  
Seite 242

- Ausspitzung  $\geq \varnothing 3,000$
- Kegelmantelanschliff
- Hauptschneidenform konkav
- sehr harte Beschichtung
- vier Führungsfasen



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 66,000   | 28,000   | 36,000   | 6,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,100    | 6,000    | 66,000   | 28,000   | 36,000   | 6,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,170    | 6,000    | 66,000   | 28,000   | 36,000   | 6,750    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,200    | 6,000    | 66,000   | 28,000   | 36,000   | 6,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,250    | 6,000    | 66,000   | 28,000   | 36,000   | 6,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,300    | 6,000    | 66,000   | 28,000   | 36,000   | 7,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,400    | 6,000    | 66,000   | 28,000   | 36,000   | 7,100    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,500    | 6,000    | 66,000   | 28,000   | 36,000   | 7,140    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,570    | 6,000    | 66,000   | 28,000   | 36,000   | 7,200    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,600    | 6,000    | 66,000   | 28,000   | 36,000   | 7,300    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,700    | 6,000    | 66,000   | 28,000   | 36,000   | 7,400    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,800    | 6,000    | 74,000   | 36,000   | 36,000   | 7,500    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,900    | 6,000    | 74,000   | 36,000   | 36,000   | 7,540    | 8,000    | 91,000   | 53,000   | 36,000   |
| 3,970    | 6,000    | 74,000   | 36,000   | 36,000   | 7,600    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,000    | 6,000    | 74,000   | 36,000   | 36,000   | 7,700    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,100    | 6,000    | 74,000   | 36,000   | 36,000   | 7,800    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,200    | 6,000    | 74,000   | 36,000   | 36,000   | 7,900    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,300    | 6,000    | 74,000   | 36,000   | 36,000   | 7,940    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,370    | 6,000    | 74,000   | 36,000   | 36,000   | 8,000    | 8,000    | 91,000   | 53,000   | 36,000   |
| 4,400    | 6,000    | 74,000   | 36,000   | 36,000   | 8,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,500    | 6,000    | 74,000   | 36,000   | 36,000   | 8,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,600    | 6,000    | 74,000   | 36,000   | 36,000   | 8,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,650    | 6,000    | 74,000   | 36,000   | 36,000   | 8,330    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,700    | 6,000    | 74,000   | 36,000   | 36,000   | 8,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,760    | 6,000    | 82,000   | 44,000   | 36,000   | 8,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,800    | 6,000    | 82,000   | 44,000   | 36,000   | 8,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 4,900    | 6,000    | 82,000   | 44,000   | 36,000   | 8,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,000    | 6,000    | 82,000   | 44,000   | 36,000   | 8,730    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,100    | 6,000    | 82,000   | 44,000   | 36,000   | 8,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,160    | 6,000    | 82,000   | 44,000   | 36,000   | 8,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,200    | 6,000    | 82,000   | 44,000   | 36,000   | 9,000    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,300    | 6,000    | 82,000   | 44,000   | 36,000   | 9,100    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,400    | 6,000    | 82,000   | 44,000   | 36,000   | 9,130    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,500    | 6,000    | 82,000   | 44,000   | 36,000   | 9,200    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,550    | 6,000    | 82,000   | 44,000   | 36,000   | 9,250    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,560    | 6,000    | 82,000   | 44,000   | 36,000   | 9,300    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,600    | 6,000    | 82,000   | 44,000   | 36,000   | 9,400    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,700    | 6,000    | 82,000   | 44,000   | 36,000   | 9,500    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,800    | 6,000    | 82,000   | 44,000   | 36,000   | 9,520    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,900    | 6,000    | 82,000   | 44,000   | 36,000   | 9,600    | 10,000   | 103,000  | 61,000   | 40,000   |
| 5,950    | 6,000    | 82,000   | 44,000   | 36,000   | 9,700    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,000    | 6,000    | 82,000   | 44,000   | 36,000   | 9,800    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,100    | 8,000    | 91,000   | 53,000   | 36,000   | 9,900    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,200    | 8,000    | 91,000   | 53,000   | 36,000   | 9,920    | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,300    | 8,000    | 91,000   | 53,000   | 36,000   | 10,000   | 10,000   | 103,000  | 61,000   | 40,000   |
| 6,350    | 8,000    | 91,000   | 53,000   | 36,000   | 10,100   | 12,000   | 118,000  | 71,000   | 45,000   |
| 6,400    | 8,000    | 91,000   | 53,000   | 36,000   | 10,200   | 12,000   | 118,000  | 71,000   | 45,000   |
| 6,500    | 8,000    | 91,000   | 53,000   | 36,000   | 10,300   | 12,000   | 118,000  | 71,000   | 45,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 10,320   | 12,000   | 118,000  | 71,000   | 45,000   | 14,290   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,400   | 12,000   | 118,000  | 71,000   | 45,000   | 14,300   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,500   | 12,000   | 118,000  | 71,000   | 45,000   | 14,500   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,600   | 12,000   | 118,000  | 71,000   | 45,000   | 14,700   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,700   | 12,000   | 118,000  | 71,000   | 45,000   | 15,000   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,800   | 12,000   | 118,000  | 71,000   | 45,000   | 15,200   | 16,000   | 133,000  | 83,000   | 48,000   |
| 10,900   | 12,000   | 118,000  | 71,000   | 45,000   | 15,300   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,000   | 12,000   | 118,000  | 71,000   | 45,000   | 15,500   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,100   | 12,000   | 118,000  | 71,000   | 45,000   | 15,700   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,110   | 12,000   | 118,000  | 71,000   | 45,000   | 16,000   | 16,000   | 133,000  | 83,000   | 48,000   |
| 11,200   | 12,000   | 118,000  | 71,000   | 45,000   | 16,300   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,300   | 12,000   | 118,000  | 71,000   | 45,000   | 16,500   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,400   | 12,000   | 118,000  | 71,000   | 45,000   | 16,900   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,500   | 12,000   | 118,000  | 71,000   | 45,000   | 17,000   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,600   | 12,000   | 118,000  | 71,000   | 45,000   | 17,300   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,700   | 12,000   | 118,000  | 71,000   | 45,000   | 17,500   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,800   | 12,000   | 118,000  | 71,000   | 45,000   | 18,000   | 18,000   | 143,000  | 93,000   | 48,000   |
| 11,900   | 12,000   | 118,000  | 71,000   | 45,000   | 18,500   | 20,000   | 153,000  | 101,000  | 50,000   |
| 11,910   | 12,000   | 118,000  | 71,000   | 45,000   | 18,900   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,000   | 12,000   | 118,000  | 71,000   | 45,000   | 19,000   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,200   | 14,000   | 124,000  | 77,000   | 45,000   | 19,050   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,500   | 14,000   | 124,000  | 77,000   | 45,000   | 19,300   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,700   | 14,000   | 124,000  | 77,000   | 45,000   | 19,500   | 20,000   | 153,000  | 101,000  | 50,000   |
| 12,800   | 14,000   | 124,000  | 77,000   | 45,000   | 20,000   | 20,000   | 153,000  | 101,000  | 50,000   |
| 13,000   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 13,300   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 13,500   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 13,700   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 14,000   | 14,000   | 124,000  | 77,000   | 45,000   |          |          |          |          |          |
| 14,200   | 16,000   | 133,000  | 83,000   | 48,000   |          |          |          |          |          |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



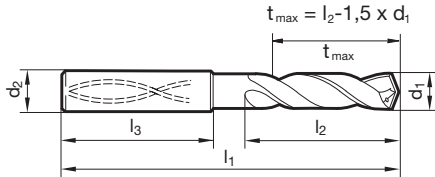
Katalog-Nr. 51791



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ○ | ○ | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 244

- Kegelmantelschliff
- Hauptschneidenform konkav
- optimierte Schneidengeometrie
- vier Führungsfasen



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 70,000   | 30,000   | 36,000   |
| 3,100    | 6,000    | 70,000   | 30,000   | 36,000   |
| 3,170    | 6,000    | 70,000   | 30,000   | 36,000   |
| 3,200    | 6,000    | 70,000   | 30,000   | 36,000   |
| 3,250    | 6,000    | 70,000   | 30,000   | 36,000   |
| 3,300    | 6,000    | 70,000   | 30,000   | 36,000   |
| 3,400    | 6,000    | 75,000   | 35,500   | 36,000   |
| 3,500    | 6,000    | 75,000   | 35,500   | 36,000   |
| 3,570    | 6,000    | 75,000   | 35,500   | 36,000   |
| 3,600    | 6,000    | 75,000   | 35,500   | 36,000   |
| 3,700    | 6,000    | 75,000   | 35,500   | 36,000   |
| 3,800    | 6,000    | 75,000   | 37,500   | 36,000   |
| 3,900    | 6,000    | 75,000   | 37,500   | 36,000   |
| 3,970    | 6,000    | 75,000   | 37,500   | 36,000   |
| 4,000    | 6,000    | 75,000   | 37,500   | 36,000   |
| 4,040    | 6,000    | 75,000   | 37,500   | 36,000   |
| 4,100    | 6,000    | 75,000   | 37,500   | 36,000   |
| 4,200    | 6,000    | 75,000   | 37,500   | 36,000   |
| 4,300    | 6,000    | 85,000   | 45,000   | 36,000   |
| 4,370    | 6,000    | 85,000   | 45,000   | 36,000   |
| 4,400    | 6,000    | 85,000   | 45,000   | 36,000   |
| 4,500    | 6,000    | 85,000   | 45,000   | 36,000   |
| 4,600    | 6,000    | 85,000   | 45,000   | 36,000   |
| 4,650    | 6,000    | 85,000   | 45,000   | 36,000   |
| 4,700    | 6,000    | 85,000   | 45,000   | 36,000   |
| 4,760    | 6,000    | 90,000   | 50,000   | 36,000   |
| 4,800    | 6,000    | 90,000   | 50,000   | 36,000   |
| 4,900    | 6,000    | 90,000   | 50,000   | 36,000   |
| 5,000    | 6,000    | 90,000   | 50,000   | 36,000   |
| 5,100    | 6,000    | 90,000   | 50,000   | 36,000   |
| 5,110    | 6,000    | 90,000   | 50,000   | 36,000   |
| 5,160    | 6,000    | 90,000   | 50,000   | 36,000   |
| 5,200    | 6,000    | 90,000   | 50,000   | 36,000   |
| 5,300    | 6,000    | 90,000   | 50,000   | 36,000   |
| 5,400    | 6,000    | 97,000   | 57,000   | 36,000   |
| 5,410    | 6,000    | 97,000   | 57,000   | 36,000   |
| 5,500    | 6,000    | 97,000   | 57,000   | 36,000   |
| 5,550    | 6,000    | 97,000   | 57,000   | 36,000   |
| 5,560    | 6,000    | 97,000   | 57,000   | 36,000   |
| 5,600    | 6,000    | 97,000   | 57,000   | 36,000   |
| 5,700    | 6,000    | 97,000   | 57,000   | 36,000   |
| 5,800    | 6,000    | 97,000   | 57,000   | 36,000   |
| 5,900    | 6,000    | 97,000   | 57,000   | 36,000   |
| 5,950    | 6,000    | 97,000   | 57,000   | 36,000   |
| 6,000    | 6,000    | 97,000   | 57,000   | 36,000   |
| 6,100    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,200    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,300    | 8,000    | 106,000  | 66,000   | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 6,350    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,400    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,500    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,530    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,550    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,600    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,700    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,750    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,800    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,900    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,000    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,100    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,140    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,200    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,300    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,400    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,500    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,540    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,550    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,600    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,650    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,700    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,800    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,900    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,940    | 8,000    | 116,000  | 76,000   | 36,000   |
| 8,000    | 8,000    | 116,000  | 76,000   | 36,000   |
| 8,100    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,200    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,300    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,330    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,400    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,500    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,600    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,700    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,730    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,800    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,900    | 10,000   | 131,000  | 87,000   | 40,000   |
| 9,000    | 10,000   | 131,000  | 87,000   | 40,000   |
| 9,100    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,130    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,200    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,250    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,300    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,340    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,400    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,500    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,520    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,550    | 10,000   | 139,000  | 95,000   | 40,000   |



## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



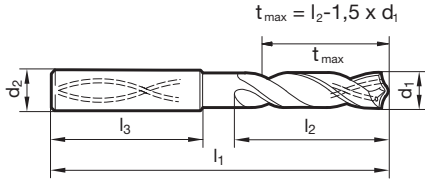
Katalog-Nr. 51756



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|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● |   |   |   | ● | ○ |

Arbeitsrichtwerte  
Seite 242

- Ausspitzung  $\geq \varnothing 3,000$
- Kegelmantelschliff
- Hauptschneidenform konkav
- sehr harte Beschichtung
- vier Führungsfasen



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 70,000   | 30,000   | 36,000   |
| 3,170    | 6,000    | 70,000   | 30,000   | 36,000   |
| 3,250    | 6,000    | 70,000   | 30,000   | 36,000   |
| 3,300    | 6,000    | 70,000   | 30,000   | 36,000   |
| 3,400    | 6,000    | 75,000   | 35,500   | 36,000   |
| 3,500    | 6,000    | 75,000   | 35,500   | 36,000   |
| 3,570    | 6,000    | 75,000   | 35,500   | 36,000   |
| 3,700    | 6,000    | 75,000   | 35,500   | 36,000   |
| 3,970    | 6,000    | 75,000   | 37,500   | 36,000   |
| 4,000    | 6,000    | 75,000   | 37,500   | 36,000   |
| 4,200    | 6,000    | 75,000   | 37,500   | 36,000   |
| 4,300    | 6,000    | 85,000   | 45,000   | 36,000   |
| 4,370    | 6,000    | 85,000   | 45,000   | 36,000   |
| 4,500    | 6,000    | 85,000   | 45,000   | 36,000   |
| 4,650    | 6,000    | 85,000   | 45,000   | 36,000   |
| 4,760    | 6,000    | 90,000   | 50,000   | 36,000   |
| 5,000    | 6,000    | 90,000   | 50,000   | 36,000   |
| 5,100    | 6,000    | 90,000   | 50,000   | 36,000   |
| 5,160    | 6,000    | 90,000   | 50,000   | 36,000   |
| 5,200    | 6,000    | 90,000   | 50,000   | 36,000   |
| 5,500    | 6,000    | 97,000   | 57,000   | 36,000   |
| 5,550    | 6,000    | 97,000   | 57,000   | 36,000   |
| 5,560    | 6,000    | 97,000   | 57,000   | 36,000   |
| 5,950    | 6,000    | 97,000   | 57,000   | 36,000   |
| 6,000    | 6,000    | 97,000   | 57,000   | 36,000   |
| 6,350    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,500    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,530    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,750    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,800    | 8,000    | 106,000  | 66,000   | 36,000   |
| 6,900    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,000    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,140    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,400    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,500    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,540    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,800    | 8,000    | 116,000  | 76,000   | 36,000   |
| 7,940    | 8,000    | 116,000  | 76,000   | 36,000   |
| 8,000    | 8,000    | 116,000  | 76,000   | 36,000   |
| 8,330    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,500    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,600    | 10,000   | 131,000  | 87,000   | 40,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 8,730    | 10,000   | 131,000  | 87,000   | 40,000   |
| 8,800    | 10,000   | 131,000  | 87,000   | 40,000   |
| 9,000    | 10,000   | 131,000  | 87,000   | 40,000   |
| 9,130    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,250    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,340    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,400    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,500    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,520    | 10,000   | 139,000  | 95,000   | 40,000   |
| 9,920    | 10,000   | 139,000  | 95,000   | 40,000   |
| 10,000   | 10,000   | 139,000  | 95,000   | 40,000   |
| 10,200   | 12,000   | 155,000  | 106,000  | 45,000   |
| 10,320   | 12,000   | 155,000  | 106,000  | 45,000   |
| 10,400   | 12,000   | 155,000  | 106,000  | 45,000   |
| 10,500   | 12,000   | 155,000  | 106,000  | 45,000   |
| 10,720   | 12,000   | 155,000  | 106,000  | 45,000   |
| 10,800   | 12,000   | 155,000  | 106,000  | 45,000   |
| 11,000   | 12,000   | 155,000  | 106,000  | 45,000   |
| 11,110   | 12,000   | 163,000  | 114,000  | 45,000   |
| 11,300   | 12,000   | 163,000  | 114,000  | 45,000   |
| 11,400   | 12,000   | 163,000  | 114,000  | 45,000   |
| 11,500   | 12,000   | 163,000  | 114,000  | 45,000   |
| 11,510   | 12,000   | 163,000  | 114,000  | 45,000   |
| 11,910   | 12,000   | 163,000  | 114,000  | 45,000   |
| 12,000   | 12,000   | 163,000  | 114,000  | 45,000   |
| 12,300   | 14,000   | 182,000  | 133,000  | 45,000   |
| 12,500   | 14,000   | 182,000  | 133,000  | 45,000   |
| 12,700   | 14,000   | 182,000  | 133,000  | 45,000   |
| 13,000   | 14,000   | 182,000  | 133,000  | 45,000   |
| 13,100   | 14,000   | 182,000  | 133,000  | 45,000   |
| 13,490   | 14,000   | 182,000  | 133,000  | 45,000   |
| 13,500   | 14,000   | 182,000  | 133,000  | 45,000   |
| 14,000   | 14,000   | 182,000  | 133,000  | 45,000   |
| 14,500   | 16,000   | 204,000  | 152,000  | 48,000   |
| 15,000   | 16,000   | 204,000  | 152,000  | 48,000   |
| 15,100   | 16,000   | 204,000  | 152,000  | 48,000   |
| 15,500   | 16,000   | 204,000  | 152,000  | 48,000   |
| 15,870   | 16,000   | 204,000  | 152,000  | 48,000   |
| 16,000   | 16,000   | 204,000  | 152,000  | 48,000   |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



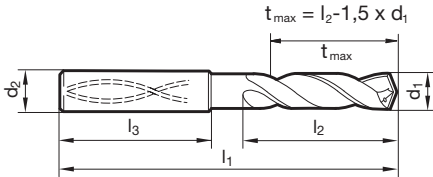
Katalog-Nr. 51792



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ○ | ○ | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 244

- Kegelmantelschliff
- Hauptschneidenform konkav
- optimierte Schneidengeometrie
- vier Führungsfasen



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 95,000   | 55,000   | 36,000   | 6,350    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,100    | 6,000    | 95,000   | 55,000   | 36,000   | 6,400    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,170    | 6,000    | 95,000   | 55,000   | 36,000   | 6,500    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,200    | 6,000    | 95,000   | 55,000   | 36,000   | 6,530    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,250    | 6,000    | 95,000   | 55,000   | 36,000   | 6,550    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,300    | 6,000    | 95,000   | 55,000   | 36,000   | 6,600    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,400    | 6,000    | 95,000   | 55,000   | 36,000   | 6,700    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,500    | 6,000    | 102,000  | 62,000   | 36,000   | 6,750    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,570    | 6,000    | 102,000  | 62,000   | 36,000   | 6,800    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,600    | 6,000    | 102,000  | 62,000   | 36,000   | 6,900    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,700    | 6,000    | 102,000  | 62,000   | 36,000   | 7,000    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,800    | 6,000    | 102,000  | 62,000   | 36,000   | 7,100    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,900    | 6,000    | 102,000  | 62,000   | 36,000   | 7,140    | 8,000    | 158,000  | 118,000  | 36,000   |
| 3,970    | 6,000    | 102,000  | 62,000   | 36,000   | 7,200    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,000    | 6,000    | 102,000  | 62,000   | 36,000   | 7,300    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,040    | 6,000    | 109,000  | 69,000   | 36,000   | 7,400    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,100    | 6,000    | 109,000  | 69,000   | 36,000   | 7,500    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,200    | 6,000    | 109,000  | 69,000   | 36,000   | 7,540    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,300    | 6,000    | 109,000  | 69,000   | 36,000   | 7,550    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,370    | 6,000    | 109,000  | 69,000   | 36,000   | 7,600    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,400    | 6,000    | 109,000  | 69,000   | 36,000   | 7,650    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,500    | 6,000    | 116,000  | 76,000   | 36,000   | 7,700    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,600    | 6,000    | 116,000  | 76,000   | 36,000   | 7,800    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,650    | 6,000    | 116,000  | 76,000   | 36,000   | 7,900    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,700    | 6,000    | 116,000  | 76,000   | 36,000   | 7,940    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,760    | 6,000    | 116,000  | 76,000   | 36,000   | 8,000    | 8,000    | 158,000  | 118,000  | 36,000   |
| 4,800    | 6,000    | 116,000  | 76,000   | 36,000   | 8,100    | 10,000   | 190,000  | 146,000  | 40,000   |
| 4,900    | 6,000    | 116,000  | 76,000   | 36,000   | 8,200    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,000    | 6,000    | 116,000  | 76,000   | 36,000   | 8,300    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,100    | 6,000    | 123,000  | 83,000   | 36,000   | 8,330    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,110    | 6,000    | 123,000  | 83,000   | 36,000   | 8,400    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,160    | 6,000    | 123,000  | 83,000   | 36,000   | 8,500    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,200    | 6,000    | 123,000  | 83,000   | 36,000   | 8,600    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,300    | 6,000    | 123,000  | 83,000   | 36,000   | 8,700    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,400    | 6,000    | 123,000  | 83,000   | 36,000   | 8,730    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,410    | 6,000    | 123,000  | 83,000   | 36,000   | 8,800    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,500    | 6,000    | 130,000  | 90,000   | 36,000   | 8,900    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,550    | 6,000    | 130,000  | 90,000   | 36,000   | 9,000    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,560    | 6,000    | 130,000  | 90,000   | 36,000   | 9,100    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,600    | 6,000    | 130,000  | 90,000   | 36,000   | 9,130    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,700    | 6,000    | 130,000  | 90,000   | 36,000   | 9,200    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,800    | 6,000    | 130,000  | 90,000   | 36,000   | 9,250    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,900    | 6,000    | 130,000  | 90,000   | 36,000   | 9,300    | 10,000   | 190,000  | 146,000  | 40,000   |
| 5,950    | 6,000    | 130,000  | 90,000   | 36,000   | 9,340    | 10,000   | 190,000  | 146,000  | 40,000   |
| 6,000    | 6,000    | 130,000  | 90,000   | 36,000   | 9,400    | 10,000   | 190,000  | 146,000  | 40,000   |
| 6,100    | 8,000    | 158,000  | 118,000  | 36,000   | 9,500    | 10,000   | 190,000  | 146,000  | 40,000   |
| 6,200    | 8,000    | 158,000  | 118,000  | 36,000   | 9,520    | 10,000   | 190,000  | 146,000  | 40,000   |
| 6,300    | 8,000    | 158,000  | 118,000  | 36,000   | 9,550    | 10,000   | 190,000  | 146,000  | 40,000   |





## SuperV-Bohrer

## SuperV-Bohrer mit Innenkühlung



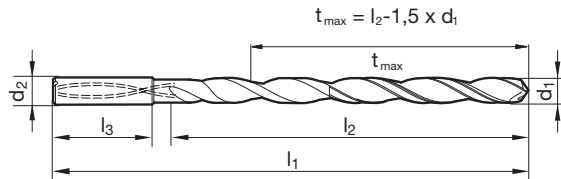
Katalog-Nr. 51764



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ○ | ○ |   |

 Arbeitsrichtwerte  
Seite 246

- Ausspitzung  $\geq \varnothing 3,000$
- Kegelmantelschliff
- Kopfbeschichtung
- Hauptschneidenform konkav
- optimierter Nutquerschnitt
- maximaler Kühlkanalquerschnitt
- Einsatz im Hydraulik-Dehnspannfutter
- vier Führungsfasen
- Kühlmitteldruck beachten (s. Diagramm „Kühlmittlempfehlungen“)



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 95,000   | 55,000   | 36,000   |
| 3,100    | 6,000    | 106,000  | 66,000   | 36,000   |
| 3,170    | 6,000    | 106,000  | 66,000   | 36,000   |
| 3,200    | 6,000    | 106,000  | 66,000   | 36,000   |
| 3,300    | 6,000    | 106,000  | 66,000   | 36,000   |
| 3,500    | 6,000    | 116,000  | 76,000   | 36,000   |
| 3,570    | 6,000    | 116,000  | 76,000   | 36,000   |
| 3,700    | 6,000    | 116,000  | 76,000   | 36,000   |
| 3,800    | 6,000    | 116,000  | 76,000   | 36,000   |
| 3,970    | 6,000    | 116,000  | 76,000   | 36,000   |
| 4,000    | 6,000    | 116,000  | 76,000   | 36,000   |
| 4,100    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,200    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,300    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,370    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,500    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,600    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,760    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,800    | 6,000    | 133,000  | 93,000   | 36,000   |
| 5,000    | 6,000    | 133,000  | 93,000   | 36,000   |
| 5,100    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,160    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,410    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,500    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,560    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,600    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,800    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,950    | 6,000    | 150,000  | 110,000  | 36,000   |
| 6,000    | 6,000    | 150,000  | 110,000  | 36,000   |
| 6,300    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,350    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,500    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,750    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,800    | 8,000    | 167,000  | 127,000  | 36,000   |
| 7,000    | 8,000    | 167,000  | 127,000  | 36,000   |
| 7,140    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,500    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,540    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,800    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,940    | 8,000    | 183,000  | 143,000  | 36,000   |
| 8,000    | 8,000    | 183,000  | 143,000  | 36,000   |
| 8,330    | 10,000   | 204,000  | 160,000  | 40,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 8,500    | 10,000   | 204,000  | 160,000  | 40,000   |
| 8,730    | 10,000   | 204,000  | 160,000  | 40,000   |
| 8,800    | 10,000   | 204,000  | 160,000  | 40,000   |
| 9,000    | 10,000   | 204,000  | 160,000  | 40,000   |
| 9,130    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,500    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,520    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,800    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,920    | 10,000   | 221,000  | 177,000  | 40,000   |
| 10,000   | 10,000   | 221,000  | 177,000  | 40,000   |
| 10,200   | 12,000   | 247,000  | 198,000  | 45,000   |
| 10,320   | 12,000   | 247,000  | 198,000  | 45,000   |
| 10,500   | 12,000   | 247,000  | 198,000  | 45,000   |
| 10,720   | 12,000   | 247,000  | 198,000  | 45,000   |
| 11,000   | 12,000   | 247,000  | 198,000  | 45,000   |
| 11,110   | 12,000   | 263,000  | 214,000  | 45,000   |
| 11,510   | 12,000   | 263,000  | 214,000  | 45,000   |
| 11,800   | 12,000   | 263,000  | 214,000  | 45,000   |
| 11,910   | 12,000   | 263,000  | 214,000  | 45,000   |
| 12,000   | 12,000   | 263,000  | 214,000  | 45,000   |
| 12,300   | 14,000   | 297,000  | 248,000  | 45,000   |
| 12,500   | 14,000   | 297,000  | 248,000  | 45,000   |
| 12,700   | 14,000   | 297,000  | 248,000  | 45,000   |
| 13,000   | 14,000   | 297,000  | 248,000  | 45,000   |
| 13,100   | 14,000   | 297,000  | 248,000  | 45,000   |
| 13,490   | 14,000   | 297,000  | 248,000  | 45,000   |
| 13,890   | 14,000   | 297,000  | 248,000  | 45,000   |
| 14,000   | 14,000   | 297,000  | 248,000  | 45,000   |
| 14,290   | 16,000   | 333,000  | 281,000  | 48,000   |
| 15,000   | 16,000   | 333,000  | 281,000  | 48,000   |
| 15,870   | 16,000   | 333,000  | 281,000  | 48,000   |
| 16,000   | 16,000   | 333,000  | 281,000  | 48,000   |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



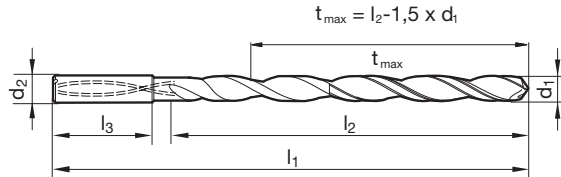
Katalog-Nr. 71764



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
|   |   |   | • |   |   |

Arbeitsrichtwerte  
Seite 248

- Flächenanschliff
- Hauptschneidenform konkav
- optimierter Nutquerschnitt
- maximaler Kühlkanalquerschnitt
- Kühlmitteldruck beachten
- zum Pilotieren empfehlen wir den SuperV-AL/Artikel-Nr. 71791 oder SuperV-180/ Artikel-Nr. 51718



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 95,000   | 55,000   | 36,000   |
| 3,100    | 6,000    | 106,000  | 66,000   | 36,000   |
| 3,170    | 6,000    | 106,000  | 66,000   | 36,000   |
| 3,200    | 6,000    | 106,000  | 66,000   | 36,000   |
| 3,250    | 6,000    | 106,000  | 66,000   | 36,000   |
| 3,300    | 6,000    | 106,000  | 66,000   | 36,000   |
| 3,400    | 6,000    | 106,000  | 66,000   | 36,000   |
| 3,500    | 6,000    | 116,000  | 76,000   | 36,000   |
| 3,570    | 6,000    | 116,000  | 76,000   | 36,000   |
| 3,600    | 6,000    | 116,000  | 76,000   | 36,000   |
| 3,700    | 6,000    | 116,000  | 76,000   | 36,000   |
| 3,800    | 6,000    | 116,000  | 76,000   | 36,000   |
| 3,900    | 6,000    | 116,000  | 76,000   | 36,000   |
| 3,970    | 6,000    | 116,000  | 76,000   | 36,000   |
| 4,000    | 6,000    | 116,000  | 76,000   | 36,000   |
| 4,100    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,200    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,300    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,370    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,400    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,500    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,600    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,650    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,700    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,760    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,800    | 6,000    | 133,000  | 93,000   | 36,000   |
| 4,900    | 6,000    | 133,000  | 93,000   | 36,000   |
| 5,000    | 6,000    | 133,000  | 93,000   | 36,000   |
| 5,100    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,160    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,200    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,300    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,400    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,500    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,550    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,560    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,600    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,700    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,800    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,900    | 6,000    | 150,000  | 110,000  | 36,000   |
| 5,950    | 6,000    | 150,000  | 110,000  | 36,000   |
| 6,000    | 6,000    | 150,000  | 110,000  | 36,000   |
| 6,100    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,200    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,300    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,350    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,400    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,500    | 8,000    | 167,000  | 127,000  | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 6,600    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,700    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,750    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,800    | 8,000    | 167,000  | 127,000  | 36,000   |
| 6,900    | 8,000    | 167,000  | 127,000  | 36,000   |
| 7,000    | 8,000    | 167,000  | 127,000  | 36,000   |
| 7,100    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,140    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,200    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,300    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,400    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,500    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,540    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,600    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,700    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,800    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,900    | 8,000    | 183,000  | 143,000  | 36,000   |
| 7,940    | 8,000    | 183,000  | 143,000  | 36,000   |
| 8,000    | 8,000    | 183,000  | 143,000  | 36,000   |
| 8,100    | 10,000   | 204,000  | 160,000  | 40,000   |
| 8,200    | 10,000   | 204,000  | 160,000  | 40,000   |
| 8,300    | 10,000   | 204,000  | 160,000  | 40,000   |
| 8,330    | 10,000   | 204,000  | 160,000  | 40,000   |
| 8,400    | 10,000   | 204,000  | 160,000  | 40,000   |
| 8,500    | 10,000   | 204,000  | 160,000  | 40,000   |
| 8,600    | 10,000   | 204,000  | 160,000  | 40,000   |
| 8,700    | 10,000   | 204,000  | 160,000  | 40,000   |
| 8,730    | 10,000   | 204,000  | 160,000  | 40,000   |
| 8,800    | 10,000   | 204,000  | 160,000  | 40,000   |
| 8,900    | 10,000   | 204,000  | 160,000  | 40,000   |
| 9,000    | 10,000   | 204,000  | 160,000  | 40,000   |
| 9,100    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,130    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,200    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,250    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,300    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,340    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,400    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,500    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,520    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,600    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,700    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,800    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,900    | 10,000   | 221,000  | 177,000  | 40,000   |
| 9,920    | 10,000   | 221,000  | 177,000  | 40,000   |
| 10,000   | 10,000   | 221,000  | 177,000  | 40,000   |
| 10,100   | 12,000   | 247,000  | 198,000  | 45,000   |
| 10,200   | 12,000   | 247,000  | 198,000  | 45,000   |

| d1<br>mm      | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm      | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|---------------|----------|----------|----------|----------|---------------|----------|----------|----------|----------|
| <b>10,300</b> | 12,000   | 247,000  | 198,000  | 45,000   | <b>11,900</b> | 12,000   | 263,000  | 214,000  | 45,000   |
| <b>10,320</b> | 12,000   | 247,000  | 198,000  | 45,000   | <b>11,910</b> | 12,000   | 263,000  | 214,000  | 45,000   |
| <b>10,400</b> | 12,000   | 247,000  | 198,000  | 45,000   | <b>12,000</b> | 12,000   | 263,000  | 214,000  | 45,000   |
| <b>10,500</b> | 12,000   | 247,000  | 198,000  | 45,000   | <b>12,100</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>10,600</b> | 12,000   | 247,000  | 198,000  | 45,000   | <b>12,200</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>10,700</b> | 12,000   | 247,000  | 198,000  | 45,000   | <b>12,500</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>10,800</b> | 12,000   | 247,000  | 198,000  | 45,000   | <b>12,600</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>10,900</b> | 12,000   | 247,000  | 198,000  | 45,000   | <b>12,700</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>11,000</b> | 12,000   | 247,000  | 198,000  | 45,000   | <b>12,800</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>11,100</b> | 12,000   | 263,000  | 214,000  | 45,000   | <b>12,900</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>11,110</b> | 12,000   | 263,000  | 214,000  | 45,000   | <b>13,000</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>11,200</b> | 12,000   | 263,000  | 214,000  | 45,000   | <b>13,100</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>11,300</b> | 12,000   | 263,000  | 214,000  | 45,000   | <b>13,300</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>11,400</b> | 12,000   | 263,000  | 214,000  | 45,000   | <b>13,400</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>11,500</b> | 12,000   | 263,000  | 214,000  | 45,000   | <b>13,500</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>11,600</b> | 12,000   | 263,000  | 214,000  | 45,000   | <b>13,700</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>11,700</b> | 12,000   | 263,000  | 214,000  | 45,000   | <b>13,800</b> | 14,000   | 297,000  | 248,000  | 45,000   |
| <b>11,800</b> | 12,000   | 263,000  | 214,000  | 45,000   | <b>14,000</b> | 14,000   | 297,000  | 248,000  | 45,000   |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



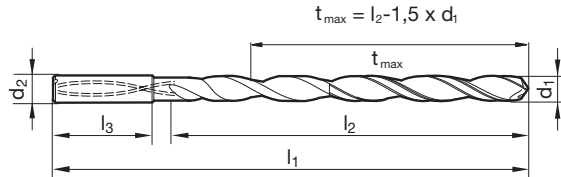
Katalog-Nr. 51765



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 246

- Ausspitzung  $\geq \varnothing 3,000$
- Kegelmantelschliff
- Kopfbeschichtung
- Hauptschneidenform konkav
- optimierter Nutquerschnitt
- maximaler Kühlkanalquerschnitt
- vier Führungsfasen
- Kühlmitteldruck beachten (s. Diagramm „Kühlmittlempfehlungen“)



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 110,000  | 70,000   | 36,000   |
| 3,100    | 6,000    | 123,000  | 83,000   | 36,000   |
| 3,170    | 6,000    | 123,000  | 83,000   | 36,000   |
| 3,200    | 6,000    | 123,000  | 83,000   | 36,000   |
| 3,300    | 6,000    | 123,000  | 83,000   | 36,000   |
| 3,500    | 6,000    | 136,000  | 96,000   | 36,000   |
| 3,570    | 6,000    | 136,000  | 96,000   | 36,000   |
| 3,700    | 6,000    | 136,000  | 96,000   | 36,000   |
| 3,800    | 6,000    | 136,000  | 96,000   | 36,000   |
| 3,970    | 6,000    | 136,000  | 96,000   | 36,000   |
| 4,000    | 6,000    | 136,000  | 96,000   | 36,000   |
| 4,200    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,300    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,370    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,500    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,600    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,760    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,800    | 6,000    | 158,000  | 118,000  | 36,000   |
| 5,000    | 6,000    | 158,000  | 118,000  | 36,000   |
| 5,100    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,160    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,410    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,500    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,560    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,800    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,950    | 6,000    | 180,000  | 140,000  | 36,000   |
| 6,000    | 6,000    | 180,000  | 140,000  | 36,000   |
| 6,300    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,350    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,500    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,750    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,800    | 8,000    | 202,000  | 162,000  | 36,000   |
| 7,000    | 8,000    | 202,000  | 162,000  | 36,000   |
| 7,140    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,500    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,540    | 8,000    | 223,000  | 183,000  | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 7,800    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,940    | 8,000    | 223,000  | 183,000  | 36,000   |
| 8,000    | 8,000    | 223,000  | 183,000  | 36,000   |
| 8,330    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,500    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,730    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,800    | 10,000   | 249,000  | 205,000  | 40,000   |
| 9,000    | 10,000   | 249,000  | 205,000  | 40,000   |
| 9,130    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,520    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,920    | 10,000   | 271,000  | 227,000  | 40,000   |
| 10,000   | 10,000   | 271,000  | 227,000  | 40,000   |
| 10,200   | 12,000   | 302,000  | 253,000  | 45,000   |
| 10,320   | 12,000   | 302,000  | 253,000  | 45,000   |
| 10,500   | 12,000   | 302,000  | 253,000  | 45,000   |
| 10,720   | 12,000   | 302,000  | 253,000  | 45,000   |
| 11,000   | 12,000   | 302,000  | 253,000  | 45,000   |
| 11,110   | 12,000   | 323,000  | 274,000  | 45,000   |
| 11,510   | 12,000   | 323,000  | 274,000  | 45,000   |
| 11,800   | 12,000   | 323,000  | 274,000  | 45,000   |
| 11,910   | 12,000   | 323,000  | 274,000  | 45,000   |
| 12,000   | 12,000   | 323,000  | 274,000  | 45,000   |
| 12,300   | 14,000   | 367,000  | 318,000  | 45,000   |
| 12,500   | 14,000   | 367,000  | 318,000  | 45,000   |
| 12,700   | 14,000   | 367,000  | 318,000  | 45,000   |
| 13,000   | 14,000   | 367,000  | 318,000  | 45,000   |
| 13,100   | 14,000   | 367,000  | 318,000  | 45,000   |
| 13,490   | 14,000   | 367,000  | 318,000  | 45,000   |
| 13,890   | 14,000   | 367,000  | 318,000  | 45,000   |
| 14,000   | 14,000   | 367,000  | 318,000  | 45,000   |
| 14,290   | 16,000   | 413,000  | 361,000  | 48,000   |
| 15,000   | 16,000   | 413,000  | 361,000  | 48,000   |
| 15,870   | 16,000   | 413,000  | 361,000  | 48,000   |
| 16,000   | 16,000   | 413,000  | 361,000  | 48,000   |

## SuperV-Bohrer

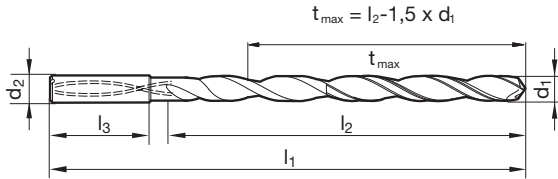
## SuperV-Bohrer mit Innenkühlung



Katalog-Nr. 71765


 Arbeitsrichtwerte  
Seite 248

- Flächenanschliff
- Hauptschneidenform konkav
- optimierter Nutquerschnitt
- maximaler Kühlkanalquerschnitt
- Kühlmitteldruck beachten
- zum Pilotieren empfehlen wir den SuperV-AL/Artikel-Nr. 71791 oder SuperV-180/ Artikel-Nr. 51718



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 110,000  | 70,000   | 36,000   |
| 3,100    | 6,000    | 123,000  | 83,000   | 36,000   |
| 3,170    | 6,000    | 123,000  | 83,000   | 36,000   |
| 3,200    | 6,000    | 123,000  | 83,000   | 36,000   |
| 3,250    | 6,000    | 123,000  | 83,000   | 36,000   |
| 3,300    | 6,000    | 123,000  | 83,000   | 36,000   |
| 3,400    | 6,000    | 123,000  | 83,000   | 36,000   |
| 3,500    | 6,000    | 136,000  | 96,000   | 36,000   |
| 3,570    | 6,000    | 136,000  | 96,000   | 36,000   |
| 3,600    | 6,000    | 136,000  | 96,000   | 36,000   |
| 3,700    | 6,000    | 136,000  | 96,000   | 36,000   |
| 3,800    | 6,000    | 136,000  | 96,000   | 36,000   |
| 3,900    | 6,000    | 136,000  | 96,000   | 36,000   |
| 3,970    | 6,000    | 136,000  | 96,000   | 36,000   |
| 4,000    | 6,000    | 136,000  | 96,000   | 36,000   |
| 4,100    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,200    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,300    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,370    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,400    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,500    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,600    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,650    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,700    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,760    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,800    | 6,000    | 158,000  | 118,000  | 36,000   |
| 4,900    | 6,000    | 158,000  | 118,000  | 36,000   |
| 5,000    | 6,000    | 158,000  | 118,000  | 36,000   |
| 5,100    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,160    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,200    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,300    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,400    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,500    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,550    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,560    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,600    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,700    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,800    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,900    | 6,000    | 180,000  | 140,000  | 36,000   |
| 5,950    | 6,000    | 180,000  | 140,000  | 36,000   |
| 6,000    | 6,000    | 180,000  | 140,000  | 36,000   |
| 6,100    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,200    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,300    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,350    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,400    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,500    | 8,000    | 202,000  | 162,000  | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 6,600    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,700    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,750    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,800    | 8,000    | 202,000  | 162,000  | 36,000   |
| 6,900    | 8,000    | 202,000  | 162,000  | 36,000   |
| 7,000    | 8,000    | 202,000  | 162,000  | 36,000   |
| 7,100    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,140    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,200    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,300    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,400    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,500    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,540    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,600    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,700    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,800    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,900    | 8,000    | 223,000  | 183,000  | 36,000   |
| 7,940    | 8,000    | 223,000  | 183,000  | 36,000   |
| 8,000    | 8,000    | 223,000  | 183,000  | 36,000   |
| 8,100    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,200    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,300    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,330    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,400    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,500    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,600    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,700    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,730    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,800    | 10,000   | 249,000  | 205,000  | 40,000   |
| 8,900    | 10,000   | 249,000  | 205,000  | 40,000   |
| 9,000    | 10,000   | 249,000  | 205,000  | 40,000   |
| 9,100    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,130    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,200    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,250    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,300    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,340    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,400    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,500    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,520    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,600    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,700    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,800    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,900    | 10,000   | 271,000  | 227,000  | 40,000   |
| 9,920    | 10,000   | 271,000  | 227,000  | 40,000   |
| 10,000   | 10,000   | 271,000  | 227,000  | 40,000   |
| 10,100   | 12,000   | 302,000  | 253,000  | 45,000   |
| 10,200   | 12,000   | 302,000  | 253,000  | 45,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 10,300   | 12,000   | 302,000  | 253,000  | 45,000   | 11,900   | 12,000   | 323,000  | 274,000  | 45,000   |
| 10,320   | 12,000   | 302,000  | 253,000  | 45,000   | 11,910   | 12,000   | 323,000  | 274,000  | 45,000   |
| 10,400   | 12,000   | 302,000  | 253,000  | 45,000   | 12,000   | 12,000   | 323,000  | 274,000  | 45,000   |
| 10,500   | 12,000   | 302,000  | 253,000  | 45,000   | 12,100   | 14,000   | 367,000  | 318,000  | 45,000   |
| 10,600   | 12,000   | 302,000  | 253,000  | 45,000   | 12,200   | 14,000   | 367,000  | 318,000  | 45,000   |
| 10,700   | 12,000   | 302,000  | 253,000  | 45,000   | 12,500   | 14,000   | 367,000  | 318,000  | 45,000   |
| 10,800   | 12,000   | 302,000  | 253,000  | 45,000   | 12,600   | 14,000   | 367,000  | 318,000  | 45,000   |
| 10,900   | 12,000   | 302,000  | 253,000  | 45,000   | 12,700   | 14,000   | 367,000  | 318,000  | 45,000   |
| 11,000   | 12,000   | 302,000  | 253,000  | 45,000   | 12,800   | 14,000   | 367,000  | 318,000  | 45,000   |
| 11,100   | 12,000   | 323,000  | 274,000  | 45,000   | 12,900   | 14,000   | 367,000  | 318,000  | 45,000   |
| 11,110   | 12,000   | 323,000  | 274,000  | 45,000   | 13,000   | 14,000   | 367,000  | 318,000  | 45,000   |
| 11,200   | 12,000   | 323,000  | 274,000  | 45,000   | 13,100   | 14,000   | 367,000  | 318,000  | 45,000   |
| 11,300   | 12,000   | 323,000  | 274,000  | 45,000   | 13,300   | 14,000   | 367,000  | 318,000  | 45,000   |
| 11,400   | 12,000   | 323,000  | 274,000  | 45,000   | 13,400   | 14,000   | 367,000  | 318,000  | 45,000   |
| 11,500   | 12,000   | 323,000  | 274,000  | 45,000   | 13,500   | 14,000   | 367,000  | 318,000  | 45,000   |
| 11,600   | 12,000   | 323,000  | 274,000  | 45,000   | 13,700   | 14,000   | 367,000  | 318,000  | 45,000   |
| 11,700   | 12,000   | 323,000  | 274,000  | 45,000   | 13,800   | 14,000   | 367,000  | 318,000  | 45,000   |
| 11,800   | 12,000   | 323,000  | 274,000  | 45,000   | 14,000   | 14,000   | 367,000  | 318,000  | 45,000   |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung

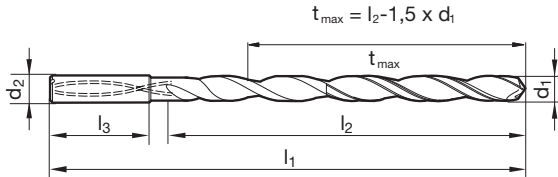


Katalog-Nr. 51766



|   |   |   |   |   |   |                                |
|---|---|---|---|---|---|--------------------------------|
| P | M | K | N | S | H | Arbeitsrichtwerte<br>Seite 246 |
| ● | ● | ● | ○ | ○ |   |                                |

- Ausspitzung  $\geq \varnothing 3,000$
- Kegelmantelschliff
- Kopfbeschichtung
- Hauptschneidenform konkav
- optimierter Nutquerschnitt
- maximaler Kühlkanalquerschnitt
- vier Führungsfasen
- Kühlmitteldruck beachten (s. Diagramm „Kühlmittelpfehlungen“)



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 125,000  | 85,000   | 36,000   |
| 3,100    | 6,000    | 141,000  | 101,000  | 36,000   |
| 3,170    | 6,000    | 141,000  | 101,000  | 36,000   |
| 3,200    | 6,000    | 141,000  | 101,000  | 36,000   |
| 3,300    | 6,000    | 141,000  | 101,000  | 36,000   |
| 3,500    | 6,000    | 156,000  | 116,000  | 36,000   |
| 3,570    | 6,000    | 156,000  | 116,000  | 36,000   |
| 3,700    | 6,000    | 156,000  | 116,000  | 36,000   |
| 3,800    | 6,000    | 156,000  | 116,000  | 36,000   |
| 3,970    | 6,000    | 156,000  | 116,000  | 36,000   |
| 4,000    | 6,000    | 156,000  | 116,000  | 36,000   |
| 4,100    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,200    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,300    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,370    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,500    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,600    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,760    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,800    | 6,000    | 183,000  | 143,000  | 36,000   |
| 5,000    | 6,000    | 183,000  | 143,000  | 36,000   |
| 5,100    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,160    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,410    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,500    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,560    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,800    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,950    | 6,000    | 210,000  | 170,000  | 36,000   |
| 6,000    | 6,000    | 210,000  | 170,000  | 36,000   |
| 6,300    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,350    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,500    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,750    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,800    | 8,000    | 237,000  | 197,000  | 36,000   |
| 7,000    | 8,000    | 237,000  | 197,000  | 36,000   |
| 7,140    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,500    | 8,000    | 263,000  | 223,000  | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 7,540    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,940    | 8,000    | 263,000  | 223,000  | 36,000   |
| 8,000    | 8,000    | 263,000  | 223,000  | 36,000   |
| 8,330    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,500    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,730    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,800    | 10,000   | 294,000  | 250,000  | 40,000   |
| 9,000    | 10,000   | 294,000  | 250,000  | 40,000   |
| 9,130    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,520    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,920    | 10,000   | 321,000  | 277,000  | 40,000   |
| 10,000   | 10,000   | 321,000  | 277,000  | 40,000   |
| 10,320   | 12,000   | 359,000  | 310,000  | 45,000   |
| 10,720   | 12,000   | 359,000  | 310,000  | 45,000   |
| 11,000   | 12,000   | 359,000  | 310,000  | 45,000   |
| 11,110   | 12,000   | 386,000  | 337,000  | 45,000   |
| 11,510   | 12,000   | 386,000  | 337,000  | 45,000   |
| 11,910   | 12,000   | 386,000  | 337,000  | 45,000   |
| 12,000   | 12,000   | 386,000  | 337,000  | 45,000   |
| 12,300   | 14,000   | 437,000  | 388,000  | 45,000   |
| 12,700   | 14,000   | 437,000  | 388,000  | 45,000   |
| 13,000   | 14,000   | 437,000  | 388,000  | 45,000   |
| 13,100   | 14,000   | 437,000  | 388,000  | 45,000   |
| 13,490   | 14,000   | 437,000  | 388,000  | 45,000   |
| 13,890   | 14,000   | 437,000  | 388,000  | 45,000   |
| 14,000   | 14,000   | 437,000  | 388,000  | 45,000   |
| 14,290   | 16,000   | 493,000  | 441,000  | 48,000   |
| 15,000   | 16,000   | 493,000  | 441,000  | 48,000   |
| 15,870   | 16,000   | 493,000  | 441,000  | 48,000   |
| 16,000   | 16,000   | 493,000  | 441,000  | 48,000   |



## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



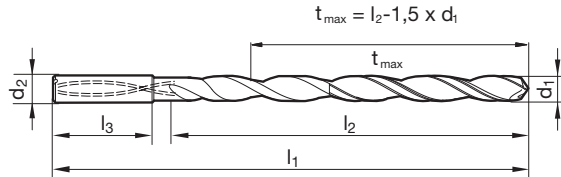
Katalog-Nr. 71766



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
|   |   |   | • |   |   |

Arbeitsrichtwerte  
Seite 248

- Flächenanschliff
- Hauptschneidenform konkav
- optimierter Nutquerschnitt
- maximaler Kühlkanalquerschnitt
- Kühlmitteldruck beachten
- zum Pilotieren empfehlen wir den SuperV-AL/Katalog-Nr. 71791 oder SuperV-180/ Katalog-Nr. 51718



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 125,000  | 85,000   | 36,000   |
| 3,100    | 6,000    | 141,000  | 101,000  | 36,000   |
| 3,170    | 6,000    | 141,000  | 101,000  | 36,000   |
| 3,200    | 6,000    | 141,000  | 101,000  | 36,000   |
| 3,250    | 6,000    | 141,000  | 101,000  | 36,000   |
| 3,300    | 6,000    | 141,000  | 101,000  | 36,000   |
| 3,400    | 6,000    | 141,000  | 101,000  | 36,000   |
| 3,500    | 6,000    | 156,000  | 116,000  | 36,000   |
| 3,570    | 6,000    | 156,000  | 116,000  | 36,000   |
| 3,600    | 6,000    | 156,000  | 116,000  | 36,000   |
| 3,700    | 6,000    | 156,000  | 116,000  | 36,000   |
| 3,800    | 6,000    | 156,000  | 116,000  | 36,000   |
| 3,900    | 6,000    | 156,000  | 116,000  | 36,000   |
| 3,970    | 6,000    | 156,000  | 116,000  | 36,000   |
| 4,000    | 6,000    | 156,000  | 116,000  | 36,000   |
| 4,100    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,200    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,300    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,370    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,400    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,500    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,600    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,650    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,700    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,760    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,800    | 6,000    | 183,000  | 143,000  | 36,000   |
| 4,900    | 6,000    | 183,000  | 143,000  | 36,000   |
| 5,000    | 6,000    | 183,000  | 143,000  | 36,000   |
| 5,100    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,160    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,200    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,300    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,400    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,500    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,550    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,560    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,600    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,700    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,800    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,900    | 6,000    | 210,000  | 170,000  | 36,000   |
| 5,950    | 6,000    | 210,000  | 170,000  | 36,000   |
| 6,000    | 6,000    | 210,000  | 170,000  | 36,000   |
| 6,100    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,200    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,300    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,350    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,400    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,500    | 8,000    | 237,000  | 197,000  | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 6,600    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,700    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,750    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,800    | 8,000    | 237,000  | 197,000  | 36,000   |
| 6,900    | 8,000    | 237,000  | 197,000  | 36,000   |
| 7,000    | 8,000    | 237,000  | 197,000  | 36,000   |
| 7,100    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,140    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,200    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,300    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,400    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,500    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,540    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,600    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,700    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,800    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,900    | 8,000    | 263,000  | 223,000  | 36,000   |
| 7,940    | 8,000    | 263,000  | 223,000  | 36,000   |
| 8,000    | 8,000    | 263,000  | 223,000  | 36,000   |
| 8,100    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,200    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,300    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,330    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,400    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,500    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,600    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,700    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,730    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,800    | 10,000   | 294,000  | 250,000  | 40,000   |
| 8,900    | 10,000   | 294,000  | 250,000  | 40,000   |
| 9,000    | 10,000   | 294,000  | 250,000  | 40,000   |
| 9,100    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,130    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,200    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,250    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,300    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,340    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,400    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,500    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,520    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,600    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,700    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,800    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,900    | 10,000   | 321,000  | 277,000  | 40,000   |
| 9,920    | 10,000   | 321,000  | 277,000  | 40,000   |
| 10,000   | 10,000   | 321,000  | 277,000  | 40,000   |
| 10,100   | 12,000   | 359,000  | 310,000  | 45,000   |
| 10,200   | 12,000   | 359,000  | 310,000  | 45,000   |

| d1<br>mm      | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | d1<br>mm      | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|---------------|----------|----------|----------|----------|---------------|----------|----------|----------|----------|
| <b>10,300</b> | 12,000   | 359,000  | 310,000  | 45,000   | <b>11,900</b> | 12,000   | 386,000  | 337,000  | 45,000   |
| <b>10,320</b> | 12,000   | 359,000  | 310,000  | 45,000   | <b>11,910</b> | 12,000   | 386,000  | 337,000  | 45,000   |
| <b>10,400</b> | 12,000   | 359,000  | 310,000  | 45,000   | <b>12,000</b> | 12,000   | 386,000  | 337,000  | 45,000   |
| <b>10,500</b> | 12,000   | 359,000  | 310,000  | 45,000   | <b>12,100</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>10,600</b> | 12,000   | 359,000  | 310,000  | 45,000   | <b>12,200</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>10,700</b> | 12,000   | 359,000  | 310,000  | 45,000   | <b>12,500</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>10,800</b> | 12,000   | 359,000  | 310,000  | 45,000   | <b>12,600</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>10,900</b> | 12,000   | 359,000  | 310,000  | 45,000   | <b>12,700</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>11,000</b> | 12,000   | 359,000  | 310,000  | 45,000   | <b>12,800</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>11,100</b> | 12,000   | 386,000  | 337,000  | 45,000   | <b>12,900</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>11,110</b> | 12,000   | 386,000  | 337,000  | 45,000   | <b>13,000</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>11,200</b> | 12,000   | 386,000  | 337,000  | 45,000   | <b>13,100</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>11,300</b> | 12,000   | 386,000  | 337,000  | 45,000   | <b>13,300</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>11,400</b> | 12,000   | 386,000  | 337,000  | 45,000   | <b>13,400</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>11,500</b> | 12,000   | 386,000  | 337,000  | 45,000   | <b>13,500</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>11,600</b> | 12,000   | 386,000  | 337,000  | 45,000   | <b>13,700</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>11,700</b> | 12,000   | 386,000  | 337,000  | 45,000   | <b>13,800</b> | 14,000   | 437,000  | 388,000  | 45,000   |
| <b>11,800</b> | 12,000   | 386,000  | 337,000  | 45,000   | <b>14,000</b> | 14,000   | 437,000  | 388,000  | 45,000   |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



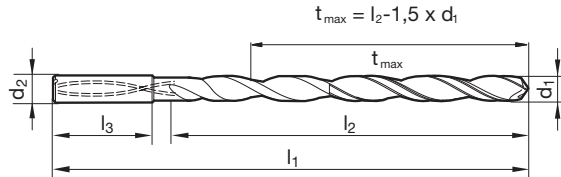
Katalog-Nr. 51767



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 246

- Ausspitzung  $\geq \varnothing 3,000$
- Kegelmantelanschiff
- Kopfbeschichtung
- Hauptschneidenform konkav
- optimierter Nutquerschnitt
- maximaler Kühlkanalquerschnitt
- vier Führungsfasen
- Kühlmitteldruck beachten (s. Diagramm „Kühlmittlempfehlungen“)



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 140,000  | 100,000  | 36,000   |
| 3,100    | 6,000    | 158,000  | 118,000  | 36,000   |
| 3,170    | 6,000    | 158,000  | 118,000  | 36,000   |
| 3,200    | 6,000    | 158,000  | 118,000  | 36,000   |
| 3,300    | 6,000    | 158,000  | 118,000  | 36,000   |
| 3,500    | 6,000    | 176,000  | 136,000  | 36,000   |
| 3,570    | 6,000    | 176,000  | 136,000  | 36,000   |
| 3,700    | 6,000    | 176,000  | 136,000  | 36,000   |
| 3,800    | 6,000    | 176,000  | 136,000  | 36,000   |
| 3,970    | 6,000    | 176,000  | 136,000  | 36,000   |
| 4,000    | 6,000    | 176,000  | 136,000  | 36,000   |
| 4,100    | 6,000    | 208,000  | 168,000  | 36,000   |
| 4,200    | 6,000    | 208,000  | 168,000  | 36,000   |
| 4,370    | 6,000    | 208,000  | 168,000  | 36,000   |
| 4,500    | 6,000    | 208,000  | 168,000  | 36,000   |
| 4,760    | 6,000    | 208,000  | 168,000  | 36,000   |
| 5,000    | 6,000    | 208,000  | 168,000  | 36,000   |
| 5,100    | 6,000    | 240,000  | 200,000  | 36,000   |
| 5,160    | 6,000    | 240,000  | 200,000  | 36,000   |
| 5,410    | 6,000    | 240,000  | 200,000  | 36,000   |
| 5,500    | 6,000    | 240,000  | 200,000  | 36,000   |
| 5,560    | 6,000    | 240,000  | 200,000  | 36,000   |
| 5,950    | 6,000    | 240,000  | 200,000  | 36,000   |
| 6,000    | 6,000    | 240,000  | 200,000  | 36,000   |
| 6,300    | 8,000    | 272,000  | 232,000  | 36,000   |
| 6,350    | 8,000    | 272,000  | 232,000  | 36,000   |
| 6,500    | 8,000    | 272,000  | 232,000  | 36,000   |
| 6,750    | 8,000    | 272,000  | 232,000  | 36,000   |
| 6,800    | 8,000    | 272,000  | 232,000  | 36,000   |
| 7,000    | 8,000    | 272,000  | 232,000  | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 7,140    | 8,000    | 303,000  | 263,000  | 36,000   |
| 7,500    | 8,000    | 303,000  | 263,000  | 36,000   |
| 7,540    | 8,000    | 303,000  | 263,000  | 36,000   |
| 7,940    | 8,000    | 303,000  | 263,000  | 36,000   |
| 8,000    | 8,000    | 303,000  | 263,000  | 36,000   |
| 8,330    | 10,000   | 339,000  | 295,000  | 40,000   |
| 8,500    | 10,000   | 339,000  | 295,000  | 40,000   |
| 8,730    | 10,000   | 339,000  | 295,000  | 40,000   |
| 8,800    | 10,000   | 339,000  | 295,000  | 40,000   |
| 9,000    | 10,000   | 339,000  | 295,000  | 40,000   |
| 9,130    | 10,000   | 371,000  | 327,000  | 40,000   |
| 9,520    | 10,000   | 371,000  | 327,000  | 40,000   |
| 9,920    | 10,000   | 371,000  | 327,000  | 40,000   |
| 10,000   | 10,000   | 371,000  | 327,000  | 40,000   |
| 10,320   | 12,000   | 412,000  | 363,000  | 45,000   |
| 10,720   | 12,000   | 412,000  | 363,000  | 45,000   |
| 11,000   | 12,000   | 412,000  | 363,000  | 45,000   |
| 11,110   | 12,000   | 443,000  | 394,000  | 45,000   |
| 11,510   | 12,000   | 443,000  | 394,000  | 45,000   |
| 11,910   | 12,000   | 443,000  | 394,000  | 45,000   |
| 12,000   | 12,000   | 443,000  | 394,000  | 45,000   |
| 12,300   | 14,000   | 507,000  | 458,000  | 45,000   |
| 12,700   | 14,000   | 507,000  | 458,000  | 45,000   |
| 13,000   | 14,000   | 507,000  | 458,000  | 45,000   |
| 13,100   | 14,000   | 507,000  | 458,000  | 45,000   |
| 13,490   | 14,000   | 507,000  | 458,000  | 45,000   |
| 13,890   | 14,000   | 507,000  | 458,000  | 45,000   |
| 14,000   | 14,000   | 507,000  | 458,000  | 45,000   |

## SuperV-Bohrer

### SuperV-Bohrer mit Innenkühlung



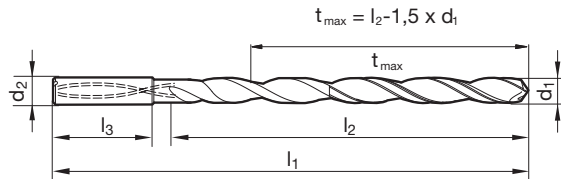
Katalog-Nr. 51768



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 246

- Ausspitzung  $\geq \varnothing 3,000$
- Kegelmantelschliff
- Kopfbeschichtung
- Hauptschneidenform konkav
- optimierter Nutquerschnitt
- maximaler Kühlkanalquerschnitt
- vier Führungsfasen
- Kühlmitteldruck beachten (s. Diagramm „Kühlmittlempfehlungen“)



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 3,000    | 6,000    | 170,000  | 130,000  | 36,000   |
| 3,100    | 6,000    | 193,000  | 153,000  | 36,000   |
| 3,170    | 6,000    | 193,000  | 153,000  | 36,000   |
| 3,200    | 6,000    | 193,000  | 153,000  | 36,000   |
| 3,300    | 6,000    | 193,000  | 153,000  | 36,000   |
| 3,500    | 6,000    | 193,000  | 153,000  | 36,000   |
| 3,570    | 6,000    | 216,000  | 176,000  | 36,000   |
| 3,800    | 6,000    | 216,000  | 176,000  | 36,000   |
| 3,970    | 6,000    | 216,000  | 176,000  | 36,000   |
| 4,000    | 6,000    | 216,000  | 176,000  | 36,000   |
| 4,200    | 6,000    | 238,000  | 198,000  | 36,000   |
| 4,370    | 6,000    | 238,000  | 198,000  | 36,000   |
| 4,500    | 6,000    | 238,000  | 198,000  | 36,000   |
| 4,760    | 6,000    | 258,000  | 218,000  | 36,000   |
| 5,000    | 6,000    | 258,000  | 218,000  | 36,000   |
| 5,100    | 6,000    | 280,000  | 240,000  | 36,000   |
| 5,160    | 6,000    | 280,000  | 240,000  | 36,000   |
| 5,410    | 6,000    | 280,000  | 240,000  | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 5,500    | 6,000    | 280,000  | 240,000  | 36,000   |
| 5,560    | 6,000    | 300,000  | 260,000  | 36,000   |
| 5,950    | 6,000    | 300,000  | 260,000  | 36,000   |
| 6,000    | 6,000    | 300,000  | 260,000  | 36,000   |
| 6,300    | 8,000    | 322,000  | 282,000  | 36,000   |
| 6,350    | 8,000    | 322,000  | 282,000  | 36,000   |
| 6,500    | 8,000    | 322,000  | 282,000  | 36,000   |
| 6,750    | 8,000    | 342,000  | 302,000  | 36,000   |
| 6,800    | 8,000    | 342,000  | 302,000  | 36,000   |
| 7,000    | 8,000    | 342,000  | 302,000  | 36,000   |
| 7,140    | 8,000    | 363,000  | 323,000  | 36,000   |
| 7,500    | 8,000    | 363,000  | 323,000  | 36,000   |
| 7,540    | 8,000    | 383,000  | 343,000  | 36,000   |
| 7,940    | 8,000    | 383,000  | 343,000  | 36,000   |
| 8,000    | 8,000    | 383,000  | 343,000  | 36,000   |
| 8,500    | 10,000   | 409,000  | 365,000  | 40,000   |
| 9,000    | 10,000   | 429,000  | 386,000  | 40,000   |
| 10,000   | 10,000   | 471,000  | 427,000  | 40,000   |

## SuperV-Bohrer

### SuperV-M Universal-Kleinstbohrer



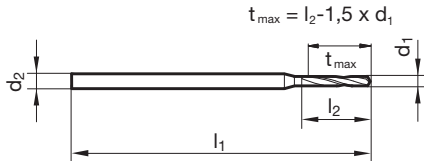
Katalog-Nr. 51720



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • |   | • |   |   |   |

Arbeitsrichtwerte  
Seite 250

- Ausspitzung  $\geq \varnothing 0,800$
- Flächenanschliff
- Hauptschneidenform gerade



| d1<br>mm | inch | d2<br>mm | l1<br>mm | l2<br>mm | d1<br>mm | inch | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|----------|------|----------|----------|----------|
| 0,100    |      | 3,000    | 38,000   | 1,200    | 0,580    |      | 3,000    | 38,000   | 7,000    |
| 0,110    |      | 3,000    | 38,000   | 1,200    | 0,590    |      | 3,000    | 38,000   | 7,000    |
| 0,120    |      | 3,000    | 38,000   | 1,400    | 0,600    |      | 3,000    | 38,000   | 7,000    |
| 0,130    |      | 3,000    | 38,000   | 1,400    | 0,610    |      | 3,000    | 38,000   | 7,000    |
| 0,140    |      | 3,000    | 38,000   | 1,400    | 0,620    |      | 3,000    | 38,000   | 7,000    |
| 0,150    |      | 3,000    | 38,000   | 2,000    | 0,630    |      | 3,000    | 38,000   | 7,000    |
| 0,160    |      | 3,000    | 38,000   | 2,000    | 0,640    |      | 3,000    | 38,000   | 7,000    |
| 0,170    |      | 3,000    | 38,000   | 2,000    | 0,650    |      | 3,000    | 38,000   | 7,000    |
| 0,180    |      | 3,000    | 38,000   | 2,000    | 0,660    |      | 3,000    | 38,000   | 7,000    |
| 0,190    |      | 3,000    | 38,000   | 2,000    | 0,670    |      | 3,000    | 38,000   | 7,000    |
| 0,200    |      | 3,000    | 38,000   | 2,500    | 0,680    |      | 3,000    | 38,000   | 7,000    |
| 0,210    |      | 3,000    | 38,000   | 2,500    | 0,690    |      | 3,000    | 38,000   | 7,000    |
| 0,220    |      | 3,000    | 38,000   | 2,500    | 0,700    |      | 3,000    | 38,000   | 8,000    |
| 0,230    |      | 3,000    | 38,000   | 2,500    | 0,710    |      | 3,000    | 38,000   | 8,000    |
| 0,240    |      | 3,000    | 38,000   | 2,500    | 0,720    |      | 3,000    | 38,000   | 8,000    |
| 0,250    |      | 3,000    | 38,000   | 3,000    | 0,730    |      | 3,000    | 38,000   | 8,000    |
| 0,260    |      | 3,000    | 38,000   | 3,000    | 0,740    |      | 3,000    | 38,000   | 8,000    |
| 0,270    |      | 3,000    | 38,000   | 3,000    | 0,750    |      | 3,000    | 38,000   | 8,000    |
| 0,280    |      | 3,000    | 38,000   | 3,000    | 0,760    |      | 3,000    | 38,000   | 8,000    |
| 0,290    |      | 3,000    | 38,000   | 3,000    | 0,770    |      | 3,000    | 38,000   | 8,000    |
| 0,300    |      | 3,000    | 38,000   | 5,000    | 0,780    |      | 3,000    | 38,000   | 8,000    |
| 0,310    |      | 3,000    | 38,000   | 5,000    | 0,790    | 1/32 | 3,000    | 38,000   | 8,000    |
| 0,320    |      | 3,000    | 38,000   | 5,000    | 0,800    |      | 3,000    | 38,000   | 10,000   |
| 0,330    |      | 3,000    | 38,000   | 5,000    | 0,810    |      | 3,000    | 38,000   | 10,000   |
| 0,340    |      | 3,000    | 38,000   | 5,000    | 0,820    |      | 3,000    | 38,000   | 10,000   |
| 0,350    |      | 3,000    | 38,000   | 6,000    | 0,830    |      | 3,000    | 38,000   | 10,000   |
| 0,360    |      | 3,000    | 38,000   | 6,000    | 0,840    |      | 3,000    | 38,000   | 10,000   |
| 0,370    |      | 3,000    | 38,000   | 6,000    | 0,850    |      | 3,000    | 38,000   | 10,000   |
| 0,380    |      | 3,000    | 38,000   | 6,000    | 0,860    |      | 3,000    | 38,000   | 10,000   |
| 0,390    |      | 3,000    | 38,000   | 6,000    | 0,870    |      | 3,000    | 38,000   | 10,000   |
| 0,400    |      | 3,000    | 38,000   | 7,000    | 0,880    |      | 3,000    | 38,000   | 10,000   |
| 0,410    |      | 3,000    | 38,000   | 7,000    | 0,890    |      | 3,000    | 38,000   | 10,000   |
| 0,420    |      | 3,000    | 38,000   | 7,000    | 0,900    |      | 3,000    | 38,000   | 10,000   |
| 0,430    |      | 3,000    | 38,000   | 7,000    | 0,910    |      | 3,000    | 38,000   | 10,000   |
| 0,440    |      | 3,000    | 38,000   | 7,000    | 0,920    |      | 3,000    | 38,000   | 10,000   |
| 0,450    |      | 3,000    | 38,000   | 7,000    | 0,930    |      | 3,000    | 38,000   | 10,000   |
| 0,460    |      | 3,000    | 38,000   | 7,000    | 0,940    |      | 3,000    | 38,000   | 10,000   |
| 0,470    |      | 3,000    | 38,000   | 7,000    | 0,950    |      | 3,000    | 38,000   | 10,000   |
| 0,480    |      | 3,000    | 38,000   | 7,000    | 0,960    |      | 3,000    | 38,000   | 10,000   |
| 0,490    |      | 3,000    | 38,000   | 7,000    | 0,970    |      | 3,000    | 38,000   | 10,000   |
| 0,500    |      | 3,000    | 38,000   | 7,000    | 0,980    |      | 3,000    | 38,000   | 10,000   |
| 0,510    |      | 3,000    | 38,000   | 7,000    | 0,990    |      | 3,000    | 38,000   | 10,000   |
| 0,520    |      | 3,000    | 38,000   | 7,000    | 1,000    |      | 3,000    | 38,000   | 10,000   |
| 0,530    |      | 3,000    | 38,000   | 7,000    | 1,010    |      | 3,000    | 38,000   | 10,000   |
| 0,540    |      | 3,000    | 38,000   | 7,000    | 1,020    |      | 3,000    | 38,000   | 10,000   |
| 0,550    |      | 3,000    | 38,000   | 7,000    | 1,030    |      | 3,000    | 38,000   | 10,000   |
| 0,560    |      | 3,000    | 38,000   | 7,000    | 1,040    |      | 3,000    | 38,000   | 10,000   |
| 0,570    |      | 3,000    | 38,000   | 7,000    | 1,050    |      | 3,000    | 38,000   | 10,000   |

| d1<br>mm | inch | d2<br>mm | l1<br>mm | l2<br>mm | d1<br>mm | inch | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|----------|------|----------|----------|----------|
| 1,060    |      | 3,000    | 38,000   | 10,000   | 1,660    |      | 3,000    | 38,000   | 12,000   |
| 1,070    |      | 3,000    | 38,000   | 10,000   | 1,670    |      | 3,000    | 38,000   | 12,000   |
| 1,080    |      | 3,000    | 38,000   | 10,000   | 1,680    |      | 3,000    | 38,000   | 12,000   |
| 1,090    |      | 3,000    | 38,000   | 10,000   | 1,690    |      | 3,000    | 38,000   | 12,000   |
| 1,100    |      | 3,000    | 38,000   | 10,000   | 1,700    |      | 3,000    | 38,000   | 12,000   |
| 1,110    |      | 3,000    | 38,000   | 10,000   | 1,710    |      | 3,000    | 38,000   | 12,000   |
| 1,120    |      | 3,000    | 38,000   | 10,000   | 1,720    |      | 3,000    | 38,000   | 12,000   |
| 1,130    |      | 3,000    | 38,000   | 10,000   | 1,730    |      | 3,000    | 38,000   | 12,000   |
| 1,140    |      | 3,000    | 38,000   | 10,000   | 1,740    |      | 3,000    | 38,000   | 12,000   |
| 1,150    |      | 3,000    | 38,000   | 10,000   | 1,750    |      | 3,000    | 38,000   | 12,000   |
| 1,160    |      | 3,000    | 38,000   | 10,000   | 1,760    |      | 3,000    | 38,000   | 12,000   |
| 1,170    |      | 3,000    | 38,000   | 10,000   | 1,770    |      | 3,000    | 38,000   | 12,000   |
| 1,180    |      | 3,000    | 38,000   | 10,000   | 1,780    |      | 3,000    | 38,000   | 12,000   |
| 1,190    |      | 3,000    | 38,000   | 10,000   | 1,790    |      | 3,000    | 38,000   | 12,000   |
| 1,200    |      | 3,000    | 38,000   | 10,000   | 1,800    |      | 3,000    | 38,000   | 12,000   |
| 1,210    |      | 3,000    | 38,000   | 10,000   | 1,810    |      | 3,000    | 38,000   | 12,000   |
| 1,220    |      | 3,000    | 38,000   | 10,000   | 1,820    |      | 3,000    | 38,000   | 12,000   |
| 1,230    |      | 3,000    | 38,000   | 10,000   | 1,830    |      | 3,000    | 38,000   | 12,000   |
| 1,240    |      | 3,000    | 38,000   | 10,000   | 1,840    |      | 3,000    | 38,000   | 12,000   |
| 1,250    |      | 3,000    | 38,000   | 10,000   | 1,850    |      | 3,000    | 38,000   | 12,000   |
| 1,260    |      | 3,000    | 38,000   | 10,000   | 1,860    |      | 3,000    | 38,000   | 12,000   |
| 1,270    |      | 3,000    | 38,000   | 10,000   | 1,870    |      | 3,000    | 38,000   | 12,000   |
| 1,280    |      | 3,000    | 38,000   | 10,000   | 1,880    |      | 3,000    | 38,000   | 12,000   |
| 1,290    |      | 3,000    | 38,000   | 10,000   | 1,890    |      | 3,000    | 38,000   | 12,000   |
| 1,300    |      | 3,000    | 38,000   | 10,000   | 1,900    |      | 3,000    | 38,000   | 12,000   |
| 1,310    |      | 3,000    | 38,000   | 10,000   | 1,910    |      | 3,000    | 38,000   | 12,000   |
| 1,320    |      | 3,000    | 38,000   | 10,000   | 1,920    |      | 3,000    | 38,000   | 12,000   |
| 1,330    |      | 3,000    | 38,000   | 10,000   | 1,930    |      | 3,000    | 38,000   | 12,000   |
| 1,340    |      | 3,000    | 38,000   | 10,000   | 1,940    |      | 3,000    | 38,000   | 12,000   |
| 1,350    |      | 3,000    | 38,000   | 10,000   | 1,950    |      | 3,000    | 38,000   | 12,000   |
| 1,360    |      | 3,000    | 38,000   | 10,000   | 1,960    |      | 3,000    | 38,000   | 12,000   |
| 1,370    |      | 3,000    | 38,000   | 10,000   | 1,970    |      | 3,000    | 38,000   | 12,000   |
| 1,380    |      | 3,000    | 38,000   | 10,000   | 1,980    | 5/64 | 3,000    | 38,000   | 12,000   |
| 1,390    |      | 3,000    | 38,000   | 10,000   | 1,990    |      | 3,000    | 38,000   | 12,000   |
| 1,400    |      | 3,000    | 38,000   | 10,000   | 2,000    |      | 3,000    | 38,000   | 12,000   |
| 1,410    |      | 3,000    | 38,000   | 10,000   | 2,050    |      | 3,000    | 38,000   | 12,000   |
| 1,420    |      | 3,000    | 38,000   | 10,000   | 2,100    |      | 3,000    | 38,000   | 12,000   |
| 1,430    |      | 3,000    | 38,000   | 10,000   | 2,150    |      | 3,000    | 38,000   | 12,000   |
| 1,440    |      | 3,000    | 38,000   | 10,000   | 2,200    |      | 3,000    | 38,000   | 12,000   |
| 1,450    |      | 3,000    | 38,000   | 10,000   | 2,250    |      | 3,000    | 38,000   | 12,000   |
| 1,460    |      | 3,000    | 38,000   | 10,000   | 2,300    |      | 3,000    | 38,000   | 12,000   |
| 1,470    |      | 3,000    | 38,000   | 10,000   | 2,350    |      | 3,000    | 38,000   | 12,000   |
| 1,480    |      | 3,000    | 38,000   | 10,000   | 2,400    |      | 3,000    | 38,000   | 12,000   |
| 1,490    |      | 3,000    | 38,000   | 10,000   | 2,450    |      | 3,000    | 38,000   | 12,000   |
| 1,500    |      | 3,000    | 38,000   | 10,000   | 2,500    |      | 3,000    | 38,000   | 12,000   |
| 1,510    |      | 3,000    | 38,000   | 10,000   | 2,550    |      | 3,000    | 38,000   | 12,000   |
| 1,520    |      | 3,000    | 38,000   | 10,000   | 2,600    |      | 3,000    | 38,000   | 12,000   |
| 1,530    |      | 3,000    | 38,000   | 10,000   | 2,700    |      | 3,000    | 38,000   | 12,000   |
| 1,540    |      | 3,000    | 38,000   | 10,000   | 2,750    |      | 3,000    | 38,000   | 12,000   |
| 1,550    |      | 3,000    | 38,000   | 10,000   | 2,800    |      | 3,000    | 38,000   | 12,000   |
| 1,560    |      | 3,000    | 38,000   | 10,000   | 2,900    |      | 3,000    | 38,000   | 12,000   |
| 1,570    |      | 3,000    | 38,000   | 10,000   | 2,950    |      | 3,000    | 38,000   | 12,000   |
| 1,580    |      | 3,000    | 38,000   | 10,000   | 3,000    |      | 3,000    | 38,000   | 12,000   |
| 1,590    |      | 3,000    | 38,000   | 10,000   |          |      |          |          |          |
| 1,600    |      | 3,000    | 38,000   | 12,000   |          |      |          |          |          |
| 1,610    |      | 3,000    | 38,000   | 12,000   |          |      |          |          |          |
| 1,620    |      | 3,000    | 38,000   | 12,000   |          |      |          |          |          |
| 1,630    |      | 3,000    | 38,000   | 12,000   |          |      |          |          |          |
| 1,640    |      | 3,000    | 38,000   | 12,000   |          |      |          |          |          |
| 1,650    |      | 3,000    | 38,000   | 12,000   |          |      |          |          |          |

## SuperV-Bohrer

### SuperV-NX Hochleistungs-Kleinstbohrer mit Innenkühlung

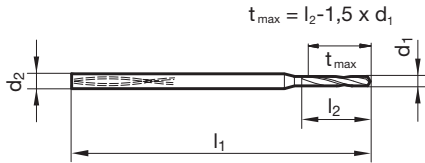


Katalog-Nr. 51997



|   |   |   |   |   |   |                                |
|---|---|---|---|---|---|--------------------------------|
| P | M | K | N | S | H | Arbeitsrichtwerte<br>Seite 250 |
| ● | ● | ● | ○ | ○ |   |                                |

- Ausspitzung  $\geq \varnothing 1,400$
- Flächenanschliff
- Hauptschneidenform gerade
- geschliffener Schneidenabzug
- Kühlmitteldruck beachten (s. Diagramm „Kühlmittlempfehlungen“)



| d1<br>mm | inch | d2<br>mm | l1<br>mm | l2<br>mm | d1<br>mm | inch | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|----------|------|----------|----------|----------|
| 1,000    |      | 3,000    | 48,000   | 8,000    | 2,200    |      | 4,000    | 62,000   | 18,000   |
| 1,020    |      | 3,000    | 48,000   | 8,500    | 2,250    |      | 4,000    | 62,000   | 18,000   |
| 1,050    |      | 3,000    | 48,000   | 8,500    | 2,300    |      | 4,000    | 62,000   | 18,000   |
| 1,100    |      | 3,000    | 48,000   | 9,000    | 2,350    |      | 4,000    | 62,000   | 19,000   |
| 1,150    |      | 3,000    | 48,000   | 9,500    | 2,380    | 3/32 | 4,000    | 62,000   | 19,000   |
| 1,180    |      | 3,000    | 48,000   | 9,500    | 2,400    |      | 4,000    | 62,000   | 19,000   |
| 1,190    |      | 3,000    | 48,000   | 10,000   | 2,450    |      | 4,000    | 62,000   | 20,000   |
| 1,200    |      | 3,000    | 48,000   | 10,000   | 2,500    |      | 4,000    | 62,000   | 20,000   |
| 1,250    |      | 3,000    | 48,000   | 10,000   | 2,550    |      | 4,000    | 62,000   | 20,000   |
| 1,280    |      | 3,000    | 48,000   | 10,500   | 2,600    |      | 4,000    | 66,000   | 21,000   |
| 1,300    |      | 3,000    | 48,000   | 10,500   | 2,650    |      | 4,000    | 66,000   | 21,000   |
| 1,350    |      | 3,000    | 48,000   | 11,000   | 2,700    |      | 4,000    | 66,000   | 22,000   |
| 1,400    |      | 4,000    | 52,000   | 11,000   | 2,750    |      | 4,000    | 66,000   | 22,000   |
| 1,450    |      | 4,000    | 52,000   | 12,000   | 2,780    | 7/64 | 4,000    | 66,000   | 22,000   |
| 1,500    |      | 4,000    | 52,000   | 12,000   | 2,800    |      | 4,000    | 66,000   | 22,000   |
| 1,550    |      | 4,000    | 52,000   | 12,000   | 2,850    |      | 4,000    | 66,000   | 23,000   |
| 1,590    | 1/16 | 4,000    | 52,000   | 13,000   | 2,900    |      | 4,000    | 66,000   | 23,000   |
| 1,600    |      | 4,000    | 52,000   | 13,000   | 2,950    |      | 4,000    | 66,000   | 24,000   |
| 1,650    |      | 4,000    | 52,000   | 13,000   | 3,000    |      | 4,000    | 66,000   | 24,000   |
| 1,700    |      | 4,000    | 56,000   | 14,000   |          |      |          |          |          |
| 1,750    |      | 4,000    | 56,000   | 14,000   |          |      |          |          |          |
| 1,800    |      | 4,000    | 56,000   | 14,000   |          |      |          |          |          |
| 1,850    |      | 4,000    | 56,000   | 15,000   |          |      |          |          |          |
| 1,900    |      | 4,000    | 56,000   | 15,000   |          |      |          |          |          |
| 1,950    |      | 4,000    | 56,000   | 16,000   |          |      |          |          |          |
| 1,980    | 5/64 | 4,000    | 56,000   | 16,000   |          |      |          |          |          |
| 2,000    |      | 4,000    | 56,000   | 16,000   |          |      |          |          |          |
| 2,050    |      | 4,000    | 56,000   | 16,000   |          |      |          |          |          |
| 2,100    |      | 4,000    | 62,000   | 17,000   |          |      |          |          |          |
| 2,150    |      | 4,000    | 62,000   | 17,000   |          |      |          |          |          |

## SuperV-Bohrer

## SuperV-NX Hochleistungs-Kleinstbohrer mit Innenkühlung



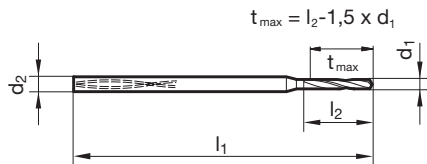
Katalog-Nr. 51998



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ○ | ○ |   |

 Arbeitsrichtwerte  
Seite 250

- Ausspitzung  $\geq \varnothing 1,400$
- Flächenanschliff
- Hauptschneidenform gerade
- geschliffener Schneidenabzug
- Kühlmitteldruck beachten (s. Diagramm „Kühlmittelpfehlungen“)



| d1<br>mm | inch | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|
| 1,000    |      | 3,000    | 48,000   | 11,000   |
| 1,020    |      | 3,000    | 48,000   | 11,500   |
| 1,050    |      | 3,000    | 48,000   | 12,000   |
| 1,100    |      | 3,000    | 48,000   | 12,500   |
| 1,150    |      | 3,000    | 48,000   | 13,000   |
| 1,180    |      | 3,000    | 48,000   | 13,000   |
| 1,190    |      | 3,000    | 48,000   | 13,500   |
| 1,200    |      | 3,000    | 48,000   | 13,500   |
| 1,250    |      | 3,000    | 48,000   | 14,000   |
| 1,280    |      | 3,000    | 48,000   | 14,500   |
| 1,300    |      | 3,000    | 48,000   | 14,500   |
| 1,350    |      | 3,000    | 48,000   | 15,000   |
| 1,400    |      | 4,000    | 52,000   | 15,000   |
| 1,450    |      | 4,000    | 52,000   | 16,000   |
| 1,500    |      | 4,000    | 52,000   | 17,000   |
| 1,550    | 1/16 | 4,000    | 52,000   | 17,000   |
| 1,590    |      | 4,000    | 52,000   | 18,000   |
| 1,600    |      | 4,000    | 52,000   | 18,000   |
| 1,650    |      | 4,000    | 52,000   | 18,000   |
| 1,700    |      | 4,000    | 56,000   | 19,000   |
| 1,750    |      | 4,000    | 56,000   | 19,000   |
| 1,800    |      | 4,000    | 56,000   | 20,000   |
| 1,850    |      | 4,000    | 56,000   | 20,000   |
| 1,900    |      | 4,000    | 56,000   | 21,000   |
| 1,950    |      | 4,000    | 56,000   | 21,000   |
| 1,980    | 5/64 | 4,000    | 56,000   | 22,000   |
| 2,000    |      | 4,000    | 56,000   | 22,000   |
| 2,050    |      | 4,000    | 56,000   | 23,000   |
| 2,100    |      | 4,000    | 62,000   | 23,000   |
| 2,150    |      | 4,000    | 62,000   | 24,000   |

| d1<br>mm | inch | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|
| 2,200    |      | 4,000    | 62,000   | 24,000   |
| 2,250    |      | 4,000    | 62,000   | 25,000   |
| 2,300    |      | 4,000    | 62,000   | 25,000   |
| 2,350    |      | 4,000    | 62,000   | 26,000   |
| 2,380    | 3/32 | 4,000    | 62,000   | 26,000   |
| 2,400    |      | 4,000    | 62,000   | 26,000   |
| 2,450    |      | 4,000    | 62,000   | 27,000   |
| 2,500    |      | 4,000    | 62,000   | 28,000   |
| 2,550    |      | 4,000    | 62,000   | 28,000   |
| 2,600    |      | 4,000    | 66,000   | 29,000   |
| 2,650    |      | 4,000    | 66,000   | 29,000   |
| 2,700    |      | 4,000    | 66,000   | 30,000   |
| 2,750    |      | 4,000    | 66,000   | 30,000   |
| 2,780    | 7/64 | 4,000    | 66,000   | 31,000   |
| 2,800    |      | 4,000    | 66,000   | 31,000   |
| 2,850    |      | 4,000    | 66,000   | 31,000   |
| 2,900    |      | 4,000    | 66,000   | 32,000   |
| 2,950    |      | 4,000    | 66,000   | 32,000   |
| 3,000    |      | 4,000    | 66,000   | 33,000   |



## SuperV-Bohrer

### SuperV-NX Hochleistungs-Kleinstbohrer mit Innenkühlung

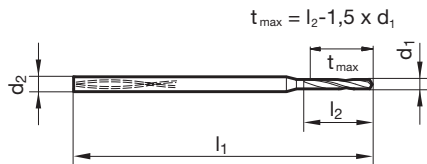


Katalog-Nr. 51999



|   |   |   |   |   |   |                                |
|---|---|---|---|---|---|--------------------------------|
| P | M | K | N | S | H | Arbeitsrichtwerte<br>Seite 250 |
| ● | ● | ● | ○ | ○ |   |                                |

- Ausspitzung  $\geq \varnothing 1,400$
- Flächenanschliff
- Kopfbeschichtung
- Hauptschneidenform gerade
- geschliffener Schneidenabzug
- Kühlmitteldruck beachten (s. Diagramm „Kühlmittlempfehlungen“)



| d1<br>mm | inch | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|
| 1,000    |      | 3,000    | 56,000   | 18,000   |
| 1,020    |      | 3,000    | 56,000   | 18,500   |
| 1,050    |      | 3,000    | 56,000   | 19,000   |
| 1,100    |      | 3,000    | 56,000   | 20,000   |
| 1,150    |      | 3,000    | 56,000   | 21,000   |
| 1,180    |      | 3,000    | 56,000   | 21,500   |
| 1,190    |      | 3,000    | 56,000   | 21,500   |
| 1,200    |      | 3,000    | 56,000   | 22,000   |
| 1,250    |      | 3,000    | 56,000   | 22,500   |
| 1,280    |      | 3,000    | 56,000   | 23,500   |
| 1,300    |      | 3,000    | 56,000   | 23,500   |
| 1,350    |      | 3,000    | 56,000   | 24,500   |
| 1,400    |      | 4,000    | 62,000   | 25,000   |
| 1,500    |      | 4,000    | 62,000   | 27,000   |
| 1,590    | 1/16 | 4,000    | 62,000   | 29,000   |
| 1,600    |      | 4,000    | 62,000   | 29,000   |
| 1,700    |      | 4,000    | 70,000   | 31,000   |
| 1,800    |      | 4,000    | 70,000   | 32,000   |

| d1<br>mm | inch | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|
| 1,900    |      | 4,000    | 70,000   | 34,000   |
| 1,980    | 5/64 | 4,000    | 70,000   | 36,000   |
| 2,000    |      | 4,000    | 70,000   | 36,000   |
| 2,100    |      | 4,000    | 78,000   | 38,000   |
| 2,200    |      | 4,000    | 78,000   | 40,000   |
| 2,300    |      | 4,000    | 78,000   | 42,000   |
| 2,380    | 3/32 | 4,000    | 78,000   | 44,000   |
| 2,400    |      | 4,000    | 78,000   | 44,000   |
| 2,500    |      | 4,000    | 78,000   | 45,000   |
| 2,600    |      | 4,000    | 87,000   | 47,000   |
| 2,700    |      | 4,000    | 87,000   | 48,000   |
| 2,780    | 7/64 | 4,000    | 87,000   | 50,000   |
| 2,800    |      | 4,000    | 87,000   | 50,000   |
| 2,900    |      | 4,000    | 87,000   | 52,000   |
| 3,000    |      | 4,000    | 87,000   | 54,000   |

## SuperV-Bohrer

## SuperV-NX U Hochleistungs-Kleinstbohrer mit Innenkühlung



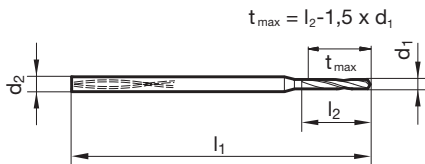
Katalog-Nr. 51980



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ○ | ○ |   |

 Arbeitsrichtwerte  
Seite 250

- Ausspitzung  $\geq \text{Ø } 1,000$
- Flächenanschliff
- Hauptschneidenform gerade
- mit Hauptschneidenabzug
- Kopfbeschichtung



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|
| 1,000    | 3,000    | 59,000   | 23,000   |
| 1,050    | 3,000    | 59,000   | 24,200   |
| 1,100    | 3,000    | 59,000   | 25,300   |
| 1,150    | 3,000    | 63,000   | 26,500   |
| 1,190    | 3,000    | 63,000   | 27,400   |
| 1,200    | 3,000    | 63,000   | 27,600   |
| 1,250    | 3,000    | 63,000   | 28,800   |
| 1,300    | 3,000    | 68,000   | 29,900   |
| 1,350    | 3,000    | 68,000   | 31,100   |
| 1,400    | 4,000    | 70,000   | 32,200   |
| 1,450    | 4,000    | 70,000   | 33,400   |
| 1,500    | 4,000    | 70,000   | 34,500   |
| 1,550    | 4,000    | 70,000   | 35,700   |
| 1,590    | 4,000    | 70,000   | 36,600   |
| 1,600    | 4,000    | 70,000   | 36,800   |
| 1,650    | 4,000    | 70,000   | 38,000   |
| 1,700    | 4,000    | 79,000   | 39,400   |
| 1,750    | 4,000    | 79,000   | 40,300   |
| 1,800    | 4,000    | 79,000   | 41,400   |
| 1,850    | 4,000    | 79,000   | 42,600   |
| 1,900    | 4,000    | 79,000   | 43,700   |
| 1,950    | 4,000    | 79,000   | 44,900   |
| 1,980    | 4,000    | 79,000   | 45,600   |
| 2,000    | 4,000    | 79,000   | 46,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|
| 2,050    | 4,000    | 79,000   | 47,200   |
| 2,100    | 4,000    | 91,000   | 48,300   |
| 2,150    | 4,000    | 91,000   | 49,500   |
| 2,200    | 4,000    | 91,000   | 50,600   |
| 2,250    | 4,000    | 91,000   | 51,800   |
| 2,300    | 4,000    | 91,000   | 52,900   |
| 2,320    | 4,000    | 91,000   | 54,100   |
| 2,350    | 4,000    | 91,000   | 54,100   |
| 2,380    | 4,000    | 91,000   | 54,800   |
| 2,400    | 4,000    | 91,000   | 55,200   |
| 2,450    | 4,000    | 91,000   | 56,400   |
| 2,500    | 4,000    | 91,000   | 57,500   |
| 2,550    | 4,000    | 91,000   | 58,700   |
| 2,600    | 4,000    | 102,000  | 59,800   |
| 2,650    | 4,000    | 102,000  | 61,000   |
| 2,700    | 4,000    | 102,000  | 62,100   |
| 2,750    | 4,000    | 102,000  | 63,300   |
| 2,780    | 4,000    | 102,000  | 64,000   |
| 2,800    | 4,000    | 102,000  | 64,400   |
| 2,850    | 4,000    | 102,000  | 65,600   |
| 2,900    | 4,000    | 102,000  | 66,700   |
| 2,950    | 4,000    | 102,000  | 67,900   |
| 3,000    | 4,000    | 102,000  | 69,000   |

## SuperV-Bohrer

### SuperV-NX VA Hochleistungs-Kleinstbohrer ohne Innenkühlung



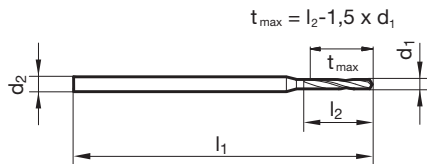
Katalog-Nr. 51970



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ | ● |   | ○ | ● |   |

Arbeitsrichtwerte  
Seite 252

- Flächenanschliff
- Hauptschneidenform leicht konkav
- optimierte Schneidengeometrie



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|
| 0,500    | 3,000    | 38,000   | 2,800    |
| 0,550    | 3,000    | 38,000   | 3,100    |
| 0,600    | 3,000    | 38,000   | 3,300    |
| 0,650    | 3,000    | 38,000   | 3,600    |
| 0,660    | 3,000    | 38,000   | 3,700    |
| 0,700    | 3,000    | 38,000   | 3,900    |
| 0,740    | 3,000    | 38,000   | 4,100    |
| 0,750    | 3,000    | 38,000   | 4,200    |
| 0,790    | 3,000    | 38,000   | 4,400    |
| 0,800    | 3,000    | 38,000   | 4,400    |
| 0,820    | 3,000    | 38,000   | 4,600    |
| 0,850    | 3,000    | 38,000   | 4,700    |
| 0,900    | 3,000    | 38,000   | 5,000    |
| 0,950    | 3,000    | 38,000   | 5,300    |
| 1,000    | 3,000    | 38,000   | 5,500    |
| 1,020    | 3,000    | 38,000   | 5,700    |
| 1,050    | 3,000    | 38,000   | 5,800    |
| 1,100    | 3,000    | 38,000   | 6,100    |
| 1,150    | 3,000    | 38,000   | 6,400    |
| 1,180    | 3,000    | 38,000   | 6,500    |
| 1,190    | 3,000    | 38,000   | 6,600    |
| 1,200    | 3,000    | 38,000   | 6,600    |
| 1,250    | 3,000    | 38,000   | 6,900    |
| 1,280    | 3,000    | 38,000   | 7,100    |
| 1,300    | 3,000    | 38,000   | 7,200    |
| 1,350    | 3,000    | 38,000   | 7,500    |
| 1,400    | 4,000    | 46,000   | 7,700    |
| 1,450    | 4,000    | 46,000   | 8,000    |
| 1,460    | 4,000    | 46,000   | 8,100    |
| 1,500    | 4,000    | 46,000   | 8,300    |
| 1,550    | 4,000    | 46,000   | 8,600    |
| 1,560    | 4,000    | 46,000   | 8,600    |
| 1,590    | 4,000    | 46,000   | 8,800    |
| 1,600    | 4,000    | 46,000   | 8,800    |
| 1,650    | 4,000    | 46,000   | 9,100    |
| 1,660    | 4,000    | 46,000   | 9,200    |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|
| 1,700    | 4,000    | 46,000   | 9,400    |
| 1,750    | 4,000    | 46,000   | 9,700    |
| 1,800    | 4,000    | 46,000   | 9,900    |
| 1,850    | 4,000    | 46,000   | 10,200   |
| 1,900    | 4,000    | 46,000   | 10,500   |
| 1,950    | 4,000    | 46,000   | 10,800   |
| 1,980    | 4,000    | 46,000   | 10,900   |
| 2,000    | 4,000    | 46,000   | 11,000   |
| 2,050    | 4,000    | 46,000   | 11,300   |
| 2,100    | 4,000    | 50,000   | 11,600   |
| 2,150    | 4,000    | 50,000   | 11,900   |
| 2,200    | 4,000    | 50,000   | 12,100   |
| 2,250    | 4,000    | 50,000   | 12,400   |
| 2,300    | 4,000    | 50,000   | 12,700   |
| 2,350    | 4,000    | 50,000   | 13,000   |
| 2,380    | 4,000    | 50,000   | 13,100   |
| 2,400    | 4,000    | 50,000   | 13,200   |
| 2,450    | 4,000    | 50,000   | 13,500   |
| 2,500    | 4,000    | 50,000   | 13,800   |
| 2,550    | 4,000    | 50,000   | 14,100   |
| 2,600    | 4,000    | 50,000   | 14,300   |
| 2,650    | 4,000    | 50,000   | 14,600   |
| 2,700    | 4,000    | 50,000   | 14,900   |
| 2,750    | 4,000    | 50,000   | 15,200   |
| 2,780    | 4,000    | 50,000   | 15,300   |
| 2,800    | 4,000    | 50,000   | 15,400   |
| 2,850    | 4,000    | 50,000   | 15,700   |
| 2,900    | 4,000    | 50,000   | 16,000   |
| 2,950    | 4,000    | 50,000   | 16,300   |
| 3,000    | 4,000    | 50,000   | 16,500   |

## SuperV-Bohrer

## SuperV-NX VA Hochleistungs-Kleinstbohrer mit Innenkühlung



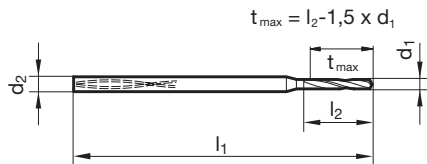
Katalog-Nr. 51971



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ | ● |   | ○ | ● |   |

 Arbeitsrichtwerte  
Seite 252

- Flächenanschliff
- Hauptschneidenform leicht konkav
- optimierte Schneidengeometrie



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|
| 1,000    | 3,000    | 38,000   | 5,500    |
| 1,020    | 3,000    | 38,000   | 5,700    |
| 1,050    | 3,000    | 38,000   | 5,800    |
| 1,100    | 3,000    | 38,000   | 6,100    |
| 1,150    | 3,000    | 38,000   | 6,400    |
| 1,180    | 3,000    | 38,000   | 6,500    |
| 1,190    | 3,000    | 38,000   | 6,600    |
| 1,200    | 3,000    | 38,000   | 6,600    |
| 1,250    | 3,000    | 38,000   | 6,900    |
| 1,280    | 3,000    | 38,000   | 7,100    |
| 1,300    | 3,000    | 38,000   | 7,200    |
| 1,350    | 3,000    | 38,000   | 7,500    |
| 1,400    | 4,000    | 46,000   | 7,700    |
| 1,450    | 4,000    | 46,000   | 8,000    |
| 1,460    | 4,000    | 46,000   | 8,100    |
| 1,500    | 4,000    | 46,000   | 8,300    |
| 1,550    | 4,000    | 46,000   | 8,600    |
| 1,560    | 4,000    | 46,000   | 8,600    |
| 1,590    | 4,000    | 46,000   | 8,800    |
| 1,600    | 4,000    | 46,000   | 8,800    |
| 1,650    | 4,000    | 46,000   | 9,100    |
| 1,660    | 4,000    | 46,000   | 9,200    |
| 1,700    | 4,000    | 46,000   | 9,400    |
| 1,750    | 4,000    | 46,000   | 9,700    |
| 1,800    | 4,000    | 46,000   | 9,900    |
| 1,850    | 4,000    | 46,000   | 10,200   |
| 1,900    | 4,000    | 46,000   | 10,500   |
| 1,950    | 4,000    | 46,000   | 10,800   |
| 1,980    | 4,000    | 46,000   | 10,900   |
| 2,000    | 4,000    | 46,000   | 11,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|
| 2,050    | 4,000    | 46,000   | 11,300   |
| 2,100    | 4,000    | 50,000   | 11,600   |
| 2,150    | 4,000    | 50,000   | 11,900   |
| 2,200    | 4,000    | 50,000   | 12,100   |
| 2,250    | 4,000    | 50,000   | 12,400   |
| 2,300    | 4,000    | 50,000   | 12,700   |
| 2,350    | 4,000    | 50,000   | 13,000   |
| 2,380    | 4,000    | 50,000   | 13,100   |
| 2,400    | 4,000    | 50,000   | 13,200   |
| 2,450    | 4,000    | 50,000   | 13,500   |
| 2,500    | 4,000    | 50,000   | 13,800   |
| 2,550    | 4,000    | 50,000   | 14,100   |
| 2,600    | 4,000    | 50,000   | 14,300   |
| 2,650    | 4,000    | 50,000   | 14,600   |
| 2,700    | 4,000    | 50,000   | 14,900   |
| 2,750    | 4,000    | 50,000   | 15,200   |
| 2,780    | 4,000    | 50,000   | 15,300   |
| 2,800    | 4,000    | 50,000   | 15,400   |
| 2,850    | 4,000    | 50,000   | 15,700   |
| 2,900    | 4,000    | 50,000   | 16,000   |
| 2,950    | 4,000    | 50,000   | 16,300   |
| 3,000    | 4,000    | 50,000   | 16,500   |

## SuperV-Bohrer

### SuperV-NX VA Hochleistungs-Kleinstbohrer mit Innenkühlung



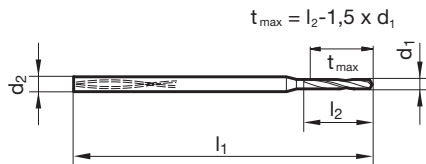
Katalog-Nr. 51972



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ | ● |   | ○ | ● |   |

Arbeitsrichtwerte  
Seite 252

- Flächenanschliff
- Hauptschneidenform leicht konkav
- optimierte Schneidengeometrie



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|
| 1,000    | 3,000    | 48,000   | 9,000    |
| 1,050    | 3,000    | 48,000   | 9,500    |
| 1,100    | 3,000    | 48,000   | 9,900    |
| 1,150    | 3,000    | 48,000   | 10,400   |
| 1,190    | 3,000    | 48,000   | 10,800   |
| 1,200    | 3,000    | 51,000   | 10,800   |
| 1,250    | 3,000    | 51,000   | 11,300   |
| 1,300    | 3,000    | 51,000   | 11,700   |
| 1,350    | 3,000    | 51,000   | 12,200   |
| 1,400    | 4,000    | 56,000   | 12,600   |
| 1,450    | 4,000    | 56,000   | 13,100   |
| 1,500    | 4,000    | 56,000   | 13,500   |
| 1,550    | 4,000    | 56,000   | 14,000   |
| 1,590    | 4,000    | 56,000   | 14,400   |
| 1,600    | 4,000    | 56,000   | 14,400   |
| 1,650    | 4,000    | 56,000   | 14,900   |
| 1,700    | 4,000    | 61,000   | 15,300   |
| 1,750    | 4,000    | 61,000   | 15,800   |
| 1,800    | 4,000    | 61,000   | 16,200   |
| 1,850    | 4,000    | 61,000   | 16,700   |
| 1,900    | 4,000    | 61,000   | 17,100   |
| 1,950    | 4,000    | 61,000   | 17,600   |
| 1,980    | 4,000    | 61,000   | 17,900   |
| 2,000    | 4,000    | 61,000   | 18,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|
| 2,050    | 4,000    | 61,000   | 18,500   |
| 2,100    | 4,000    | 66,000   | 18,900   |
| 2,150    | 4,000    | 66,000   | 19,400   |
| 2,200    | 4,000    | 66,000   | 19,800   |
| 2,250    | 4,000    | 66,000   | 20,300   |
| 2,300    | 4,000    | 66,000   | 20,700   |
| 2,350    | 4,000    | 66,000   | 21,200   |
| 2,380    | 4,000    | 66,000   | 21,500   |
| 2,400    | 4,000    | 66,000   | 21,600   |
| 2,450    | 4,000    | 66,000   | 22,100   |
| 2,500    | 4,000    | 66,000   | 22,500   |
| 2,550    | 4,000    | 66,000   | 23,000   |
| 2,600    | 4,000    | 71,000   | 23,400   |
| 2,650    | 4,000    | 71,000   | 23,900   |
| 2,700    | 4,000    | 71,000   | 24,300   |
| 2,750    | 4,000    | 71,000   | 24,800   |
| 2,780    | 4,000    | 71,000   | 25,100   |
| 2,800    | 4,000    | 71,000   | 25,200   |
| 2,850    | 4,000    | 71,000   | 25,700   |
| 2,900    | 4,000    | 71,000   | 26,100   |
| 2,950    | 4,000    | 71,000   | 26,600   |
| 3,000    | 4,000    | 71,000   | 27,000   |

## SuperV-Bohrer

## SuperV-NX VA Hochleistungs-Kleinstbohrer mit Innenkühlung



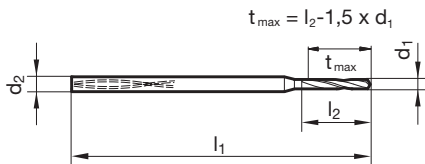
Katalog-Nr. 51973



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ | ● |   | ○ | ● |   |

 Arbeitsrichtwerte  
Seite 252

- Flächenanschliff
- Hauptschneidenform leicht konkav
- optimierte Schneidengeometrie



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|
| 1,000    | 3,000    | 48,000   | 13,000   |
| 1,050    | 3,000    | 48,000   | 13,700   |
| 1,100    | 3,000    | 48,000   | 14,300   |
| 1,150    | 3,000    | 48,000   | 15,000   |
| 1,190    | 3,000    | 48,000   | 15,500   |
| 1,200    | 3,000    | 51,000   | 15,600   |
| 1,250    | 3,000    | 51,000   | 16,300   |
| 1,300    | 3,000    | 51,000   | 16,900   |
| 1,350    | 3,000    | 51,000   | 17,600   |
| 1,400    | 4,000    | 56,000   | 18,200   |
| 1,450    | 4,000    | 56,000   | 18,900   |
| 1,500    | 4,000    | 56,000   | 19,500   |
| 1,550    | 4,000    | 56,000   | 20,200   |
| 1,590    | 4,000    | 56,000   | 20,700   |
| 1,600    | 4,000    | 56,000   | 20,800   |
| 1,650    | 4,000    | 56,000   | 21,500   |
| 1,700    | 4,000    | 61,000   | 22,100   |
| 1,750    | 4,000    | 61,000   | 22,800   |
| 1,800    | 4,000    | 61,000   | 23,400   |
| 1,850    | 4,000    | 61,000   | 24,100   |
| 1,900    | 4,000    | 61,000   | 24,700   |
| 1,950    | 4,000    | 61,000   | 25,400   |
| 1,980    | 4,000    | 61,000   | 25,800   |
| 2,000    | 4,000    | 61,000   | 26,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|
| 2,050    | 4,000    | 61,000   | 26,700   |
| 2,100    | 4,000    | 66,000   | 27,300   |
| 2,150    | 4,000    | 66,000   | 28,000   |
| 2,200    | 4,000    | 66,000   | 28,600   |
| 2,250    | 4,000    | 66,000   | 29,300   |
| 2,300    | 4,000    | 66,000   | 29,900   |
| 2,350    | 4,000    | 66,000   | 30,600   |
| 2,380    | 4,000    | 66,000   | 31,000   |
| 2,400    | 4,000    | 66,000   | 31,200   |
| 2,450    | 4,000    | 66,000   | 31,900   |
| 2,500    | 4,000    | 66,000   | 32,500   |
| 2,550    | 4,000    | 66,000   | 33,200   |
| 2,600    | 4,000    | 71,000   | 33,800   |
| 2,650    | 4,000    | 71,000   | 34,500   |
| 2,700    | 4,000    | 71,000   | 35,100   |
| 2,750    | 4,000    | 71,000   | 35,800   |
| 2,780    | 4,000    | 71,000   | 36,200   |
| 2,800    | 4,000    | 71,000   | 36,400   |
| 2,850    | 4,000    | 71,000   | 37,100   |
| 2,900    | 4,000    | 71,000   | 37,700   |
| 2,950    | 4,000    | 71,000   | 38,400   |
| 3,000    | 4,000    | 71,000   | 39,000   |

## SuperV-Bohrer

### SuperV-NX VA Hochleistungs-Kleinstbohrer mit Innenkühlung



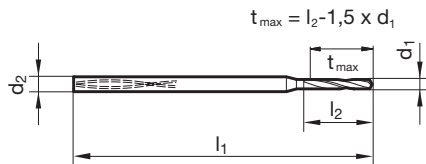
Katalog-Nr. 51974



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ | ● | ○ | ○ | ● | ○ |

Arbeitsrichtwerte  
Seite 252

- Ausspitzung  $\geq \varnothing 1,000$
- Flächenanschliff
- Hauptschneidenform leicht konkav
- optimierte Schneidengeometrie



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|
| 1,000    | 3,000    | 54,000   | 18,000   |
| 1,050    | 3,000    | 54,000   | 18,900   |
| 1,100    | 3,000    | 54,000   | 19,800   |
| 1,150    | 3,000    | 54,000   | 20,700   |
| 1,190    | 3,000    | 54,000   | 21,500   |
| 1,200    | 3,000    | 58,000   | 21,600   |
| 1,250    | 3,000    | 58,000   | 22,500   |
| 1,300    | 3,000    | 58,000   | 23,400   |
| 1,350    | 3,000    | 58,000   | 24,300   |
| 1,400    | 4,000    | 64,000   | 25,200   |
| 1,450    | 4,000    | 64,000   | 26,100   |
| 1,500    | 4,000    | 64,000   | 27,000   |
| 1,550    | 4,000    | 64,000   | 27,900   |
| 1,590    | 4,000    | 64,000   | 28,700   |
| 1,600    | 4,000    | 64,000   | 28,800   |
| 1,650    | 4,000    | 64,000   | 29,700   |
| 1,700    | 4,000    | 71,000   | 30,600   |
| 1,750    | 4,000    | 71,000   | 31,500   |
| 1,800    | 4,000    | 71,000   | 32,400   |
| 1,850    | 4,000    | 71,000   | 33,300   |
| 1,900    | 4,000    | 71,000   | 34,200   |
| 1,950    | 4,000    | 71,000   | 35,100   |
| 1,980    | 4,000    | 71,000   | 35,700   |
| 2,000    | 4,000    | 71,000   | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|
| 2,050    | 4,000    | 71,000   | 36,900   |
| 2,100    | 4,000    | 79,000   | 37,800   |
| 2,150    | 4,000    | 79,000   | 38,700   |
| 2,200    | 4,000    | 79,000   | 39,600   |
| 2,250    | 4,000    | 79,000   | 40,500   |
| 2,300    | 4,000    | 79,000   | 41,400   |
| 2,350    | 4,000    | 79,000   | 42,300   |
| 2,380    | 4,000    | 79,000   | 42,900   |
| 2,400    | 4,000    | 79,000   | 43,200   |
| 2,450    | 4,000    | 79,000   | 44,100   |
| 2,500    | 4,000    | 79,000   | 45,000   |
| 2,550    | 4,000    | 79,000   | 45,900   |
| 2,600    | 4,000    | 87,000   | 46,800   |
| 2,650    | 4,000    | 87,000   | 47,700   |
| 2,700    | 4,000    | 87,000   | 48,600   |
| 2,750    | 4,000    | 87,000   | 49,500   |
| 2,780    | 4,000    | 87,000   | 50,100   |
| 2,800    | 4,000    | 87,000   | 50,400   |
| 2,850    | 4,000    | 87,000   | 51,300   |
| 2,900    | 4,000    | 87,000   | 52,200   |
| 2,950    | 4,000    | 87,000   | 53,100   |
| 3,000    | 4,000    | 87,000   | 54,000   |

## Hartmetall-Spiralbohrer

### Spiralbohrer kurz



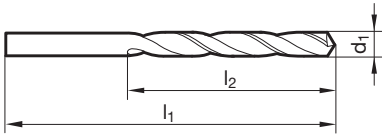
Katalog-Nr. 51290



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ | ○ | ○ | ● | ○ |   |

Arbeitsrichtwerte  
Seite 254

- Flächenanschliff
- Hauptschneidenform gerade
- höhere Verschleißfestigkeit



| d1<br>mm | inch | l1<br>mm | l2<br>mm | d1<br>mm | inch | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|------|----------|----------|
| 1,000    |      | 34,000   | 12,000   | 5,800    |      | 93,000   | 57,000   |
| 1,100    |      | 36,000   | 14,000   | 5,900    |      | 93,000   | 57,000   |
| 1,200    |      | 38,000   | 16,000   | 6,000    |      | 93,000   | 57,000   |
| 1,300    |      | 38,000   | 16,000   | 6,100    |      | 101,000  | 63,000   |
| 1,400    |      | 40,000   | 18,000   | 6,200    |      | 101,000  | 63,000   |
| 1,500    |      | 40,000   | 18,000   | 6,300    |      | 101,000  | 63,000   |
| 1,600    |      | 43,000   | 20,000   | 6,400    |      | 101,000  | 63,000   |
| 1,700    |      | 43,000   | 20,000   | 6,500    |      | 101,000  | 63,000   |
| 1,800    |      | 46,000   | 22,000   | 6,600    |      | 101,000  | 63,000   |
| 1,900    |      | 46,000   | 22,000   | 6,700    |      | 101,000  | 63,000   |
| 2,000    |      | 49,000   | 24,000   | 6,800    |      | 109,000  | 69,000   |
| 2,100    |      | 49,000   | 24,000   | 6,900    |      | 109,000  | 69,000   |
| 2,200    |      | 53,000   | 27,000   | 7,000    |      | 109,000  | 69,000   |
| 2,300    |      | 53,000   | 27,000   | 7,100    |      | 109,000  | 69,000   |
| 2,400    |      | 57,000   | 30,000   | 7,200    |      | 109,000  | 69,000   |
| 2,500    |      | 57,000   | 30,000   | 7,300    |      | 109,000  | 69,000   |
| 2,600    |      | 57,000   | 30,000   | 7,400    |      | 109,000  | 69,000   |
| 2,700    |      | 61,000   | 33,000   | 7,500    |      | 109,000  | 69,000   |
| 2,800    |      | 61,000   | 33,000   | 7,600    |      | 117,000  | 75,000   |
| 2,900    |      | 61,000   | 33,000   | 7,700    |      | 117,000  | 75,000   |
| 3,000    |      | 61,000   | 33,000   | 7,800    |      | 117,000  | 75,000   |
| 3,100    |      | 65,000   | 36,000   | 7,900    |      | 117,000  | 75,000   |
| 3,200    |      | 65,000   | 36,000   | 8,000    |      | 117,000  | 75,000   |
| 3,300    |      | 65,000   | 36,000   | 8,100    |      | 117,000  | 75,000   |
| 3,400    |      | 70,000   | 39,000   | 8,200    |      | 117,000  | 75,000   |
| 3,500    |      | 70,000   | 39,000   | 8,300    |      | 117,000  | 75,000   |
| 3,600    |      | 70,000   | 39,000   | 8,400    |      | 117,000  | 75,000   |
| 3,700    |      | 70,000   | 39,000   | 8,500    |      | 117,000  | 75,000   |
| 3,800    |      | 75,000   | 43,000   | 8,600    |      | 125,000  | 81,000   |
| 3,900    |      | 75,000   | 43,000   | 8,700    |      | 125,000  | 81,000   |
| 4,000    |      | 75,000   | 43,000   | 8,800    |      | 125,000  | 81,000   |
| 4,100    |      | 75,000   | 43,000   | 8,900    |      | 125,000  | 81,000   |
| 4,200    |      | 75,000   | 43,000   | 9,000    |      | 125,000  | 81,000   |
| 4,300    |      | 80,000   | 47,000   | 9,100    |      | 125,000  | 81,000   |
| 4,400    |      | 80,000   | 47,000   | 9,200    |      | 125,000  | 81,000   |
| 4,500    |      | 80,000   | 47,000   | 9,300    |      | 125,000  | 81,000   |
| 4,600    |      | 80,000   | 47,000   | 9,400    |      | 125,000  | 81,000   |
| 4,700    |      | 80,000   | 47,000   | 9,500    |      | 125,000  | 81,000   |
| 4,800    |      | 86,000   | 52,000   | 9,600    |      | 133,000  | 87,000   |
| 4,900    |      | 86,000   | 52,000   | 9,700    |      | 133,000  | 87,000   |
| 5,000    |      | 86,000   | 52,000   | 9,800    |      | 133,000  | 87,000   |
| 5,100    |      | 86,000   | 52,000   | 9,900    |      | 133,000  | 87,000   |
| 5,200    |      | 86,000   | 52,000   | 10,000   |      | 133,000  | 87,000   |
| 5,300    |      | 86,000   | 52,000   | 10,500   |      | 133,000  | 87,000   |
| 5,400    |      | 93,000   | 57,000   | 11,000   |      | 142,000  | 94,000   |
| 5,500    |      | 93,000   | 57,000   | 11,500   |      | 142,000  | 94,000   |
| 5,600    |      | 93,000   | 57,000   | 12,000   |      | 151,000  | 101,000  |
| 5,700    |      | 93,000   | 57,000   |          |      |          |          |



## Spiralbohrer mit Zylinderschaft

### Spiralbohrer mit verstärktem Zylinderschaft



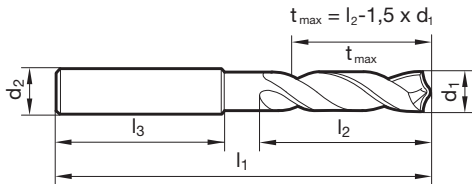
Katalog-Nr. 51146



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ |   | ○ |   |   | ● |

Arbeitsrichtwerte  
Seite 254

- Hauptschneidenform gerade (durch Korrektur)
- Flächenanschliff



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 2,600    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,000    | 6,000    | 62,000   | 20,000   | 36,000   |
| 3,400    | 6,000    | 62,000   | 20,000   | 36,000   |
| 4,000    | 6,000    | 66,000   | 24,000   | 36,000   |
| 4,300    | 6,000    | 66,000   | 24,000   | 36,000   |
| 5,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,100    | 6,000    | 66,000   | 28,000   | 36,000   |
| 5,600    | 6,000    | 66,000   | 28,000   | 36,000   |
| 6,000    | 6,000    | 66,000   | 28,000   | 36,000   |
| 6,900    | 8,000    | 79,000   | 34,000   | 36,000   |
| 7,100    | 8,000    | 79,000   | 41,000   | 36,000   |
| 8,000    | 8,000    | 79,000   | 41,000   | 36,000   |

| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm |
|----------|----------|----------|----------|----------|
| 8,600    | 10,000   | 89,000   | 47,000   | 40,000   |
| 9,100    | 10,000   | 89,000   | 47,000   | 40,000   |
| 10,000   | 10,000   | 89,000   | 47,000   | 40,000   |
| 10,400   | 12,000   | 102,000  | 55,000   | 45,000   |
| 10,600   | 12,000   | 102,000  | 55,000   | 45,000   |
| 11,100   | 12,000   | 102,000  | 55,000   | 45,000   |
| 12,000   | 12,000   | 102,000  | 55,000   | 45,000   |
| 14,100   | 16,000   | 115,000  | 65,000   | 48,000   |

## Einlippenbohrer

## Einlippenbohrer SuperT-NXL



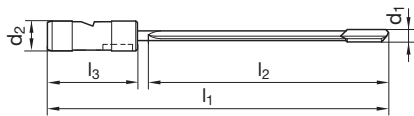
Katalog-Nr. 65030



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ○ | ● | ○ | ○ | ○ |

 Arbeitsrichtwerte  
Seite 256

- nur auf Tiefbohrmaschinen verwendbar
- universell einsetzbar
- Umfangsform G
- fixe Gesamtlänge 800 mm
- blanke Spanfläche für bessere Spanbildung



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | Code-Nr. |
|----------|----------|----------|----------|----------|----------|
| 3,000    | 25,000   | 800,000  | 700,000  | 70,000   | 3,000    |
| 4,000    | 25,000   | 800,000  | 700,000  | 70,000   | 4,000    |
| 5,000    | 25,000   | 800,000  | 700,000  | 70,000   | 5,000    |
| 6,000    | 25,000   | 800,000  | 700,000  | 70,000   | 6,000    |
| 7,000    | 25,000   | 800,000  | 700,000  | 70,000   | 7,000    |
| 8,000    | 25,000   | 800,000  | 700,000  | 70,000   | 8,000    |
| 9,000    | 25,000   | 800,000  | 700,000  | 70,000   | 9,000    |
| 10,000   | 25,000   | 800,000  | 700,000  | 70,000   | 10,000   |
| 11,000   | 25,000   | 800,000  | 700,000  | 70,000   | 11,000   |
| 11,500   | 25,000   | 800,000  | 700,000  | 70,000   | 11,500   |
| 12,000   | 25,000   | 800,000  | 700,000  | 70,000   | 12,000   |
| 13,000   | 25,000   | 800,000  | 700,000  | 70,000   | 13,000   |
| 14,000   | 25,000   | 800,000  | 700,000  | 70,000   | 14,000   |
| 15,000   | 25,000   | 800,000  | 700,000  | 70,000   | 15,000   |
| 16,000   | 25,000   | 800,000  | 700,000  | 70,000   | 16,000   |
| 17,000   | 25,000   | 800,000  | 700,000  | 70,000   | 17,000   |
| 18,000   | 25,000   | 800,000  | 700,000  | 70,000   | 18,000   |
| 19,000   | 25,000   | 800,000  | 700,000  | 70,000   | 19,000   |
| 20,000   | 25,000   | 800,000  | 700,000  | 70,000   | 20,000   |
| 21,000   | 25,000   | 800,000  | 700,000  | 70,000   | 21,000   |
| 22,000   | 25,000   | 800,000  | 700,000  | 70,000   | 22,000   |
| 23,000   | 25,000   | 800,000  | 700,000  | 70,000   | 23,000   |
| 24,000   | 25,000   | 800,000  | 700,000  | 70,000   | 24,000   |
| 25,000   | 25,000   | 800,000  | 700,000  | 70,000   | 25,000   |

## Einlippenbohrer

### Einlippenbohrer SuperT-NXL



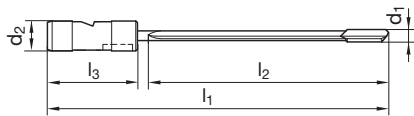
Katalog-Nr. 65031



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ○ | ● | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 256

- nur auf Tiefbohrmaschinen verwendbar
- universell einsetzbar
- Umfangsform G
- fixe Gesamtlänge 1200 mm
- blanke Spanfläche für bessere Spanbildung



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | Code-Nr. |
|----------|----------|----------|----------|----------|----------|
| 3,000    | 25,000   | 1200,000 | 1100,000 | 70,000   | 3,000    |
| 4,000    | 25,000   | 1200,000 | 1100,000 | 70,000   | 4,000    |
| 5,000    | 25,000   | 1200,000 | 1100,000 | 70,000   | 5,000    |
| 6,000    | 25,000   | 1200,000 | 1100,000 | 70,000   | 6,000    |
| 7,000    | 25,000   | 1200,000 | 1100,000 | 70,000   | 7,000    |
| 8,000    | 25,000   | 1200,000 | 1100,000 | 70,000   | 8,000    |
| 9,000    | 25,000   | 1200,000 | 1100,000 | 70,000   | 9,000    |
| 10,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 10,000   |
| 11,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 11,000   |
| 11,500   | 25,000   | 1200,000 | 1100,000 | 70,000   | 11,500   |
| 12,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 12,000   |
| 13,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 13,000   |
| 14,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 14,000   |
| 15,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 15,000   |
| 16,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 16,000   |
| 17,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 17,000   |
| 18,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 18,000   |
| 19,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 19,000   |
| 20,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 20,000   |
| 21,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 21,000   |
| 22,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 22,000   |
| 23,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 23,000   |
| 24,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 24,000   |
| 25,000   | 25,000   | 1200,000 | 1100,000 | 70,000   | 25,000   |

## Einlippenbohrer

## Einlippenbohrer SuperT-NXL



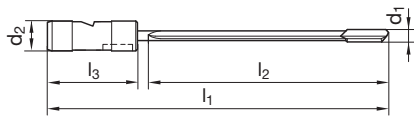
Katalog-Nr. 65032



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ○ | ● | ○ | ○ | ○ |

 Arbeitsrichtwerte  
Seite 256

- nur auf Tiefbohrmaschinen verwendbar
- universell einsetzbar
- Umfangsform G
- fixe Gesamtlänge 1600 mm
- blanke Spanfläche für bessere Spanbildung



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | Code-Nr. |
|----------|----------|----------|----------|----------|----------|
| 4,000    | 25,000   | 1600,000 | 1500,000 | 70,000   | 4,000    |
| 5,000    | 25,000   | 1600,000 | 1500,000 | 70,000   | 5,000    |
| 5,500    | 25,000   | 1600,000 | 1500,000 | 70,000   | 5,500    |
| 6,000    | 25,000   | 1600,000 | 1500,000 | 70,000   | 6,000    |
| 6,500    | 25,000   | 1600,000 | 1500,000 | 70,000   | 6,500    |
| 7,000    | 25,000   | 1600,000 | 1500,000 | 70,000   | 7,000    |
| 7,500    | 25,000   | 1600,000 | 1500,000 | 70,000   | 7,500    |
| 8,000    | 25,000   | 1600,000 | 1500,000 | 70,000   | 8,000    |
| 9,000    | 25,000   | 1600,000 | 1500,000 | 70,000   | 9,000    |
| 9,500    | 25,000   | 1600,000 | 1500,000 | 70,000   | 9,500    |
| 10,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 10,000   |
| 11,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 11,000   |
| 11,500   | 25,000   | 1600,000 | 1500,000 | 70,000   | 11,500   |
| 12,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 12,000   |
| 13,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 13,000   |
| 14,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 14,000   |
| 15,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 15,000   |
| 16,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 16,000   |
| 17,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 17,000   |
| 18,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 18,000   |
| 19,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 19,000   |
| 20,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 20,000   |
| 21,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 21,000   |
| 22,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 22,000   |
| 23,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 23,000   |
| 24,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 24,000   |
| 25,000   | 25,000   | 1600,000 | 1500,000 | 70,000   | 25,000   |

# Einlippenbohrer

## Einlippenbohrer SuperT-NXL



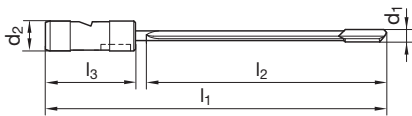
Katalog-Nr. 65033



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ○ | ● | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 256

- nur auf Tiefbohrmaschinen verwendbar
- universell einsetzbar
- Umfangsform G
- fixe Gesamtlänge 2000 mm
- blanke Spanfläche für bessere Spanbildung



| d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | Code-Nr. |
|----------|----------|----------|----------|----------|----------|
| 4,000    | 25,000   | 2000,000 | 1900,000 | 70,000   | 4,000    |
| 5,000    | 25,000   | 2000,000 | 1900,000 | 70,000   | 5,000    |
| 6,000    | 25,000   | 2000,000 | 1900,000 | 70,000   | 6,000    |
| 7,000    | 25,000   | 2000,000 | 1900,000 | 70,000   | 7,000    |
| 8,000    | 25,000   | 2000,000 | 1900,000 | 70,000   | 8,000    |
| 9,000    | 25,000   | 2000,000 | 1900,000 | 70,000   | 9,000    |
| 10,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 10,000   |
| 11,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 11,000   |
| 11,500   | 25,000   | 2000,000 | 1900,000 | 70,000   | 11,500   |
| 12,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 12,000   |
| 13,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 13,000   |
| 14,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 14,000   |
| 15,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 15,000   |
| 16,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 16,000   |
| 17,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 17,000   |
| 18,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 18,000   |
| 19,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 19,000   |
| 20,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 20,000   |
| 21,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 21,000   |
| 22,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 22,000   |
| 23,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 23,000   |
| 24,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 24,000   |
| 25,000   | 25,000   | 2000,000 | 1900,000 | 70,000   | 25,000   |
| 26,000   | 25,000   | 2000,000 | 1895,000 | 75,000   | 26,000   |
| 27,000   | 25,000   | 2000,000 | 1895,000 | 75,000   | 27,000   |
| 28,000   | 25,000   | 2000,000 | 1895,000 | 75,000   | 28,000   |
| 29,000   | 25,000   | 2000,000 | 1895,000 | 75,000   | 29,000   |
| 30,000   | 25,000   | 2000,000 | 1895,000 | 75,000   | 30,000   |
| 31,000   | 25,000   | 2000,000 | 1895,000 | 75,000   | 31,000   |
| 32,000   | 25,000   | 2000,000 | 1895,000 | 75,000   | 32,000   |

## Spiralbohrer mit Zylinderschaft

## Karosseriebohrer

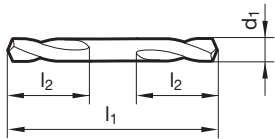


Katalog-Nr. 71660



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ○ | ● | ● | ○ |   |

- Kegelmantelschliff
- für beidseitigen Einsatz
- in Handbohrmaschinen im Karosseriebau



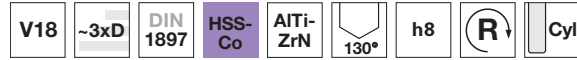
| d1<br>mm | l1<br>mm | l2<br>mm | d1<br>mm | l1<br>mm | l2<br>mm |
|----------|----------|----------|----------|----------|----------|
| 2,000    | 38,000   | 7,500    | 4,900    | 62,000   | 17,000   |
| 2,100    | 38,000   | 7,500    | 5,000    | 62,000   | 17,000   |
| 2,200    | 40,000   | 8,500    | 5,100    | 62,000   | 17,000   |
| 2,300    | 40,000   | 8,500    | 5,200    | 62,000   | 17,000   |
| 2,400    | 43,000   | 9,500    | 5,300    | 62,000   | 17,000   |
| 2,500    | 43,000   | 9,500    | 5,500    | 66,000   | 19,000   |
| 2,600    | 43,000   | 9,500    | 5,600    | 66,000   | 19,000   |
| 2,700    | 46,000   | 10,600   | 5,800    | 66,000   | 19,000   |
| 2,800    | 46,000   | 10,600   | 6,000    | 66,000   | 19,000   |
| 2,900    | 46,000   | 10,600   | 6,100    | 70,000   | 21,200   |
| 3,000    | 46,000   | 10,600   | 6,500    | 70,000   | 21,200   |
| 3,100    | 49,000   | 11,200   | 7,000    | 74,000   | 23,600   |
| 3,170    | 49,000   | 11,200   | 8,000    | 79,000   | 25,000   |
| 3,200    | 49,000   | 11,200   | 8,500    | 79,000   | 25,000   |
| 3,300    | 49,000   | 11,200   | 10,000   | 89,000   | 25,000   |
| 3,500    | 52,000   | 12,500   |          |          |          |
| 3,600    | 52,000   | 12,500   |          |          |          |
| 3,700    | 52,000   | 12,500   |          |          |          |
| 3,800    | 55,000   | 14,000   |          |          |          |
| 4,000    | 55,000   | 14,000   |          |          |          |
| 4,100    | 55,000   | 14,000   |          |          |          |
| 4,200    | 55,000   | 14,000   |          |          |          |
| 4,500    | 58,000   | 15,500   |          |          |          |
| 4,800    | 62,000   | 17,000   |          |          |          |

## Spiralbohrer mit Zylinderschaft

### Spiralbohrer extra kurz



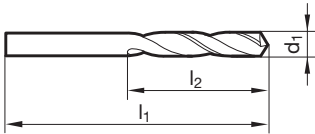
Katalog-Nr. 61131



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ | ● | ○ | ○ | ● |   |

Arbeitsrichtwerte  
Seite 254

- Ausspitzung  $\geq \varnothing 1,000$
- Kegelmantelschliff
- weite Spannuten
- besonders hohe Verschleißfestigkeit
- besonders hohe Stabilität



| d1<br>mm | inch | l1<br>mm | l2<br>mm | d1<br>mm | inch | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|------|----------|----------|
| 1,000    |      | 26,000   | 6,000    | 5,800    |      | 66,000   | 28,000   |
| 1,100    |      | 28,000   | 7,000    | 5,900    |      | 66,000   | 28,000   |
| 1,200    |      | 30,000   | 8,000    | 6,000    |      | 66,000   | 28,000   |
| 1,300    |      | 30,000   | 8,000    | 6,100    |      | 70,000   | 31,000   |
| 1,400    |      | 32,000   | 9,000    | 6,200    |      | 70,000   | 31,000   |
| 1,500    |      | 32,000   | 9,000    | 6,300    |      | 70,000   | 31,000   |
| 1,600    |      | 34,000   | 10,000   | 6,400    |      | 70,000   | 31,000   |
| 1,700    |      | 34,000   | 10,000   | 6,500    |      | 70,000   | 31,000   |
| 1,800    |      | 36,000   | 11,000   | 6,600    |      | 70,000   | 31,000   |
| 1,900    |      | 36,000   | 11,000   | 6,700    |      | 70,000   | 31,000   |
| 2,000    |      | 38,000   | 12,000   | 6,800    |      | 74,000   | 34,000   |
| 2,100    |      | 38,000   | 12,000   | 6,900    |      | 74,000   | 34,000   |
| 2,200    |      | 40,000   | 13,000   | 7,000    |      | 74,000   | 34,000   |
| 2,300    |      | 40,000   | 13,000   | 7,100    |      | 74,000   | 34,000   |
| 2,400    |      | 43,000   | 14,000   | 7,200    |      | 74,000   | 34,000   |
| 2,500    |      | 43,000   | 14,000   | 7,300    |      | 74,000   | 34,000   |
| 2,600    |      | 43,000   | 14,000   | 7,400    |      | 74,000   | 34,000   |
| 2,700    |      | 46,000   | 16,000   | 7,500    |      | 74,000   | 34,000   |
| 2,800    |      | 46,000   | 16,000   | 7,600    |      | 79,000   | 37,000   |
| 2,900    |      | 46,000   | 16,000   | 7,700    |      | 79,000   | 37,000   |
| 3,000    |      | 46,000   | 16,000   | 7,800    |      | 79,000   | 37,000   |
| 3,100    |      | 49,000   | 18,000   | 7,900    |      | 79,000   | 37,000   |
| 3,200    |      | 49,000   | 18,000   | 8,000    |      | 79,000   | 37,000   |
| 3,300    |      | 49,000   | 18,000   | 8,100    |      | 79,000   | 37,000   |
| 3,400    |      | 52,000   | 20,000   | 8,200    |      | 79,000   | 37,000   |
| 3,500    |      | 52,000   | 20,000   | 8,300    |      | 79,000   | 37,000   |
| 3,600    |      | 52,000   | 20,000   | 8,400    |      | 79,000   | 37,000   |
| 3,700    |      | 52,000   | 20,000   | 8,500    |      | 79,000   | 37,000   |
| 3,800    |      | 55,000   | 22,000   | 8,600    |      | 84,000   | 40,000   |
| 3,900    |      | 55,000   | 22,000   | 8,700    |      | 84,000   | 40,000   |
| 4,000    |      | 55,000   | 22,000   | 8,800    |      | 84,000   | 40,000   |
| 4,100    |      | 55,000   | 22,000   | 8,900    |      | 84,000   | 40,000   |
| 4,200    |      | 55,000   | 22,000   | 9,000    |      | 84,000   | 40,000   |
| 4,300    |      | 58,000   | 24,000   | 9,100    |      | 84,000   | 40,000   |
| 4,400    |      | 58,000   | 24,000   | 9,200    |      | 84,000   | 40,000   |
| 4,500    |      | 58,000   | 24,000   | 9,300    |      | 84,000   | 40,000   |
| 4,600    |      | 58,000   | 24,000   | 9,400    |      | 84,000   | 40,000   |
| 4,700    |      | 58,000   | 24,000   | 9,500    |      | 84,000   | 40,000   |
| 4,800    |      | 62,000   | 26,000   | 9,600    |      | 89,000   | 43,000   |
| 4,900    |      | 62,000   | 26,000   | 9,700    |      | 89,000   | 43,000   |
| 5,000    |      | 62,000   | 26,000   | 9,800    |      | 89,000   | 43,000   |
| 5,100    |      | 62,000   | 26,000   | 9,900    |      | 89,000   | 43,000   |
| 5,200    |      | 62,000   | 26,000   | 10,000   |      | 89,000   | 43,000   |
| 5,300    |      | 62,000   | 26,000   | 10,200   |      | 89,000   | 43,000   |
| 5,400    |      | 66,000   | 28,000   | 10,500   |      | 89,000   | 43,000   |
| 5,500    |      | 66,000   | 28,000   | 11,000   |      | 95,000   | 47,000   |
| 5,600    |      | 66,000   | 28,000   | 11,200   |      | 95,000   | 47,000   |
| 5,700    |      | 66,000   | 28,000   | 11,500   |      | 95,000   | 47,000   |

| d1<br>mm | inch | l1<br>mm | l2<br>mm | d1<br>mm | inch | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|------|----------|----------|
| 11,800   |      | 95,000   | 47,000   |          |      |          |          |
| 12,000   |      | 102,000  | 51,000   |          |      |          |          |
| 12,500   |      | 102,000  | 51,000   |          |      |          |          |
| 13,000   |      | 102,000  | 51,000   |          |      |          |          |



## Spiralbohrer mit Zylinderschaft

### Spiralbohrer kurz



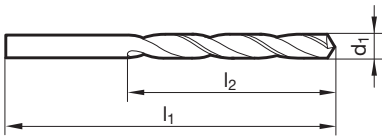
Katalog-Nr. 61232



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ | ● | ○ | ○ | ● |   |

Arbeitsrichtwerte  
Seite 254

- Ausspitzung  $\geq \varnothing 1,000$
- Kegelmantelanschliff
- weite Spannuten
- besonders hohe Stabilität
- besonders hohe Verschleißfestigkeit



| d1<br>mm | inch | l1<br>mm | l2<br>mm | d1<br>mm | inch | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|------|----------|----------|
| 1,000    |      | 34,000   | 12,000   | 5,800    |      | 93,000   | 57,000   |
| 1,100    |      | 36,000   | 14,000   | 5,900    |      | 93,000   | 57,000   |
| 1,200    |      | 38,000   | 16,000   | 6,000    |      | 93,000   | 57,000   |
| 1,300    |      | 38,000   | 16,000   | 6,100    |      | 101,000  | 63,000   |
| 1,400    |      | 40,000   | 18,000   | 6,200    |      | 101,000  | 63,000   |
| 1,500    |      | 40,000   | 18,000   | 6,300    |      | 101,000  | 63,000   |
| 1,600    |      | 43,000   | 20,000   | 6,400    |      | 101,000  | 63,000   |
| 1,700    |      | 43,000   | 20,000   | 6,500    |      | 101,000  | 63,000   |
| 1,800    |      | 46,000   | 22,000   | 6,600    |      | 101,000  | 63,000   |
| 1,900    |      | 46,000   | 22,000   | 6,700    |      | 101,000  | 63,000   |
| 2,000    |      | 49,000   | 24,000   | 6,800    |      | 109,000  | 69,000   |
| 2,100    |      | 49,000   | 24,000   | 6,900    |      | 109,000  | 69,000   |
| 2,200    |      | 53,000   | 27,000   | 7,000    |      | 109,000  | 69,000   |
| 2,300    |      | 53,000   | 27,000   | 7,100    |      | 109,000  | 69,000   |
| 2,400    |      | 57,000   | 30,000   | 7,200    |      | 109,000  | 69,000   |
| 2,500    |      | 57,000   | 30,000   | 7,300    |      | 109,000  | 69,000   |
| 2,600    |      | 57,000   | 30,000   | 7,400    |      | 109,000  | 69,000   |
| 2,700    |      | 61,000   | 33,000   | 7,500    |      | 109,000  | 69,000   |
| 2,800    |      | 61,000   | 33,000   | 7,600    |      | 117,000  | 75,000   |
| 2,900    |      | 61,000   | 33,000   | 7,700    |      | 117,000  | 75,000   |
| 3,000    |      | 61,000   | 33,000   | 7,800    |      | 117,000  | 75,000   |
| 3,100    |      | 65,000   | 36,000   | 7,900    |      | 117,000  | 75,000   |
| 3,200    |      | 65,000   | 36,000   | 8,000    |      | 117,000  | 75,000   |
| 3,300    |      | 65,000   | 36,000   | 8,100    |      | 117,000  | 75,000   |
| 3,400    |      | 70,000   | 39,000   | 8,200    |      | 117,000  | 75,000   |
| 3,500    |      | 70,000   | 39,000   | 8,300    |      | 117,000  | 75,000   |
| 3,600    |      | 70,000   | 39,000   | 8,400    |      | 117,000  | 75,000   |
| 3,700    |      | 70,000   | 39,000   | 8,500    |      | 117,000  | 75,000   |
| 3,800    |      | 75,000   | 43,000   | 8,600    |      | 125,000  | 81,000   |
| 3,900    |      | 75,000   | 43,000   | 8,700    |      | 125,000  | 81,000   |
| 4,000    |      | 75,000   | 43,000   | 8,800    |      | 125,000  | 81,000   |
| 4,100    |      | 75,000   | 43,000   | 8,900    |      | 125,000  | 81,000   |
| 4,200    |      | 75,000   | 43,000   | 9,000    |      | 125,000  | 81,000   |
| 4,300    |      | 80,000   | 47,000   | 9,100    |      | 125,000  | 81,000   |
| 4,400    |      | 80,000   | 47,000   | 9,200    |      | 125,000  | 81,000   |
| 4,500    |      | 80,000   | 47,000   | 9,300    |      | 125,000  | 81,000   |
| 4,600    |      | 80,000   | 47,000   | 9,400    |      | 125,000  | 81,000   |
| 4,700    |      | 80,000   | 47,000   | 9,500    |      | 125,000  | 81,000   |
| 4,800    |      | 86,000   | 52,000   | 9,600    |      | 133,000  | 87,000   |
| 4,900    |      | 86,000   | 52,000   | 9,700    |      | 133,000  | 87,000   |
| 5,000    |      | 86,000   | 52,000   | 9,800    |      | 133,000  | 87,000   |
| 5,100    |      | 86,000   | 52,000   | 9,900    |      | 133,000  | 87,000   |
| 5,200    |      | 86,000   | 52,000   | 10,000   |      | 133,000  | 87,000   |
| 5,300    |      | 86,000   | 52,000   | 10,200   |      | 133,000  | 87,000   |
| 5,400    |      | 93,000   | 57,000   | 10,500   |      | 133,000  | 87,000   |
| 5,500    |      | 93,000   | 57,000   | 11,000   |      | 142,000  | 94,000   |
| 5,600    |      | 93,000   | 57,000   | 11,200   |      | 142,000  | 94,000   |
| 5,700    |      | 93,000   | 57,000   | 11,500   |      | 142,000  | 94,000   |

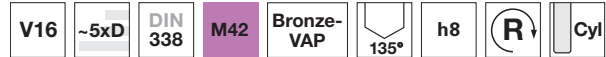
| d1<br>mm | inch | l1<br>mm | l2<br>mm | d1<br>mm | inch | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|------|----------|----------|
| 11,800   |      | 142,000  | 94,000   |          |      |          |          |
| 12,000   |      | 151,000  | 101,000  |          |      |          |          |
| 12,500   |      | 151,000  | 101,000  |          |      |          |          |
| 13,000   |      | 151,000  | 101,000  |          |      |          |          |

## Spiralbohrer mit Zylinderschaft

### V16-Spiralbohrer

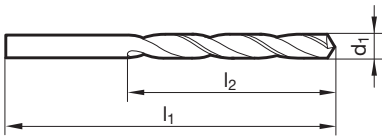


Katalog-Nr. 71018



|   |   |   |   |   |   |                                |
|---|---|---|---|---|---|--------------------------------|
| P | M | K | N | S | H | Arbeitsrichtwerte<br>Seite 254 |
| ● | ● | ● | ● | ● | ○ |                                |

- Ausspitzung  $\geq \varnothing 1,000$
- optimierter Kreuzanschliff
- 8%-kobaltlegierter HSCO-Schnellarbeitsstahl für längere Werkzeuglebensdauer, höhere Warmhärte und Wärmefestigkeit
- für stationären und mobilen Einsatz



| d1<br>mm | inch | l1<br>mm | l2<br>mm | d1<br>mm | inch  | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|-------|----------|----------|
| 1,000    |      | 34,000   | 12,000   | 4,900    |       | 86,000   | 52,000   |
| 1,100    |      | 36,000   | 14,000   | 5,000    |       | 86,000   | 52,000   |
| 1,200    |      | 38,000   | 16,000   | 5,100    |       | 86,000   | 52,000   |
| 1,300    |      | 38,000   | 16,000   | 5,160    | 13/64 | 86,000   | 52,000   |
| 1,400    |      | 40,000   | 18,000   | 5,200    |       | 86,000   | 52,000   |
| 1,500    |      | 40,000   | 18,000   | 5,300    |       | 86,000   | 52,000   |
| 1,590    | 1/16 | 43,000   | 20,000   | 5,400    |       | 93,000   | 57,000   |
| 1,600    |      | 43,000   | 20,000   | 5,500    |       | 93,000   | 57,000   |
| 1,700    |      | 43,000   | 20,000   | 5,560    | 7/32  | 93,000   | 57,000   |
| 1,800    |      | 46,000   | 22,000   | 5,600    |       | 93,000   | 57,000   |
| 1,900    |      | 46,000   | 22,000   | 5,700    |       | 93,000   | 57,000   |
| 1,980    | 5/64 | 49,000   | 24,000   | 5,800    |       | 93,000   | 57,000   |
| 2,000    |      | 49,000   | 24,000   | 5,900    |       | 93,000   | 57,000   |
| 2,100    |      | 49,000   | 24,000   | 5,950    | 15/64 | 93,000   | 57,000   |
| 2,200    |      | 53,000   | 27,000   | 6,000    |       | 93,000   | 57,000   |
| 2,300    |      | 53,000   | 27,000   | 6,100    |       | 101,000  | 63,000   |
| 2,380    | 3/32 | 57,000   | 30,000   | 6,200    |       | 101,000  | 63,000   |
| 2,400    |      | 57,000   | 30,000   | 6,300    |       | 101,000  | 63,000   |
| 2,500    |      | 57,000   | 30,000   | 6,350    | 1/4   | 101,000  | 63,000   |
| 2,600    |      | 57,000   | 30,000   | 6,400    |       | 101,000  | 63,000   |
| 2,700    |      | 61,000   | 33,000   | 6,500    |       | 101,000  | 63,000   |
| 2,780    | 7/64 | 61,000   | 33,000   | 6,600    |       | 101,000  | 63,000   |
| 2,800    |      | 61,000   | 33,000   | 6,700    |       | 101,000  | 63,000   |
| 2,900    |      | 61,000   | 33,000   | 6,800    |       | 109,000  | 69,000   |
| 3,000    |      | 61,000   | 33,000   | 6,900    |       | 109,000  | 69,000   |
| 3,100    |      | 65,000   | 36,000   | 7,000    |       | 109,000  | 69,000   |
| 3,170    | 1/8  | 65,000   | 36,000   | 7,100    |       | 109,000  | 69,000   |
| 3,200    |      | 65,000   | 36,000   | 7,140    | 9/32  | 109,000  | 69,000   |
| 3,250    |      | 65,000   | 36,000   | 7,200    |       | 109,000  | 69,000   |
| 3,300    |      | 65,000   | 36,000   | 7,300    |       | 109,000  | 69,000   |
| 3,400    |      | 70,000   | 39,000   | 7,400    |       | 109,000  | 69,000   |
| 3,500    |      | 70,000   | 39,000   | 7,500    |       | 109,000  | 69,000   |
| 3,570    | 9/64 | 70,000   | 39,000   | 7,540    | 19/64 | 117,000  | 75,000   |
| 3,600    |      | 70,000   | 39,000   | 7,600    |       | 117,000  | 75,000   |
| 3,700    |      | 70,000   | 39,000   | 7,700    |       | 117,000  | 75,000   |
| 3,800    |      | 75,000   | 43,000   | 7,800    |       | 117,000  | 75,000   |
| 3,900    |      | 75,000   | 43,000   | 7,900    |       | 117,000  | 75,000   |
| 3,970    | 5/32 | 75,000   | 43,000   | 7,940    | 5/16  | 117,000  | 75,000   |
| 4,000    |      | 75,000   | 43,000   | 8,000    |       | 117,000  | 75,000   |
| 4,100    |      | 75,000   | 43,000   | 8,100    |       | 117,000  | 75,000   |
| 4,200    |      | 75,000   | 43,000   | 8,200    |       | 117,000  | 75,000   |
| 4,300    |      | 80,000   | 47,000   | 8,300    |       | 117,000  | 75,000   |
| 4,400    |      | 80,000   | 47,000   | 8,330    | 21/64 | 117,000  | 75,000   |
| 4,500    |      | 80,000   | 47,000   | 8,400    |       | 117,000  | 75,000   |
| 4,600    |      | 80,000   | 47,000   | 8,500    |       | 117,000  | 75,000   |
| 4,700    |      | 80,000   | 47,000   | 8,600    |       | 125,000  | 81,000   |
| 4,760    | 3/16 | 86,000   | 52,000   | 8,700    |       | 125,000  | 81,000   |
| 4,800    |      | 86,000   | 52,000   | 8,730    | 11/32 | 125,000  | 81,000   |

| d1<br>mm | inch  | l1<br>mm | l2<br>mm | d1<br>mm | inch  | l1<br>mm | l2<br>mm |
|----------|-------|----------|----------|----------|-------|----------|----------|
| 8,800    |       | 125,000  | 81,000   | 10,320   | 13/32 | 133,000  | 87,000   |
| 8,900    |       | 125,000  | 81,000   | 10,500   |       | 133,000  | 87,000   |
| 9,000    |       | 125,000  | 81,000   | 10,720   | 27/64 | 142,000  | 94,000   |
| 9,100    |       | 125,000  | 81,000   | 10,800   |       | 142,000  | 94,000   |
| 9,130    | 23/64 | 125,000  | 81,000   | 11,000   |       | 142,000  | 94,000   |
| 9,200    |       | 125,000  | 81,000   | 11,110   | 7/16  | 142,000  | 94,000   |
| 9,300    |       | 125,000  | 81,000   | 11,500   |       | 142,000  | 94,000   |
| 9,500    |       | 125,000  | 81,000   | 11,510   | 29/64 | 142,000  | 94,000   |
| 9,520    | 3/8   | 133,000  | 87,000   | 11,910   | 15/32 | 151,000  | 101,000  |
| 9,600    |       | 133,000  | 87,000   | 12,000   |       | 151,000  | 101,000  |
| 9,700    |       | 133,000  | 87,000   | 12,200   |       | 151,000  | 101,000  |
| 9,800    |       | 133,000  | 87,000   | 12,300   | 31/64 | 151,000  | 101,000  |
| 9,900    |       | 133,000  | 87,000   | 12,500   |       | 151,000  | 101,000  |
| 9,920    | 25/64 | 133,000  | 87,000   | 12,700   | 1/2   | 151,000  | 101,000  |
| 10,000   |       | 133,000  | 87,000   | 12,800   |       | 151,000  | 101,000  |
| 10,100   |       | 133,000  | 87,000   | 13,000   |       | 151,000  | 101,000  |
| 10,200   |       | 133,000  | 87,000   |          |       |          |          |
| 10,300   |       | 133,000  | 87,000   |          |       |          |          |

## Spiralbohrer mit Zylinderschaft

### V16-Spiralbohrer-Sätze



|   |   |   |   |   |   |                                |
|---|---|---|---|---|---|--------------------------------|
| P | M | K | N | S | H | Arbeitsrichtwerte<br>Seite 254 |
| ● | ● | ● | ● | ● | ○ |                                |

- optimierter Kreuzanschliff
- 8%-kobaltlegierter HSCO-Schnellarbeitsstahl
- für stationären und mobilen Einsatz
- Für Monteure und Handwerker stehen Sätze mit den gebräuchlichsten Bohrerabmessungen zur Verfügung.

Katalog-Nr. 71019

| Code-Nr. | d1<br>mm | steigend um<br>mm | Stück/Satz |
|----------|----------|-------------------|------------|
| 0,013    | 1,0-10,0 | 0,5               | 19         |
| 0,014    | 1,0-13,0 | 0,5               | 25         |

**Maschinen-Gewindebohrer****V16-Pocket-Satz (Spiralbohrer, Gewindebohrer und Senker)**

- bestehend aus Gewindebohrer Katalog-Nr. 73046 (M3 / M4 / M5 / M6 / M8 / M10), Spiralbohrer Katalog-Nr. 71018 (Ø 2,5 / 3,3 / 4,2 / 5,0 / 6,8 / 8,5) und Kegelsenker 90° Katalog-Nr. 72346 (Ø 6,3 / 12,4)

**Katalog-Nr. 71020**

| Code-Nr. | Stück/Satz |
|----------|------------|
| 1,000    | 14         |

## Spiralbohrer mit Zylinderschaft

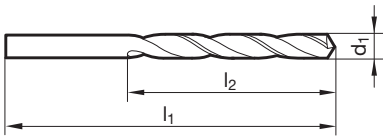
### Stangenbohrer, Länge 6 inches



Katalog-Nr. 71140

|   |            |     |       |      |    |   |     |
|---|------------|-----|-------|------|----|---|-----|
| N | NAS<br>907 | HSS | blank | 118° | h8 | R | Cyl |
| P | M          | K   | N     | S    | H  |   |     |
| • |            | •   | •     |      |    |   |     |

- Kegelmantelschliff
- Bleche aus Al-Legierungen
- geschichtete Platten (Sandwich-Pakete)
- Stahl und Guss



| d1<br>mm | inch | l1<br>mm | l2<br>mm | d1<br>mm | inch  | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|-------|----------|----------|
| 1,500    |      | 153,000  | 23,000   | 4,000    |       | 154,000  | 55,000   |
| 1,590    | 1/16 | 153,000  | 26,000   | 4,040    |       | 154,000  | 55,000   |
| 1,610    |      | 153,000  | 26,000   | 4,090    |       | 154,000  | 55,000   |
| 1,650    |      | 153,000  | 26,000   | 4,220    |       | 154,000  | 55,000   |
| 1,750    |      | 153,000  | 26,000   | 4,300    |       | 154,000  | 60,000   |
| 1,780    |      | 153,000  | 26,000   | 4,370    | 11/64 | 154,000  | 60,000   |
| 1,850    |      | 153,000  | 26,000   | 4,390    |       | 154,000  | 60,000   |
| 1,900    |      | 153,000  | 26,000   | 4,500    |       | 154,000  | 60,000   |
| 1,930    |      | 153,000  | 29,000   | 4,570    |       | 154,000  | 60,000   |
| 1,980    | 5/64 | 153,000  | 29,000   | 4,700    |       | 154,000  | 60,000   |
| 1,990    |      | 153,000  | 29,000   | 4,760    | 3/16  | 154,000  | 63,500   |
| 2,000    |      | 153,000  | 29,000   | 4,800    |       | 154,000  | 63,500   |
| 2,080    |      | 153,000  | 29,000   | 4,850    |       | 154,000  | 63,500   |
| 2,100    |      | 153,000  | 29,000   | 4,920    |       | 154,000  | 63,500   |
| 2,180    |      | 153,000  | 32,500   | 4,980    |       | 154,000  | 63,500   |
| 2,260    |      | 153,000  | 32,500   | 5,000    |       | 154,000  | 63,500   |
| 2,300    |      | 153,000  | 32,500   | 5,110    |       | 154,000  | 63,500   |
| 2,370    |      | 153,000  | 37,000   | 5,160    | 13/64 | 154,000  | 63,500   |
| 2,380    | 3/32 | 153,000  | 37,000   | 5,500    |       | 154,000  | 68,500   |
| 2,400    |      | 153,000  | 37,000   | 5,560    | 7/32  | 154,000  | 68,500   |
| 2,490    |      | 153,000  | 37,000   | 5,610    |       | 154,000  | 68,500   |
| 2,500    |      | 153,000  | 37,000   | 5,790    |       | 154,000  | 68,500   |
| 2,530    |      | 153,000  | 37,000   | 5,800    |       | 154,000  | 68,500   |
| 2,580    |      | 153,000  | 37,000   | 5,940    |       | 154,000  | 68,500   |
| 2,640    |      | 153,000  | 37,000   | 5,950    | 15/64 | 154,000  | 68,500   |
| 2,710    |      | 153,000  | 42,000   | 6,040    |       | 154,000  | 75,000   |
| 2,780    | 7/64 | 153,000  | 42,000   | 6,150    |       | 154,000  | 75,000   |
| 2,790    |      | 153,000  | 42,000   | 6,200    |       | 154,000  | 75,000   |
| 2,820    |      | 153,000  | 42,000   | 6,250    |       | 154,000  | 75,000   |
| 2,870    |      | 153,000  | 42,000   | 6,350    | 1/4   | 154,000  | 75,000   |
| 2,950    |      | 153,000  | 42,000   | 6,400    |       | 154,000  | 75,000   |
| 3,000    |      | 153,000  | 42,000   | 6,530    |       | 154,000  | 75,000   |
| 3,050    |      | 153,000  | 42,000   | 6,630    |       | 154,000  | 75,000   |
| 3,170    | 1/8  | 153,000  | 42,000   | 6,750    | 17/64 | 155,000  | 80,000   |
| 3,200    |      | 153,000  | 42,000   | 6,800    |       | 155,000  | 80,000   |
| 3,260    |      | 153,000  | 42,000   | 7,000    |       | 155,000  | 80,000   |
| 3,450    |      | 154,000  | 49,000   | 7,500    |       | 155,000  | 80,000   |
| 3,500    |      | 154,000  | 49,000   | 7,700    |       | 155,000  | 90,000   |
| 3,570    | 9/64 | 154,000  | 49,000   | 7,940    | 5/16  | 155,000  | 90,000   |
| 3,600    |      | 154,000  | 49,000   | 8,000    |       | 155,000  | 90,000   |
| 3,660    |      | 154,000  | 49,000   | 8,500    |       | 155,000  | 90,000   |
| 3,700    |      | 154,000  | 49,000   |          |       |          |          |
| 3,730    |      | 154,000  | 49,000   |          |       |          |          |
| 3,800    |      | 154,000  | 55,000   |          |       |          |          |
| 3,860    |      | 154,000  | 55,000   |          |       |          |          |
| 3,910    |      | 154,000  | 55,000   |          |       |          |          |
| 3,970    | 5/32 | 154,000  | 55,000   |          |       |          |          |
| 3,990    |      | 154,000  | 55,000   |          |       |          |          |

## Spiralbohrer mit Zylinderschaft

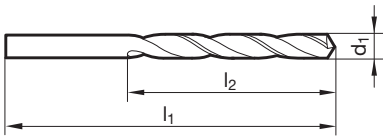
## Stangenbohrer, Länge 6 inches



Katalog-Nr. 71142

|   |            |     |               |      |    |   |     |
|---|------------|-----|---------------|------|----|---|-----|
| N | NAS<br>907 | HSS | ni-<br>triert | 135° | h8 | R | Cyl |
| P | M          | K   | N             | S    | H  |   |     |
| • |            | •   | •             |      |    |   |     |

- Kegelmantelschliff
- Bleche aus Al-Legierungen
- geschichtete Platten (Sandwich-Pakete)
- Stahl und Guss



| d1<br>mm | inch  | l1<br>mm | l2<br>mm |
|----------|-------|----------|----------|
| 1,500    |       | 153,000  | 23,000   |
| 1,590    | 1/16  | 153,000  | 26,000   |
| 1,700    |       | 153,000  | 26,000   |
| 1,750    |       | 153,000  | 26,000   |
| 1,780    |       | 153,000  | 26,000   |
| 1,900    |       | 153,000  | 26,000   |
| 1,980    | 5/64  | 153,000  | 29,000   |
| 2,000    |       | 153,000  | 29,000   |
| 2,300    |       | 153,000  | 32,500   |
| 2,380    | 3/32  | 153,000  | 37,000   |
| 2,400    |       | 153,000  | 37,000   |
| 2,490    |       | 153,000  | 37,000   |
| 2,500    |       | 153,000  | 37,000   |
| 2,530    |       | 153,000  | 37,000   |
| 2,580    |       | 153,000  | 37,000   |
| 2,640    |       | 153,000  | 37,000   |
| 2,710    |       | 153,000  | 42,000   |
| 2,780    | 7/64  | 153,000  | 42,000   |
| 2,790    |       | 153,000  | 42,000   |
| 2,820    |       | 153,000  | 42,000   |
| 2,870    |       | 153,000  | 42,000   |
| 2,950    |       | 153,000  | 42,000   |
| 3,000    |       | 153,000  | 42,000   |
| 3,050    |       | 153,000  | 42,000   |
| 3,170    | 1/8   | 153,000  | 42,000   |
| 3,200    |       | 153,000  | 42,000   |
| 3,260    |       | 153,000  | 42,000   |
| 3,450    |       | 154,000  | 49,000   |
| 3,500    |       | 154,000  | 49,000   |
| 3,570    | 9/64  | 154,000  | 49,000   |
| 3,600    |       | 154,000  | 49,000   |
| 3,660    |       | 154,000  | 49,000   |
| 3,700    |       | 154,000  | 49,000   |
| 3,800    |       | 154,000  | 55,000   |
| 3,970    | 5/32  | 154,000  | 55,000   |
| 3,990    |       | 154,000  | 55,000   |
| 4,000    |       | 154,000  | 55,000   |
| 4,040    |       | 154,000  | 55,000   |
| 4,090    |       | 154,000  | 55,000   |
| 4,220    |       | 154,000  | 55,000   |
| 4,300    |       | 154,000  | 60,000   |
| 4,370    | 11/64 | 154,000  | 60,000   |

| d1<br>mm | inch  | l1<br>mm | l2<br>mm |
|----------|-------|----------|----------|
| 4,390    |       | 154,000  | 60,000   |
| 4,500    |       | 154,000  | 60,000   |
| 4,570    |       | 154,000  | 60,000   |
| 4,620    |       | 154,000  | 60,000   |
| 4,700    |       | 154,000  | 60,000   |
| 4,760    | 3/16  | 154,000  | 63,500   |
| 4,800    |       | 154,000  | 63,500   |
| 4,850    |       | 154,000  | 63,500   |
| 4,920    |       | 154,000  | 63,500   |
| 4,980    |       | 154,000  | 63,500   |
| 5,000    |       | 154,000  | 63,500   |
| 5,060    |       | 154,000  | 63,500   |
| 5,110    |       | 154,000  | 63,500   |
| 5,160    | 13/64 | 154,000  | 63,500   |
| 5,410    |       | 154,000  | 68,500   |
| 5,500    |       | 154,000  | 68,500   |
| 5,560    | 7/32  | 154,000  | 68,500   |
| 5,610    |       | 154,000  | 68,500   |
| 5,790    |       | 154,000  | 68,500   |
| 5,800    |       | 154,000  | 68,500   |
| 5,940    |       | 154,000  | 68,500   |
| 5,950    | 15/64 | 154,000  | 68,500   |
| 6,040    |       | 154,000  | 75,000   |
| 6,150    |       | 154,000  | 75,000   |
| 6,200    |       | 154,000  | 75,000   |
| 6,250    |       | 154,000  | 75,000   |
| 6,350    | 1/4   | 154,000  | 75,000   |
| 6,450    |       | 154,000  | 75,000   |
| 6,530    |       | 154,000  | 75,000   |
| 6,750    | 17/64 | 155,000  | 80,000   |
| 6,800    |       | 155,000  | 80,000   |
| 7,000    |       | 155,000  | 80,000   |
| 7,700    |       | 155,000  | 90,000   |
| 7,940    | 5/16  | 155,000  | 90,000   |
| 8,000    |       | 155,000  | 90,000   |

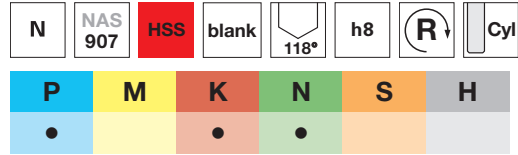


## Spiralbohrer mit Zylinderschaft

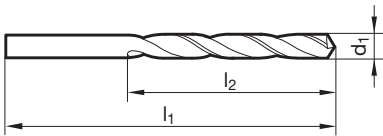
### Stangenbohrer, Länge 12 inches



Katalog-Nr. 71141



- Kegelmantelschliff
- Bleche aus Al-Legierungen
- geschichtete Platten (Sandwich-Pakete)
- Stahl und Guss



| d1<br>mm | inch | l1<br>mm | l2<br>mm | d1<br>mm | inch  | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|-------|----------|----------|
| 1,500    |      | 306,000  | 23,000   | 4,300    |       | 308,000  | 60,000   |
| 1,590    | 1/16 | 306,000  | 26,000   | 4,370    | 11/64 | 308,000  | 60,000   |
| 1,780    |      | 306,000  | 26,000   | 4,390    |       | 308,000  | 60,000   |
| 1,850    |      | 306,000  | 26,000   | 4,500    |       | 308,000  | 60,000   |
| 1,900    |      | 306,000  | 26,000   | 4,570    |       | 308,000  | 60,000   |
| 1,930    |      | 306,000  | 29,000   | 4,620    |       | 308,000  | 60,000   |
| 1,980    | 5/64 | 306,000  | 29,000   | 4,700    |       | 308,000  | 60,000   |
| 1,990    |      | 306,000  | 29,000   | 4,760    | 3/16  | 308,000  | 63,500   |
| 2,000    |      | 306,000  | 29,000   | 4,800    |       | 308,000  | 63,500   |
| 2,060    |      | 306,000  | 29,000   | 4,850    |       | 308,000  | 63,500   |
| 2,080    |      | 306,000  | 29,000   | 4,920    |       | 308,000  | 63,500   |
| 2,100    |      | 306,000  | 29,000   | 4,980    |       | 308,000  | 63,500   |
| 2,180    |      | 306,000  | 32,500   | 5,000    |       | 308,000  | 63,500   |
| 2,260    |      | 306,000  | 32,500   | 5,160    | 13/64 | 308,000  | 63,500   |
| 2,380    | 3/32 | 306,000  | 37,000   | 5,220    |       | 308,000  | 63,500   |
| 2,440    |      | 306,000  | 37,000   | 5,410    |       | 308,000  | 68,500   |
| 2,490    |      | 306,000  | 37,000   | 5,500    |       | 308,000  | 68,500   |
| 2,500    |      | 306,000  | 37,000   | 5,560    | 7/32  | 308,000  | 68,500   |
| 2,530    |      | 306,000  | 37,000   | 5,790    |       | 308,000  | 68,500   |
| 2,580    |      | 306,000  | 37,000   | 5,800    |       | 308,000  | 68,500   |
| 2,640    |      | 306,000  | 37,000   | 5,950    | 15/64 | 308,000  | 68,500   |
| 2,780    | 7/64 | 306,000  | 42,000   | 6,000    |       | 308,000  | 68,500   |
| 2,790    |      | 306,000  | 42,000   | 6,040    |       | 308,000  | 75,000   |
| 2,820    |      | 306,000  | 42,000   | 6,150    |       | 308,000  | 75,000   |
| 2,950    |      | 306,000  | 42,000   | 6,200    |       | 308,000  | 75,000   |
| 3,000    |      | 306,000  | 42,000   | 6,250    |       | 308,000  | 75,000   |
| 3,050    |      | 306,000  | 42,000   | 6,350    | 1/4   | 308,000  | 75,000   |
| 3,170    | 1/8  | 306,000  | 42,000   | 6,530    |       | 308,000  | 75,000   |
| 3,200    |      | 306,000  | 42,000   | 7,000    |       | 310,000  | 80,000   |
| 3,260    |      | 306,000  | 42,000   | 7,700    |       | 310,000  | 90,000   |
| 3,450    |      | 308,000  | 49,000   | 7,940    | 5/16  | 310,000  | 90,000   |
| 3,500    |      | 308,000  | 49,000   | 8,000    |       | 310,000  | 90,000   |
| 3,570    | 9/64 | 308,000  | 49,000   | 8,500    |       | 310,000  | 90,000   |
| 3,600    |      | 308,000  | 49,000   |          |       |          |          |
| 3,660    |      | 308,000  | 49,000   |          |       |          |          |
| 3,700    |      | 308,000  | 49,000   |          |       |          |          |
| 3,800    |      | 308,000  | 55,000   |          |       |          |          |
| 3,970    | 5/32 | 308,000  | 55,000   |          |       |          |          |
| 4,000    |      | 308,000  | 55,000   |          |       |          |          |
| 4,040    |      | 308,000  | 55,000   |          |       |          |          |
| 4,090    |      | 308,000  | 55,000   |          |       |          |          |
| 4,220    |      | 308,000  | 55,000   |          |       |          |          |

## Spiralbohrer mit Zylinderschaft

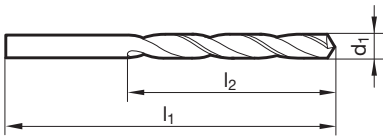
### Stangenbohrer, Länge 12 inches



Katalog-Nr. 71143

|   |            |     |               |      |    |   |     |
|---|------------|-----|---------------|------|----|---|-----|
| N | NAS<br>907 | HSS | ni-<br>triert | 135° | h8 | R | Cyl |
| P | M          | K   | N             | S    | H  |   |     |
| • |            | •   | •             |      |    |   |     |

- Kegelmantelschliff
- Bleche aus Al-Legierungen
- geschichtete Platten (Sandwich-Pakete)
- Stahl und Guss



| d1<br>mm | inch | l1<br>mm | l2<br>mm | d1<br>mm | inch  | l1<br>mm | l2<br>mm |
|----------|------|----------|----------|----------|-------|----------|----------|
| 1,500    |      | 306,000  | 23,000   | 4,220    |       | 308,000  | 55,000   |
| 1,590    | 1/16 | 306,000  | 26,000   | 4,290    |       | 308,000  | 60,000   |
| 1,780    |      | 306,000  | 26,000   | 4,300    |       | 308,000  | 60,000   |
| 1,900    |      | 306,000  | 26,000   | 4,370    | 11/64 | 308,000  | 60,000   |
| 1,980    | 5/64 | 306,000  | 29,000   | 4,390    |       | 308,000  | 60,000   |
| 2,000    |      | 306,000  | 29,000   | 4,500    |       | 308,000  | 60,000   |
| 2,300    |      | 306,000  | 32,500   | 4,570    |       | 308,000  | 60,000   |
| 2,380    | 3/32 | 306,000  | 37,000   | 4,620    |       | 308,000  | 60,000   |
| 2,490    |      | 306,000  | 37,000   | 4,700    |       | 308,000  | 60,000   |
| 2,500    |      | 306,000  | 37,000   | 4,760    | 3/16  | 308,000  | 63,500   |
| 2,530    |      | 306,000  | 37,000   | 4,800    |       | 308,000  | 63,500   |
| 2,580    |      | 306,000  | 37,000   | 4,850    |       | 308,000  | 63,500   |
| 2,640    |      | 306,000  | 37,000   | 4,920    |       | 308,000  | 63,500   |
| 2,710    |      | 306,000  | 42,000   | 4,980    |       | 308,000  | 63,500   |
| 2,780    | 7/64 | 306,000  | 42,000   | 5,000    |       | 308,000  | 63,500   |
| 2,790    |      | 306,000  | 42,000   | 5,060    |       | 308,000  | 63,500   |
| 2,820    |      | 306,000  | 42,000   | 5,110    |       | 308,000  | 63,500   |
| 2,870    |      | 306,000  | 42,000   | 5,160    | 13/64 | 308,000  | 63,500   |
| 2,950    |      | 306,000  | 42,000   | 5,500    |       | 308,000  | 68,500   |
| 3,000    |      | 306,000  | 42,000   | 5,560    | 7/32  | 308,000  | 68,500   |
| 3,050    |      | 306,000  | 42,000   | 5,790    |       | 308,000  | 68,500   |
| 3,170    | 1/8  | 306,000  | 42,000   | 5,940    |       | 308,000  | 68,500   |
| 3,200    |      | 306,000  | 42,000   | 5,950    | 15/64 | 308,000  | 68,500   |
| 3,260    |      | 306,000  | 42,000   | 6,000    |       | 308,000  | 68,500   |
| 3,450    |      | 308,000  | 49,000   | 6,040    |       | 308,000  | 75,000   |
| 3,500    |      | 308,000  | 49,000   | 6,150    |       | 308,000  | 75,000   |
| 3,600    |      | 308,000  | 49,000   | 6,200    |       | 308,000  | 75,000   |
| 3,660    |      | 308,000  | 49,000   | 6,250    |       | 308,000  | 75,000   |
| 3,700    |      | 308,000  | 49,000   | 6,350    | 1/4   | 308,000  | 75,000   |
| 3,730    |      | 308,000  | 49,000   | 6,530    |       | 308,000  | 75,000   |
| 3,800    |      | 308,000  | 55,000   | 6,800    |       | 310,000  | 80,000   |
| 3,970    | 5/32 | 308,000  | 55,000   | 7,000    |       | 310,000  | 80,000   |
| 3,990    |      | 308,000  | 55,000   | 7,700    |       | 310,000  | 90,000   |
| 4,000    |      | 308,000  | 55,000   | 7,940    | 5/16  | 310,000  | 90,000   |
| 4,040    |      | 308,000  | 55,000   | 8,000    |       | 310,000  | 90,000   |
| 4,090    |      | 308,000  | 55,000   |          |       |          |          |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



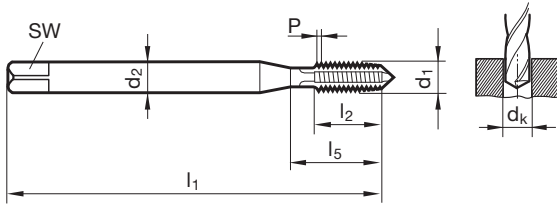
Katalog-Nr. 53733



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| d1   | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------|---------|----------|----------|----------|----------|----------|----------|
| M2   | 0,400   | 2,800    | 2,100    | 1,60     | 45,000   | 8,000    | 13,500   |
| M2,5 | 0,450   | 2,800    | 2,100    | 2,05     | 50,000   | 9,000    | 14,500   |
| M3   | 0,500   | 3,500    | 2,700    | 2,50     | 56,000   | 10,000   | 18,000   |
| M4   | 0,700   | 4,500    | 3,400    | 3,30     | 63,000   | 12,000   | 21,000   |
| M4,5 | 0,750   | 6,000    | 4,900    | 3,70     | 70,000   | 14,000   | 25,000   |
| M5   | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 14,000   | 25,000   |
| M6   | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 16,000   | 30,000   |
| M7   | 1,000   | 7,000    | 5,500    | 6,00     | 80,000   | 16,000   | 30,000   |
| M8   | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 17,000   | 35,000   |
| M9   | 1,250   | 9,000    | 7,000    | 7,80     | 90,000   | 17,000   | 35,000   |
| M10  | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 20,000   | 39,000   |
| M11  | 1,500   | 8,000    | 6,200    | 9,50     | 100,000  | 20,000   | 42,000   |
| M12  | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 24,000   | 49,000   |
| M14  | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 26,000   | 53,000   |
| M16  | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 26,000   | 54,000   |
| M18  | 2,500   | 14,000   | 11,000   | 15,50    | 125,000  | 30,000   | 62,000   |
| M20  | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 32,000   | 62,000   |
| M22  | 2,500   | 18,000   | 14,500   | 19,50    | 140,000  | 32,000   | 62,000   |
| M24  | 3,000   | 18,000   | 14,500   | 21,00    | 160,000  | 36,000   | 73,000   |
| M30  | 3,500   | 22,000   | 18,000   | 26,50    | 180,000  | 40,000   | 85,000   |
| M33  | 3,500   | 25,000   | 20,000   | 29,50    | 180,000  | 40,000   | 91,000   |
| M36  | 4,000   | 28,000   | 22,000   | 32,00    | 200,000  | 50,000   | 102,000  |
| M39  | 4,000   | 32,000   | 24,000   | 35,00    | 200,000  | 50,000   | 107,000  |
| M42  | 4,500   | 32,000   | 24,000   | 37,50    | 200,000  | 56,000   | 112,000  |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



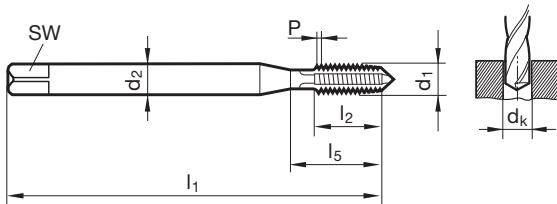
Katalog-Nr. 53734



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| d1   | P     | d2     | SW     | dk    | l1      | l2     | l5     |
|------|-------|--------|--------|-------|---------|--------|--------|
|      | mm    | mm     | mm     | mm    | mm      | mm     | mm     |
| M2   | 0,400 | 2,800  | 2,100  | 1,60  | 45,000  | 8,000  | 13,500 |
| M2,5 | 0,450 | 2,800  | 2,100  | 2,05  | 50,000  | 9,000  | 14,500 |
| M3   | 0,500 | 3,500  | 2,700  | 2,50  | 56,000  | 10,000 | 18,000 |
| M4   | 0,700 | 4,500  | 3,400  | 3,30  | 63,000  | 12,000 | 21,000 |
| M5   | 0,800 | 6,000  | 4,900  | 4,20  | 70,000  | 14,000 | 25,000 |
| M6   | 1,000 | 6,000  | 4,900  | 5,00  | 80,000  | 16,000 | 30,000 |
| M8   | 1,250 | 8,000  | 6,200  | 6,80  | 90,000  | 17,000 | 35,000 |
| M10  | 1,500 | 10,000 | 8,000  | 8,50  | 100,000 | 20,000 | 39,000 |
| M12  | 1,750 | 9,000  | 7,000  | 10,20 | 110,000 | 24,000 | 49,000 |
| M14  | 2,000 | 11,000 | 9,000  | 12,00 | 110,000 | 26,000 | 53,000 |
| M16  | 2,000 | 12,000 | 9,000  | 14,00 | 110,000 | 26,000 | 54,000 |
| M18  | 2,500 | 14,000 | 11,000 | 15,50 | 125,000 | 30,000 | 62,000 |
| M20  | 2,500 | 16,000 | 12,000 | 17,50 | 140,000 | 32,000 | 62,000 |
| M24  | 3,000 | 18,000 | 14,500 | 21,00 | 160,000 | 36,000 | 73,000 |
| M30  | 3,500 | 22,000 | 18,000 | 26,50 | 180,000 | 40,000 | 85,000 |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



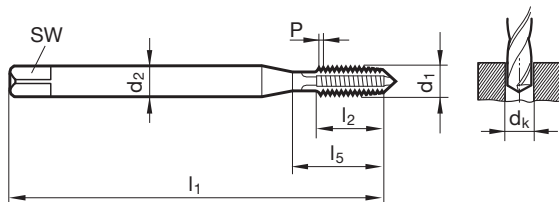
Katalog-Nr. 53735



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| d1         | P     | d2     | SW     | dk    | l1      | l2     | l5     |
|------------|-------|--------|--------|-------|---------|--------|--------|
|            | mm    | mm     | mm     | mm    | mm      | mm     | mm     |
| <b>M3</b>  | 0,500 | 3,500  | 2,700  | 2,50  | 56,000  | 10,000 | 18,000 |
| <b>M4</b>  | 0,700 | 4,500  | 3,400  | 3,30  | 63,000  | 12,000 | 21,000 |
| <b>M5</b>  | 0,800 | 6,000  | 4,900  | 4,20  | 70,000  | 14,000 | 25,000 |
| <b>M6</b>  | 1,000 | 6,000  | 4,900  | 5,00  | 80,000  | 16,000 | 30,000 |
| <b>M8</b>  | 1,250 | 8,000  | 6,200  | 6,80  | 90,000  | 17,000 | 35,000 |
| <b>M10</b> | 1,500 | 10,000 | 8,000  | 8,50  | 100,000 | 20,000 | 39,000 |
| <b>M12</b> | 1,750 | 9,000  | 7,000  | 10,20 | 110,000 | 24,000 | 49,000 |
| <b>M14</b> | 2,000 | 11,000 | 9,000  | 12,00 | 110,000 | 26,000 | 53,000 |
| <b>M16</b> | 2,000 | 12,000 | 9,000  | 14,00 | 110,000 | 26,000 | 54,000 |
| <b>M20</b> | 2,500 | 16,000 | 12,000 | 17,50 | 140,000 | 32,000 | 62,000 |

Gewindewerkzeuge

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde

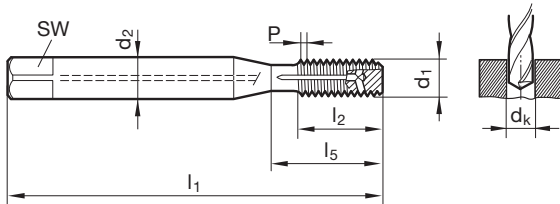


Katalog-Nr. 53736

|                         |                       |          |                 |                |          |            |
|-------------------------|-----------------------|----------|-----------------|----------------|----------|------------|
| Produktiv<br><b>N-X</b> | <b>DIN</b><br>371/376 | <b>B</b> | <b>HSS-E-PM</b> | <b>AlTiZrN</b> | <b>R</b> | <b>6HX</b> |
|-------------------------|-----------------------|----------|-----------------|----------------|----------|------------|

|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ●        | ●        | ○        | ○        | ○        |          |

Arbeitsrichtwerte  
Seite 258-279



- für Durchgangsgewinde
- mit Schälanschnitt
- radialer Kühlmittelaustritt
- Spanförderung in Vorschubrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe

| d1         | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------------|---------|----------|----------|----------|----------|----------|----------|
| <b>M5</b>  | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 14,000   | 25,000   |
| <b>M6</b>  | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 16,000   | 30,000   |
| <b>M8</b>  | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 17,000   | 35,000   |
| <b>M10</b> | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 20,000   | 39,000   |
| <b>M12</b> | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 24,000   | 49,000   |
| <b>M14</b> | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 26,000   | 53,000   |
| <b>M16</b> | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 26,000   | 54,000   |
| <b>M20</b> | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 32,000   | 62,000   |
| <b>M24</b> | 3,000   | 18,000   | 14,500   | 21,00    | 160,000  | 36,000   | 73,000   |
| <b>M30</b> | 3,500   | 22,000   | 18,000   | 26,50    | 180,000  | 40,000   | 85,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde

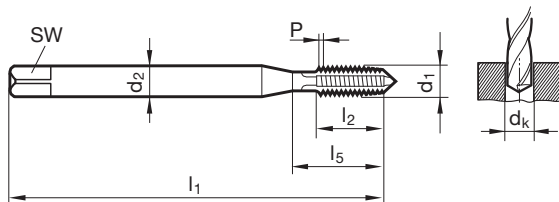


Katalog-Nr. 53737

|                         |                |          |              |         |          |                   |
|-------------------------|----------------|----------|--------------|---------|----------|-------------------|
| Produktiv<br><b>N-X</b> | DIN<br>371/376 | <b>B</b> | <b>HSS-E</b> | AlTiZrN | <b>R</b> | <b>6H</b><br>+0,1 |
|-------------------------|----------------|----------|--------------|---------|----------|-------------------|

|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ●        | ●        | ○        | ○        | ○        |          |

Arbeitsrichtwerte  
Seite 258-279



- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe

| d1   | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------|---------|----------|----------|----------|----------|----------|----------|
| M2   | 0,400   | 2,800    | 2,100    | 1,60     | 45,000   | 8,000    | 13,500   |
| M2,5 | 0,450   | 2,800    | 2,100    | 2,05     | 50,000   | 9,000    | 14,500   |
| M3   | 0,500   | 3,500    | 2,700    | 2,50     | 56,000   | 10,000   | 18,000   |
| M4   | 0,700   | 4,500    | 3,400    | 3,30     | 63,000   | 12,000   | 21,000   |
| M5   | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 14,000   | 25,000   |
| M6   | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 16,000   | 30,000   |
| M8   | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 17,000   | 35,000   |
| M10  | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 20,000   | 39,000   |
| M12  | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 24,000   | 49,000   |
| M14  | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 26,000   | 53,000   |
| M16  | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 26,000   | 54,000   |
| M18  | 2,500   | 14,000   | 11,000   | 15,50    | 125,000  | 30,000   | 62,000   |
| M20  | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 32,000   | 62,000   |
| M24  | 3,000   | 18,000   | 14,500   | 21,00    | 160,000  | 36,000   | 73,000   |
| M30  | 3,500   | 22,000   | 18,000   | 26,50    | 180,000  | 40,000   | 85,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



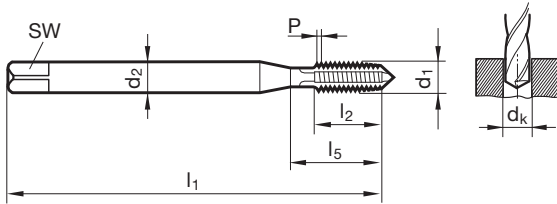
Katalog-Nr. 53738



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| d1   | P     | d2     | SW     | dk    | l1      | l2     | l5     |
|------|-------|--------|--------|-------|---------|--------|--------|
|      | mm    | mm     | mm     | mm    | mm      | mm     | mm     |
| M2   | 0,400 | 2,800  | 2,100  | 1,60  | 45,000  | 8,000  | 13,500 |
| M2,5 | 0,450 | 2,800  | 2,100  | 2,05  | 50,000  | 9,000  | 14,500 |
| M3   | 0,500 | 3,500  | 2,700  | 2,50  | 56,000  | 10,000 | 18,000 |
| M4   | 0,700 | 4,500  | 3,400  | 3,30  | 63,000  | 12,000 | 21,000 |
| M5   | 0,800 | 6,000  | 4,900  | 4,20  | 70,000  | 14,000 | 25,000 |
| M6   | 1,000 | 6,000  | 4,900  | 5,00  | 80,000  | 16,000 | 30,000 |
| M8   | 1,250 | 8,000  | 6,200  | 6,80  | 90,000  | 17,000 | 35,000 |
| M10  | 1,500 | 10,000 | 8,000  | 8,50  | 100,000 | 20,000 | 39,000 |
| M12  | 1,750 | 9,000  | 7,000  | 10,20 | 110,000 | 24,000 | 49,000 |
| M14  | 2,000 | 11,000 | 9,000  | 12,00 | 110,000 | 26,000 | 53,000 |
| M16  | 2,000 | 12,000 | 9,000  | 14,00 | 110,000 | 26,000 | 54,000 |
| M18  | 2,500 | 14,000 | 11,000 | 15,50 | 125,000 | 30,000 | 62,000 |
| M20  | 2,500 | 16,000 | 12,000 | 17,50 | 140,000 | 32,000 | 62,000 |
| M24  | 3,000 | 18,000 | 14,500 | 21,00 | 160,000 | 36,000 | 73,000 |
| M30  | 3,500 | 22,000 | 18,000 | 26,50 | 180,000 | 40,000 | 85,000 |



## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



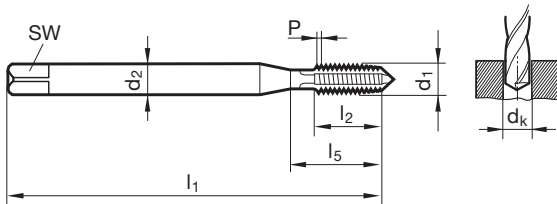
Katalog-Nr. 53739



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- überlang
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| d1         | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------------|---------|----------|----------|----------|----------|----------|----------|
| <b>M3</b>  | 0,500   | 3,500    | 2,700    | 2,50     | 90,000   | 10,000   | 18,000   |
| <b>M4</b>  | 0,700   | 4,500    | 3,400    | 3,30     | 125,000  | 12,000   | 21,000   |
| <b>M5</b>  | 0,800   | 6,000    | 4,900    | 4,20     | 140,000  | 14,000   | 25,000   |
| <b>M6</b>  | 1,000   | 6,000    | 4,900    | 5,00     | 160,000  | 16,000   | 30,000   |
| <b>M8</b>  | 1,250   | 8,000    | 6,200    | 6,80     | 180,000  | 17,000   | 35,000   |
| <b>M10</b> | 1,500   | 10,000   | 8,000    | 8,50     | 200,000  | 20,000   | 39,000   |
| <b>M12</b> | 1,750   | 9,000    | 7,000    | 10,20    | 220,000  | 24,000   | 158,000  |
| <b>M14</b> | 2,000   | 11,000   | 9,000    | 12,00    | 220,000  | 26,000   | 160,000  |
| <b>M16</b> | 2,000   | 12,000   | 9,000    | 14,00    | 220,000  | 26,000   | 160,000  |
| <b>M20</b> | 2,500   | 16,000   | 12,000   | 17,50    | 280,000  | 32,000   | 217,000  |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



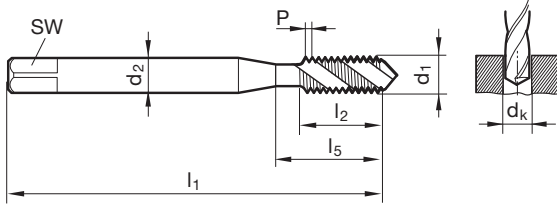
Katalog-Nr. 53746



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| d1   | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------|---------|----------|----------|----------|----------|----------|----------|
| M2   | 0,400   | 2,800    | 2,100    | 1,60     | 45,000   | 4,500    | 13,500   |
| M2,5 | 0,450   | 2,800    | 2,100    | 2,05     | 50,000   | 5,000    | 14,500   |
| M3   | 0,500   | 3,500    | 2,700    | 2,50     | 56,000   | 6,000    | 18,000   |
| M3,5 | 0,600   | 4,000    | 3,000    | 2,90     | 56,000   | 7,000    | 20,000   |
| M4   | 0,700   | 4,500    | 3,400    | 3,30     | 63,000   | 7,500    | 21,000   |
| M4,5 | 0,750   | 6,000    | 4,900    | 3,70     | 70,000   | 8,500    | 25,000   |
| M5   | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 8,500    | 25,000   |
| M6   | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 11,000   | 30,000   |
| M7   | 1,000   | 7,000    | 5,500    | 6,00     | 80,000   | 11,000   | 30,000   |
| M8   | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 14,000   | 35,000   |
| M9   | 1,250   | 9,000    | 7,000    | 7,80     | 90,000   | 14,000   | 35,000   |
| M10  | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 16,000   | 39,000   |
| M11  | 1,500   | 8,000    | 6,200    | 9,50     | 100,000  | 16,000   | 42,000   |
| M12  | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 18,500   | 49,000   |
| M14  | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 20,000   | 53,000   |
| M16  | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 20,000   | 54,000   |
| M18  | 2,500   | 14,000   | 11,000   | 15,50    | 125,000  | 25,000   | 62,000   |
| M20  | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 25,000   | 62,000   |
| M22  | 2,500   | 18,000   | 14,500   | 19,50    | 140,000  | 27,000   | 62,000   |
| M24  | 3,000   | 18,000   | 14,500   | 21,00    | 160,000  | 30,000   | 73,000   |
| M27  | 3,000   | 20,000   | 16,000   | 24,00    | 160,000  | 30,000   | 73,000   |
| M30  | 3,500   | 22,000   | 18,000   | 26,50    | 180,000  | 35,000   | 85,000   |
| M33  | 3,500   | 25,000   | 20,000   | 29,50    | 180,000  | 40,000   | 91,000   |
| M36  | 4,000   | 28,000   | 22,000   | 32,00    | 200,000  | 40,000   | 102,000  |
| M39  | 4,000   | 32,000   | 24,000   | 35,00    | 200,000  | 50,000   | 107,000  |
| M42  | 4,500   | 32,000   | 24,000   | 37,50    | 200,000  | 45,000   | 112,000  |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



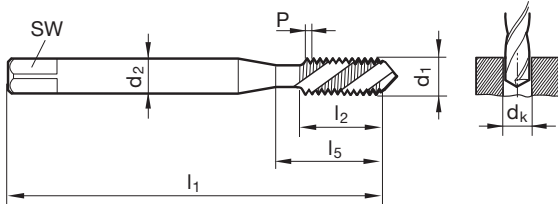
Katalog-Nr. 53747



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|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| d1   | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------|---------|----------|----------|----------|----------|----------|----------|
| M2   | 0,400   | 2,800    | 2,100    | 1,60     | 45,000   | 4,500    | 13,500   |
| M2,5 | 0,450   | 2,800    | 2,100    | 2,05     | 50,000   | 5,000    | 14,500   |
| M3   | 0,500   | 3,500    | 2,700    | 2,50     | 56,000   | 6,000    | 18,000   |
| M4   | 0,700   | 4,500    | 3,400    | 3,30     | 63,000   | 7,500    | 21,000   |
| M5   | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 8,500    | 25,000   |
| M6   | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 11,000   | 30,000   |
| M8   | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 14,000   | 35,000   |
| M10  | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 16,000   | 39,000   |
| M12  | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 18,500   | 49,000   |
| M14  | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 20,000   | 53,000   |
| M16  | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 20,000   | 54,000   |
| M18  | 2,500   | 14,000   | 11,000   | 15,50    | 125,000  | 25,000   | 62,000   |
| M20  | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 25,000   | 62,000   |
| M24  | 3,000   | 18,000   | 14,500   | 21,00    | 160,000  | 30,000   | 73,000   |
| M30  | 3,500   | 22,000   | 18,000   | 26,50    | 180,000  | 35,000   | 85,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



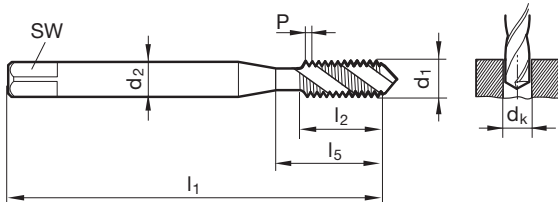
Katalog-Nr. 53748



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| d1         | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------------|---------|----------|----------|----------|----------|----------|----------|
| <b>M3</b>  | 0,500   | 3,500    | 2,700    | 2,50     | 56,000   | 6,000    | 18,000   |
| <b>M4</b>  | 0,700   | 4,500    | 3,400    | 3,30     | 63,000   | 7,500    | 21,000   |
| <b>M5</b>  | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 8,500    | 25,000   |
| <b>M6</b>  | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 11,000   | 30,000   |
| <b>M8</b>  | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 14,000   | 35,000   |
| <b>M10</b> | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 16,000   | 39,000   |
| <b>M12</b> | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 18,500   | 49,000   |
| <b>M14</b> | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 20,000   | 53,000   |
| <b>M16</b> | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 20,000   | 54,000   |
| <b>M20</b> | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 25,000   | 62,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde

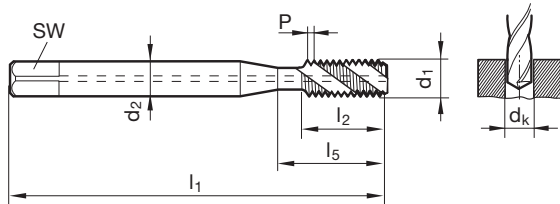


Katalog-Nr. 53749



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279



- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- mit axialem Kühlkanal
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe

| d1         | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------------|---------|----------|----------|----------|----------|----------|----------|
| <b>M5</b>  | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 8,500    | 25,000   |
| <b>M6</b>  | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 11,000   | 30,000   |
| <b>M8</b>  | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 14,000   | 35,000   |
| <b>M10</b> | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 16,000   | 39,000   |
| <b>M12</b> | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 18,500   | 49,000   |
| <b>M14</b> | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 20,000   | 53,000   |
| <b>M16</b> | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 20,000   | 54,000   |
| <b>M20</b> | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 25,000   | 62,000   |
| <b>M24</b> | 3,000   | 18,000   | 14,500   | 21,00    | 160,000  | 30,000   | 73,000   |
| <b>M30</b> | 3,500   | 22,000   | 18,000   | 26,50    | 180,000  | 35,000   | 85,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



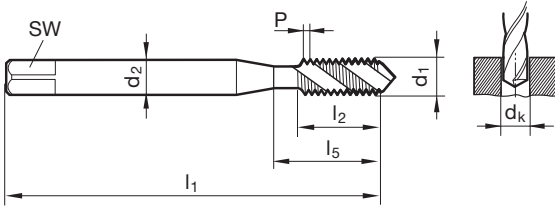
Katalog-Nr. 53760



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- kurzer Anschnitt für Gewindetiefen nahe Bohrungsgrund
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| d1   | P     | d2     | SW     | dk    | l1      | l2     | l5     |
|------|-------|--------|--------|-------|---------|--------|--------|
|      | mm    | mm     | mm     | mm    | mm      | mm     | mm     |
| M2   | 0,400 | 2,800  | 2,100  | 1,60  | 45,000  | 4,500  | 13,500 |
| M2,5 | 0,450 | 2,800  | 2,100  | 2,05  | 50,000  | 5,000  | 14,500 |
| M3   | 0,500 | 3,500  | 2,700  | 2,50  | 56,000  | 6,000  | 18,000 |
| M4   | 0,700 | 4,500  | 3,400  | 3,30  | 63,000  | 7,500  | 21,000 |
| M5   | 0,800 | 6,000  | 4,900  | 4,20  | 70,000  | 8,500  | 25,000 |
| M6   | 1,000 | 6,000  | 4,900  | 5,00  | 80,000  | 11,000 | 30,000 |
| M8   | 1,250 | 8,000  | 6,200  | 6,80  | 90,000  | 14,000 | 35,000 |
| M10  | 1,500 | 10,000 | 8,000  | 8,50  | 100,000 | 16,000 | 39,000 |
| M12  | 1,750 | 9,000  | 7,000  | 10,20 | 110,000 | 18,500 | 49,000 |
| M14  | 2,000 | 11,000 | 9,000  | 12,00 | 110,000 | 20,000 | 53,000 |
| M16  | 2,000 | 12,000 | 9,000  | 14,00 | 110,000 | 20,000 | 54,000 |
| M18  | 2,500 | 14,000 | 11,000 | 15,50 | 125,000 | 25,000 | 62,000 |
| M20  | 2,500 | 16,000 | 12,000 | 17,50 | 140,000 | 25,000 | 62,000 |
| M24  | 3,000 | 18,000 | 14,500 | 21,00 | 160,000 | 30,000 | 73,000 |
| M30  | 3,500 | 22,000 | 18,000 | 26,50 | 180,000 | 35,000 | 85,000 |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde

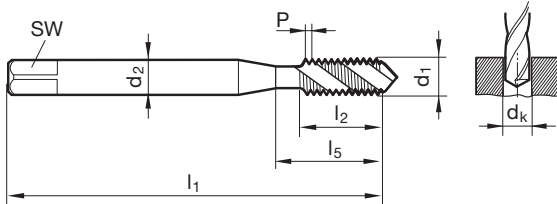


Katalog-Nr. 53750



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ | ○ |

Arbeitsrichtwerte  
Seite 258-279



- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe

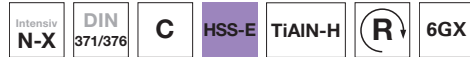
| d1   | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------|---------|----------|----------|----------|----------|----------|----------|
| M2   | 0,400   | 2,800    | 2,100    | 1,60     | 45,000   | 4,500    | 13,500   |
| M2,5 | 0,450   | 2,800    | 2,100    | 2,05     | 50,000   | 5,000    | 14,500   |
| M3   | 0,500   | 3,500    | 2,700    | 2,50     | 56,000   | 6,000    | 18,000   |
| M4   | 0,700   | 4,500    | 3,400    | 3,30     | 63,000   | 7,500    | 21,000   |
| M5   | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 8,500    | 25,000   |
| M6   | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 11,000   | 30,000   |
| M8   | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 14,000   | 35,000   |
| M10  | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 16,000   | 39,000   |
| M12  | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 18,500   | 49,000   |
| M14  | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 20,000   | 53,000   |
| M16  | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 20,000   | 54,000   |
| M18  | 2,500   | 14,000   | 11,000   | 15,50    | 125,000  | 25,000   | 62,000   |
| M20  | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 25,000   | 62,000   |
| M24  | 3,000   | 18,000   | 14,500   | 21,00    | 160,000  | 30,000   | 73,000   |
| M30  | 3,500   | 22,000   | 18,000   | 26,50    | 180,000  | 35,000   | 85,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



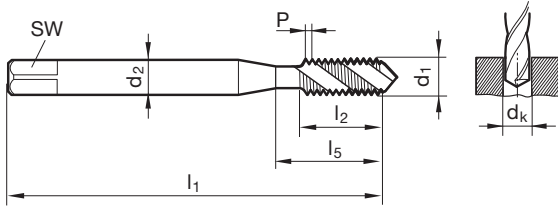
Katalog-Nr. 53751



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| d1   | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------|---------|----------|----------|----------|----------|----------|----------|
| M2   | 0,400   | 2,800    | 2,100    | 1,60     | 45,000   | 4,500    | 13,500   |
| M2,5 | 0,450   | 2,800    | 2,100    | 2,05     | 50,000   | 5,000    | 14,500   |
| M3   | 0,500   | 3,500    | 2,700    | 2,50     | 56,000   | 6,000    | 18,000   |
| M4   | 0,700   | 4,500    | 3,400    | 3,30     | 63,000   | 7,500    | 21,000   |
| M5   | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 8,500    | 25,000   |
| M6   | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 11,000   | 30,000   |
| M8   | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 14,000   | 35,000   |
| M10  | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 16,000   | 39,000   |
| M12  | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 18,500   | 49,000   |
| M14  | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 20,000   | 53,000   |
| M16  | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 20,000   | 54,000   |
| M18  | 2,500   | 14,000   | 11,000   | 15,50    | 125,000  | 25,000   | 62,000   |
| M20  | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 25,000   | 62,000   |
| M24  | 3,000   | 18,000   | 14,500   | 21,00    | 160,000  | 30,000   | 73,000   |
| M30  | 3,500   | 22,000   | 18,000   | 26,50    | 180,000  | 35,000   | 85,000   |



## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



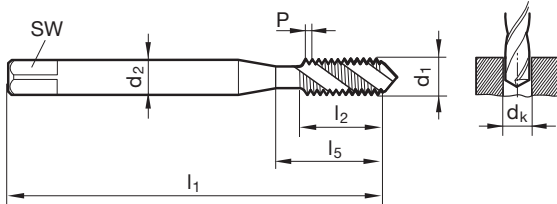
Katalog-Nr. 53752



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- überlang
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| d1  | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|-----|---------|----------|----------|----------|----------|----------|----------|
| M3  | 0,500   | 3,500    | 2,700    | 2,50     | 90,000   | 6,000    | 18,000   |
| M4  | 0,700   | 4,500    | 3,400    | 3,30     | 125,000  | 7,500    | 21,000   |
| M5  | 0,800   | 6,000    | 4,900    | 4,20     | 140,000  | 8,500    | 25,000   |
| M6  | 1,000   | 6,000    | 4,900    | 5,00     | 160,000  | 11,000   | 30,000   |
| M8  | 1,250   | 8,000    | 6,200    | 6,80     | 180,000  | 14,000   | 35,000   |
| M10 | 1,500   | 10,000   | 8,000    | 8,50     | 200,000  | 16,000   | 39,000   |
| M12 | 1,750   | 9,000    | 7,000    | 10,20    | 220,000  | 18,500   | 158,000  |
| M14 | 2,000   | 11,000   | 9,000    | 12,00    | 220,000  | 20,000   | 160,000  |
| M16 | 2,000   | 12,000   | 9,000    | 14,00    | 220,000  | 20,000   | 160,000  |
| M20 | 2,500   | 16,000   | 12,000   | 17,50    | 280,000  | 25,000   | 217,000  |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



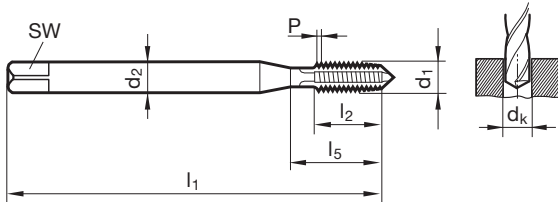
Katalog-Nr. 63033

|                       |                       |          |              |            |          |                |
|-----------------------|-----------------------|----------|--------------|------------|----------|----------------|
| Produktiv<br><b>N</b> | <b>DIN</b><br>371/376 | <b>B</b> | <b>HSS-E</b> | <b>TiN</b> | <b>R</b> | <b>ISO2/6H</b> |
|-----------------------|-----------------------|----------|--------------|------------|----------|----------------|

|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ●        | ○        | ○        | ○        |          |          |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1100 N/mm<sup>2</sup>



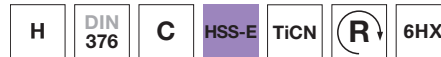
| d1         | P     | d2     | SW     | dk    | l1      | l2     | l5     |
|------------|-------|--------|--------|-------|---------|--------|--------|
|            | mm    | mm     | mm     | mm    | mm      | mm     | mm     |
| <b>M3</b>  | 0,500 | 3,500  | 2,700  | 2,50  | 56,000  | 10,000 | 18,000 |
| <b>M4</b>  | 0,700 | 4,500  | 3,400  | 3,30  | 63,000  | 12,000 | 21,000 |
| <b>M5</b>  | 0,800 | 6,000  | 4,900  | 4,20  | 70,000  | 14,000 | 25,000 |
| <b>M6</b>  | 1,000 | 6,000  | 4,900  | 5,00  | 80,000  | 16,000 | 30,000 |
| <b>M8</b>  | 1,250 | 8,000  | 6,200  | 6,80  | 90,000  | 17,000 | 35,000 |
| <b>M10</b> | 1,500 | 10,000 | 8,000  | 8,50  | 100,000 | 20,000 | 39,000 |
| <b>M12</b> | 1,750 | 9,000  | 7,000  | 10,20 | 110,000 | 24,000 | 49,000 |
| <b>M16</b> | 2,000 | 12,000 | 9,000  | 14,00 | 110,000 | 26,000 | 54,000 |
| <b>M20</b> | 2,500 | 16,000 | 12,000 | 17,50 | 140,000 | 32,000 | 62,000 |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



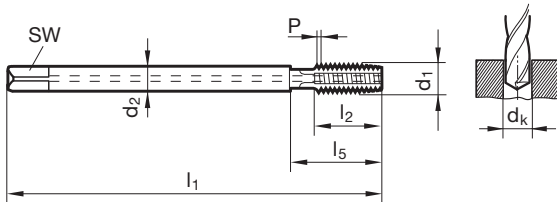
Katalog-Nr. 53646



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● |   | ● | ○ |   |   |

Arbeitsrichtwerte  
Seite 258-279

- für große Gewinde
- für Durchgangs- und Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- für Gusswerkstoffe
- für Al-Legierungen ab 7% Si-Gehalt
- mit axialem Kühlkanal



| d1         | P     | d2     | SW     | dk    | l1      | l2     | l5      |
|------------|-------|--------|--------|-------|---------|--------|---------|
|            | mm    | mm     | mm     | mm    | mm      | mm     | mm      |
| <b>M16</b> | 2,000 | 12,000 | 9,000  | 14,00 | 110,000 | 26,000 | 54,000  |
| <b>M20</b> | 2,500 | 16,000 | 12,000 | 17,50 | 140,000 | 32,000 | 62,000  |
| <b>M24</b> | 3,000 | 18,000 | 14,500 | 21,00 | 160,000 | 36,000 | 73,000  |
| <b>M27</b> | 3,000 | 20,000 | 16,000 | 24,00 | 160,000 | 36,000 | 73,000  |
| <b>M30</b> | 3,500 | 22,000 | 18,000 | 26,50 | 180,000 | 40,000 | 85,000  |
| <b>M33</b> | 3,500 | 25,000 | 20,000 | 29,50 | 180,000 | 40,000 | 91,000  |
| <b>M36</b> | 4,000 | 28,000 | 22,000 | 32,00 | 200,000 | 50,000 | 102,000 |
| <b>M39</b> | 4,000 | 32,000 | 24,000 | 35,00 | 200,000 | 50,000 | 107,000 |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



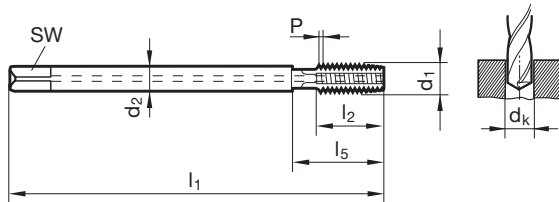
Katalog-Nr. 53647



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● |   | ● | ○ |   |   |

Arbeitsrichtwerte  
Seite 258-279

- für große Gewinde
- für Durchgangs- und Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- für Gusswerkstoffe
- für Al-Legierungen ab 7% Si-Gehalt
- mit axialem Kühlkanal
- für große Gewindetiefen



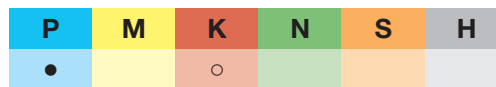
| d1  | P     | d2     | SW     | dk    | l1      | l2     | l5      |
|-----|-------|--------|--------|-------|---------|--------|---------|
|     | mm    | mm     | mm     | mm    | mm      | mm     | mm      |
| M16 | 2,000 | 12,000 | 9,000  | 14,00 | 160,000 | 26,000 | 54,000  |
| M20 | 2,500 | 16,000 | 12,000 | 17,50 | 180,000 | 32,000 | 62,000  |
| M24 | 3,000 | 18,000 | 14,500 | 21,00 | 200,000 | 36,000 | 73,000  |
| M27 | 3,000 | 20,000 | 16,000 | 24,00 | 225,000 | 36,000 | 73,000  |
| M30 | 3,500 | 22,000 | 18,000 | 26,50 | 250,000 | 40,000 | 85,000  |
| M33 | 3,500 | 25,000 | 20,000 | 29,50 | 275,000 | 40,000 | 91,000  |
| M36 | 4,000 | 28,000 | 22,000 | 32,00 | 300,000 | 50,000 | 102,000 |
| M39 | 4,000 | 32,000 | 24,000 | 35,00 | 325,000 | 50,000 | 107,000 |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde

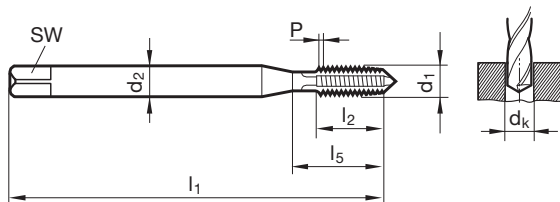


Katalog-Nr. 53642



Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- hochfeste Werkstoffe



| d1  | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|-----|---------|----------|----------|----------|----------|----------|----------|
| M2  | 0,400   | 2,800    | 2,100    | 1,60     | 45,000   | 8,000    | 13,500   |
| M3  | 0,500   | 3,500    | 2,700    | 2,50     | 56,000   | 10,000   | 18,000   |
| M4  | 0,700   | 4,500    | 3,400    | 3,30     | 63,000   | 12,000   | 21,000   |
| M5  | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 14,000   | 25,000   |
| M6  | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 16,000   | 30,000   |
| M8  | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 17,000   | 35,000   |
| M10 | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 20,000   | 39,000   |
| M12 | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 24,000   | 49,000   |
| M14 | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 26,000   | 53,000   |
| M16 | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 26,000   | 54,000   |
| M18 | 2,500   | 14,000   | 11,000   | 15,50    | 125,000  | 30,000   | 62,000   |
| M20 | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 32,000   | 62,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



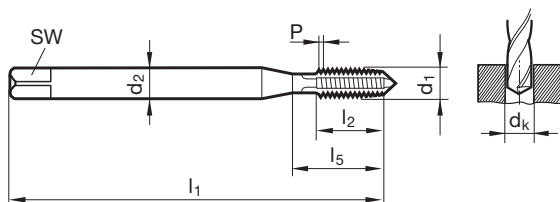
Katalog-Nr. 53640

|                       |                |          |              |      |          |         |
|-----------------------|----------------|----------|--------------|------|----------|---------|
| Produktiv<br><b>H</b> | DIN<br>371/376 | <b>B</b> | HSS-E-<br>PM | TiCN | <b>R</b> | ISO2/6H |
|-----------------------|----------------|----------|--------------|------|----------|---------|

|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ●        |          | ○        |          |          |          |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- hochfeste Werkstoffe



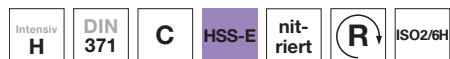
| d1         | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------------|---------|----------|----------|----------|----------|----------|----------|
| <b>M3</b>  | 0,500   | 3,500    | 2,700    | 2,50     | 56,000   | 10,000   | 18,000   |
| <b>M4</b>  | 0,700   | 4,500    | 3,400    | 3,30     | 63,000   | 12,000   | 21,000   |
| <b>M5</b>  | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 14,000   | 25,000   |
| <b>M6</b>  | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 16,000   | 30,000   |
| <b>M8</b>  | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 17,000   | 35,000   |
| <b>M10</b> | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 20,000   | 39,000   |
| <b>M12</b> | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 24,000   | 49,000   |
| <b>M14</b> | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 26,000   | 53,000   |
| <b>M16</b> | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 26,000   | 54,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



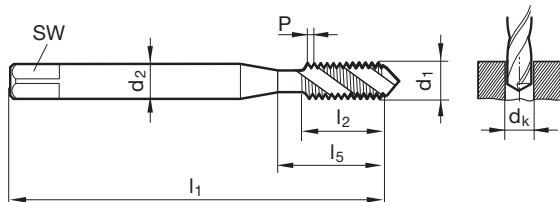
Katalog-Nr. 73661



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● |   | ○ |   |   |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 40° Rechtsdrall
- Spanförderung in Schafrichtung
- hochfeste Werkstoffe



| d1         | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------------|---------|----------|----------|----------|----------|----------|----------|
| <b>M3</b>  | 0,500   | 3,500    | 2,700    | 2,50     | 56,000   | 6,000    | 18,000   |
| <b>M4</b>  | 0,700   | 4,500    | 3,400    | 3,30     | 63,000   | 7,500    | 21,000   |
| <b>M5</b>  | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 8,500    | 25,000   |
| <b>M6</b>  | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 11,000   | 30,000   |
| <b>M8</b>  | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 14,000   | 35,000   |
| <b>M10</b> | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 16,000   | 39,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



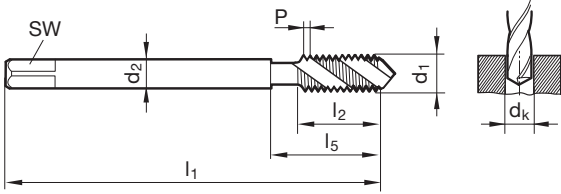
Katalog-Nr. 73664



Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 40° Rechtsdrall
- Spanförderung in Schafrichtung
- hochfeste Werkstoffe

Gewindewerkzeuge



| d1         | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------------|---------|----------|----------|----------|----------|----------|----------|
| <b>M12</b> | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 18,500   | 49,000   |
| <b>M14</b> | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 20,000   | 53,000   |
| <b>M16</b> | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 20,000   | 54,000   |
| <b>M20</b> | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 25,000   | 62,000   |



## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



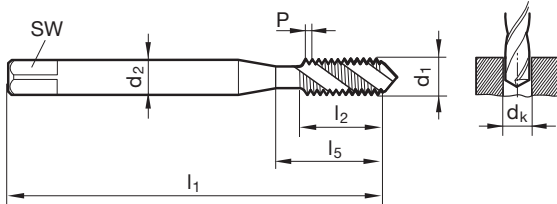
Katalog-Nr. 53661



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● |   | ○ |   |   |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 40° Rechtsdrall
- Spanförderung in Schafrichtung
- hochfeste Werkstoffe



| d1         | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|------------|---------|----------|----------|----------|----------|----------|----------|
| <b>M2</b>  | 0,400   | 2,800    | 2,100    | 1,60     | 45,000   | 4,500    | 13,500   |
| <b>M3</b>  | 0,500   | 3,500    | 2,700    | 2,50     | 56,000   | 6,000    | 18,000   |
| <b>M4</b>  | 0,700   | 4,500    | 3,400    | 3,30     | 63,000   | 7,500    | 21,000   |
| <b>M5</b>  | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 8,500    | 25,000   |
| <b>M6</b>  | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 11,000   | 30,000   |
| <b>M8</b>  | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 14,000   | 35,000   |
| <b>M10</b> | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 16,000   | 39,000   |
| <b>M12</b> | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 18,500   | 49,000   |
| <b>M14</b> | 2,000   | 11,000   | 9,000    | 12,00    | 110,000  | 20,000   | 53,000   |
| <b>M16</b> | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 20,000   | 54,000   |
| <b>M18</b> | 2,500   | 14,000   | 11,000   | 15,50    | 125,000  | 25,000   | 62,000   |
| <b>M20</b> | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 25,000   | 62,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde



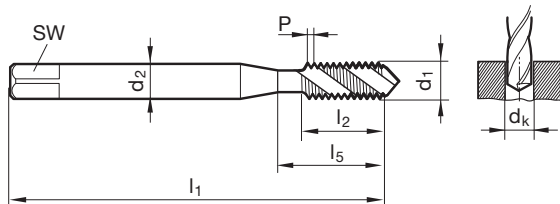
Katalog-Nr. 53664



|        |   |   |   |   |   |
|--------|---|---|---|---|---|
| P      | M | K | N | S | H |
| ≤ 1200 |   | ○ |   |   |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 15° Rechtsdrall
- Spanförderung in Schafrichtung
- hochfeste Werkstoffe



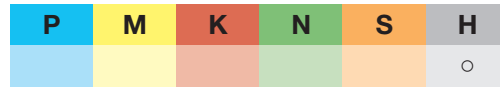
| d1  | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|-----|---------|----------|----------|----------|----------|----------|----------|
| M4  | 0,700   | 4,500    | 3,400    | 3,30     | 63,000   | 7,500    | 21,000   |
| M5  | 0,800   | 6,000    | 4,900    | 4,20     | 70,000   | 8,500    | 25,000   |
| M6  | 1,000   | 6,000    | 4,900    | 5,00     | 80,000   | 11,000   | 30,000   |
| M8  | 1,250   | 8,000    | 6,200    | 6,80     | 90,000   | 14,000   | 35,000   |
| M10 | 1,500   | 10,000   | 8,000    | 8,50     | 100,000  | 16,000   | 39,000   |
| M12 | 1,750   | 9,000    | 7,000    | 10,20    | 110,000  | 18,500   | 49,000   |
| M16 | 2,000   | 12,000   | 9,000    | 14,00    | 110,000  | 20,000   | 54,000   |
| M20 | 2,500   | 16,000   | 12,000   | 17,50    | 140,000  | 25,000   | 62,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Gewinde

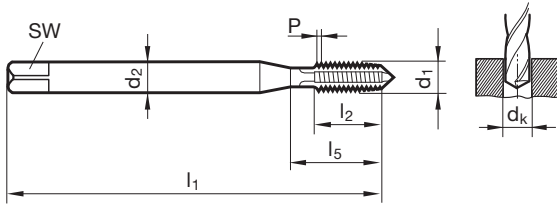


Katalog-Nr. 53676



Arbeitsrichtwerte  
Seite 258-279

- für Durchgangs- und Grundgewinde
- für Gewindetiefen bis 1,5xD
- für Materialien zwischen 45 - 55 HRC



| d1  | P<br>mm | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|-----|---------|----------|----------|----------|----------|----------|----------|
| M3  | 0,500   | 3,500    | 2,700    | 2,60     | 56,000   | 10,000   | 18,000   |
| M4  | 0,700   | 4,500    | 3,400    | 3,40     | 63,000   | 12,000   | 21,000   |
| M5  | 0,800   | 6,000    | 4,900    | 4,30     | 70,000   | 14,000   | 25,000   |
| M6  | 1,000   | 6,000    | 4,900    | 5,10     | 80,000   | 16,000   | 30,000   |
| M8  | 1,250   | 8,000    | 6,200    | 6,90     | 90,000   | 17,000   | 35,000   |
| M10 | 1,500   | 10,000   | 8,000    | 8,60     | 100,000  | 20,000   | 39,000   |
| M12 | 1,750   | 12,000   | 9,000    | 10,40    | 110,000  | 24,000   | 49,000   |
| M14 | 2,000   | 14,000   | 11,000   | 12,10    | 110,000  | 26,000   | 53,000   |
| M16 | 2,000   | 16,000   | 12,000   | 14,10    | 110,000  | 26,000   | 54,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Feingewinde



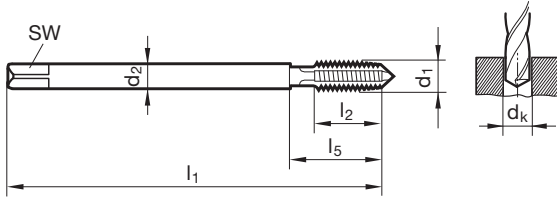
Katalog-Nr. 53778



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| Code-Nr. | d1         | d2     | SW     | dk    | l1      | l2     | l5     |
|----------|------------|--------|--------|-------|---------|--------|--------|
|          |            | mm     | mm     | mm    | mm      | mm     | mm     |
| 3,002    | M3 x 0,35  | 2,200  | 1,800  | 2,65  | 56,000  | 7,000  | 18,000 |
| 4,002    | M4 x 0,35  | 2,800  | 2,100  | 3,65  | 63,000  | 8,000  | 21,000 |
| 4,003    | M4 x 0,5   | 2,800  | 2,100  | 3,50  | 63,000  | 8,000  | 21,000 |
| 5,003    | M5 x 0,5   | 3,500  | 2,700  | 4,50  | 70,000  | 10,000 | 25,000 |
| 6,003    | M6 x 0,5   | 4,500  | 3,400  | 5,50  | 80,000  | 13,000 | 30,000 |
| 6,004    | M6 x 0,75  | 4,500  | 3,400  | 5,20  | 80,000  | 13,000 | 30,000 |
| 8,004    | M8 x 0,75  | 6,000  | 4,900  | 7,20  | 80,000  | 14,000 | 30,000 |
| 8,005    | M8 x 1     | 6,000  | 4,900  | 7,00  | 90,000  | 17,000 | 35,000 |
| 9,005    | M9 x 1     | 7,000  | 5,500  | 8,00  | 90,000  | 16,000 | 35,000 |
| 10,004   | M10 x 0,75 | 7,000  | 5,500  | 9,20  | 90,000  | 16,000 | 35,000 |
| 10,005   | M10 x 1    | 7,000  | 5,500  | 9,00  | 90,000  | 16,000 | 35,000 |
| 10,006   | M10 x 1,25 | 7,000  | 5,500  | 8,80  | 100,000 | 20,000 | 39,000 |
| 11,005   | M11 x 1    | 8,000  | 6,200  | 10,00 | 90,000  | 20,000 | 33,000 |
| 12,005   | M12 x 1    | 9,000  | 7,000  | 11,00 | 100,000 | 20,000 | 40,000 |
| 12,006   | M12 x 1,25 | 9,000  | 7,000  | 10,80 | 100,000 | 20,000 | 40,000 |
| 12,007   | M12 x 1,5  | 9,000  | 7,000  | 10,50 | 100,000 | 20,000 | 40,000 |
| 14,005   | M14 x 1    | 11,000 | 9,000  | 13,00 | 100,000 | 20,000 | 40,000 |
| 14,006   | M14 x 1,25 | 11,000 | 9,000  | 12,80 | 100,000 | 20,000 | 40,000 |
| 14,007   | M14 x 1,5  | 11,000 | 9,000  | 12,50 | 100,000 | 20,000 | 40,000 |
| 16,005   | M16 x 1    | 12,000 | 9,000  | 15,00 | 100,000 | 22,000 | 44,000 |
| 16,007   | M16 x 1,5  | 12,000 | 9,000  | 14,50 | 100,000 | 22,000 | 44,000 |
| 18,005   | M18 x 1    | 14,000 | 11,000 | 17,00 | 110,000 | 25,000 | 44,000 |
| 18,007   | M18 x 1,5  | 14,000 | 11,000 | 16,50 | 110,000 | 25,000 | 44,000 |
| 18,008   | M18 x 2    | 14,000 | 11,000 | 16,00 | 125,000 | 30,000 | 58,000 |
| 20,005   | M20 x 1    | 16,000 | 12,000 | 19,00 | 125,000 | 25,000 | 44,000 |
| 20,007   | M20 x 1,5  | 16,000 | 12,000 | 18,50 | 125,000 | 25,000 | 44,000 |
| 20,008   | M20 x 2    | 16,000 | 12,000 | 18,00 | 140,000 | 32,000 | 60,000 |
| 22,005   | M22 x 1    | 18,000 | 14,500 | 21,00 | 125,000 | 25,000 | 44,000 |
| 22,007   | M22 x 1,5  | 18,000 | 14,500 | 20,50 | 125,000 | 25,000 | 44,000 |
| 22,008   | M22 x 2    | 18,000 | 14,500 | 20,00 | 140,000 | 32,000 | 62,000 |
| 24,005   | M24 x 1    | 18,000 | 14,500 | 23,00 | 140,000 | 28,000 | 48,000 |
| 24,007   | M24 x 1,5  | 18,000 | 14,500 | 22,50 | 140,000 | 28,000 | 48,000 |
| 24,008   | M24 x 2    | 18,000 | 14,500 | 22,00 | 140,000 | 28,000 | 48,000 |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Feingewinde



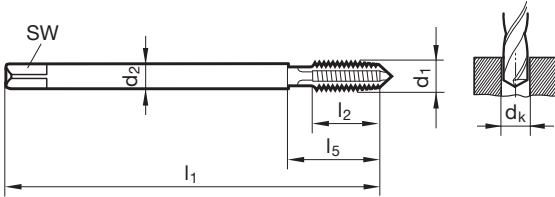
Katalog-Nr. 53789

|                         |                   |          |                 |                |          |            |
|-------------------------|-------------------|----------|-----------------|----------------|----------|------------|
| Produktiv<br><b>N-X</b> | <b>DIN</b><br>374 | <b>B</b> | <b>HSS-E-PM</b> | <b>AlTiZrN</b> | <b>R</b> | <b>6HX</b> |
|-------------------------|-------------------|----------|-----------------|----------------|----------|------------|

|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ●        | ●        | ○        | ○        | ○        |          |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| Code-Nr. | d1         | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|----------|------------|----------|----------|----------|----------|----------|----------|
| 8,005    | M8 x 1     | 6,000    | 4,900    | 7,00     | 90,000   | 17,000   | 35,000   |
| 10,005   | M10 x 1    | 7,000    | 5,500    | 9,00     | 90,000   | 16,000   | 35,000   |
| 10,006   | M10 x 1,25 | 7,000    | 5,500    | 8,80     | 100,000  | 20,000   | 39,000   |
| 12,005   | M12 x 1    | 9,000    | 7,000    | 11,00    | 100,000  | 20,000   | 40,000   |
| 12,006   | M12 x 1,25 | 9,000    | 7,000    | 10,80    | 100,000  | 20,000   | 40,000   |
| 12,007   | M12 x 1,5  | 9,000    | 7,000    | 10,50    | 100,000  | 20,000   | 40,000   |
| 14,007   | M14 x 1,5  | 11,000   | 9,000    | 12,50    | 100,000  | 20,000   | 40,000   |
| 16,007   | M16 x 1,5  | 12,000   | 9,000    | 14,50    | 100,000  | 22,000   | 44,000   |
| 18,007   | M18 x 1,5  | 14,000   | 11,000   | 16,50    | 110,000  | 25,000   | 44,000   |
| 20,007   | M20 x 1,5  | 16,000   | 12,000   | 18,50    | 125,000  | 25,000   | 44,000   |
| 24,007   | M24 x 1,5  | 18,000   | 14,500   | 22,50    | 140,000  | 28,000   | 48,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Feingewinde

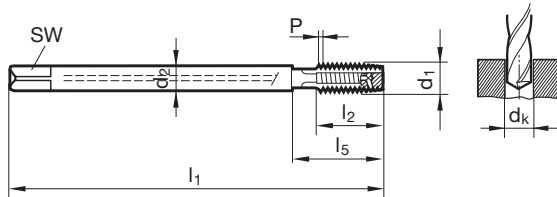


Katalog-Nr. 53790

|                         |                   |          |                 |                |          |            |
|-------------------------|-------------------|----------|-----------------|----------------|----------|------------|
| Produktiv<br><b>N-X</b> | <b>DIN</b><br>374 | <b>B</b> | <b>HSS-E-PM</b> | <b>AlTiZrN</b> | <b>R</b> | <b>6HX</b> |
|-------------------------|-------------------|----------|-----------------|----------------|----------|------------|

|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ●        | ●        | ○        | ○        | ○        |          |

Arbeitsrichtwerte  
Seite 258-279



- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- radialer Kühlmittelaustritt
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe

| Code-Nr. | d1         | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|----------|------------|----------|----------|----------|----------|----------|----------|
| 8,005    | M8 x 1     | 6,000    | 4,900    | 7,00     | 90,000   | 17,000   | 35,000   |
| 10,005   | M10 x 1    | 7,000    | 5,500    | 9,00     | 90,000   | 16,000   | 35,000   |
| 10,006   | M10 x 1,25 | 7,000    | 5,500    | 8,80     | 100,000  | 20,000   | 39,000   |
| 12,005   | M12 x 1    | 9,000    | 7,000    | 11,00    | 100,000  | 20,000   | 40,000   |
| 12,006   | M12 x 1,25 | 9,000    | 7,000    | 10,80    | 100,000  | 20,000   | 40,000   |
| 12,007   | M12 x 1,5  | 9,000    | 7,000    | 10,50    | 100,000  | 20,000   | 40,000   |
| 14,007   | M14 x 1,5  | 11,000   | 9,000    | 12,50    | 100,000  | 20,000   | 40,000   |
| 16,007   | M16 x 1,5  | 12,000   | 9,000    | 14,50    | 100,000  | 22,000   | 44,000   |
| 18,007   | M18 x 1,5  | 14,000   | 11,000   | 16,50    | 110,000  | 25,000   | 44,000   |
| 20,007   | M20 x 1,5  | 16,000   | 12,000   | 18,50    | 125,000  | 25,000   | 44,000   |
| 24,007   | M24 x 1,5  | 18,000   | 14,500   | 22,50    | 140,000  | 28,000   | 48,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Feingewinde



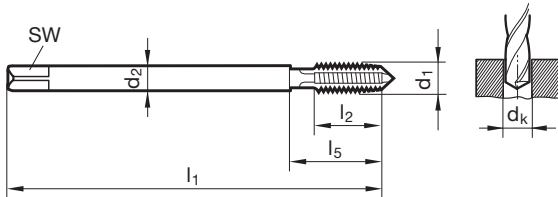
Katalog-Nr. 53779



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| Code-Nr. | d1         | d2     | SW     | dk    | l1      | l2     | l5     |
|----------|------------|--------|--------|-------|---------|--------|--------|
|          |            | mm     | mm     | mm    | mm      | mm     | mm     |
| 6,004    | M6 x 0,75  | 4,500  | 3,400  | 5,20  | 80,000  | 13,000 | 30,000 |
| 8,004    | M8 x 0,75  | 6,000  | 4,900  | 7,20  | 80,000  | 14,000 | 30,000 |
| 8,005    | M8 x 1     | 6,000  | 4,900  | 7,00  | 90,000  | 17,000 | 35,000 |
| 10,005   | M10 x 1    | 7,000  | 5,500  | 9,00  | 90,000  | 16,000 | 35,000 |
| 10,006   | M10 x 1,25 | 7,000  | 5,500  | 8,80  | 100,000 | 20,000 | 39,000 |
| 12,005   | M12 x 1    | 9,000  | 7,000  | 11,00 | 100,000 | 20,000 | 40,000 |
| 12,006   | M12 x 1,25 | 9,000  | 7,000  | 10,80 | 100,000 | 20,000 | 40,000 |
| 12,007   | M12 x 1,5  | 9,000  | 7,000  | 10,50 | 100,000 | 20,000 | 40,000 |
| 14,007   | M14 x 1,5  | 11,000 | 9,000  | 12,50 | 100,000 | 20,000 | 40,000 |
| 16,007   | M16 x 1,5  | 12,000 | 9,000  | 14,50 | 100,000 | 22,000 | 44,000 |
| 18,007   | M18 x 1,5  | 14,000 | 11,000 | 16,50 | 110,000 | 25,000 | 44,000 |
| 20,007   | M20 x 1,5  | 16,000 | 12,000 | 18,50 | 125,000 | 25,000 | 44,000 |
| 24,007   | M24 x 1,5  | 18,000 | 14,500 | 22,50 | 140,000 | 28,000 | 48,000 |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Feingewinde



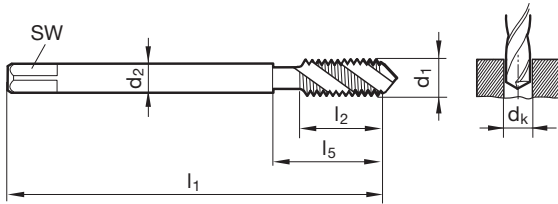
Katalog-Nr. 53780



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



Gewindewerkzeuge

| Code-Nr. | d1         | d2     | SW     | dk    | l1      | l2     | l5     |
|----------|------------|--------|--------|-------|---------|--------|--------|
|          |            | mm     | mm     | mm    | mm      | mm     | mm     |
| 3,002    | M3 x 0,35  | 2,200  | 1,800  | 2,65  | 56,000  | 4,000  | 18,000 |
| 4,002    | M4 x 0,35  | 2,800  | 2,100  | 3,65  | 63,000  | 5,000  | 21,000 |
| 4,003    | M4 x 0,5   | 2,800  | 2,100  | 3,50  | 63,000  | 5,000  | 21,000 |
| 5,003    | M5 x 0,5   | 3,500  | 2,700  | 4,50  | 70,000  | 5,000  | 25,000 |
| 6,003    | M6 x 0,5   | 4,500  | 3,400  | 5,50  | 80,000  | 5,000  | 30,000 |
| 6,004    | M6 x 0,75  | 4,500  | 3,400  | 5,20  | 80,000  | 8,000  | 30,000 |
| 8,004    | M8 x 0,75  | 6,000  | 4,900  | 7,20  | 80,000  | 8,000  | 30,000 |
| 8,005    | M8 x 1     | 6,000  | 4,900  | 7,00  | 90,000  | 11,000 | 35,000 |
| 9,005    | M9 x 1     | 7,000  | 5,500  | 8,00  | 90,000  | 11,000 | 35,000 |
| 10,004   | M10 x 0,75 | 7,000  | 5,500  | 9,20  | 90,000  | 11,000 | 35,000 |
| 10,005   | M10 x 1    | 7,000  | 5,500  | 9,00  | 90,000  | 11,000 | 35,000 |
| 10,006   | M10 x 1,25 | 7,000  | 5,500  | 8,80  | 100,000 | 14,000 | 39,000 |
| 11,005   | M11 x 1    | 8,000  | 6,200  | 10,00 | 90,000  | 11,000 | 33,000 |
| 12,005   | M12 x 1    | 9,000  | 7,000  | 11,00 | 100,000 | 11,000 | 40,000 |
| 12,006   | M12 x 1,25 | 9,000  | 7,000  | 10,80 | 100,000 | 15,000 | 40,000 |
| 12,007   | M12 x 1,5  | 9,000  | 7,000  | 10,50 | 100,000 | 15,000 | 40,000 |
| 14,005   | M14 x 1    | 11,000 | 9,000  | 13,00 | 100,000 | 11,000 | 40,000 |
| 14,006   | M14 x 1,25 | 11,000 | 9,000  | 12,80 | 100,000 | 15,000 | 40,000 |
| 14,007   | M14 x 1,5  | 11,000 | 9,000  | 12,50 | 100,000 | 15,000 | 40,000 |
| 16,005   | M16 x 1    | 12,000 | 9,000  | 15,00 | 100,000 | 11,000 | 44,000 |
| 16,007   | M16 x 1,5  | 12,000 | 9,000  | 14,50 | 100,000 | 15,000 | 44,000 |
| 18,005   | M18 x 1    | 14,000 | 11,000 | 17,00 | 110,000 | 12,000 | 44,000 |
| 18,007   | M18 x 1,5  | 14,000 | 11,000 | 16,50 | 110,000 | 16,000 | 44,000 |
| 18,008   | M18 x 2    | 14,000 | 11,000 | 16,00 | 125,000 | 20,000 | 58,000 |
| 20,005   | M20 x 1    | 16,000 | 12,000 | 19,00 | 125,000 | 12,000 | 44,000 |
| 20,007   | M20 x 1,5  | 16,000 | 12,000 | 18,50 | 125,000 | 16,000 | 44,000 |
| 20,008   | M20 x 2    | 16,000 | 12,000 | 18,00 | 140,000 | 20,000 | 60,000 |
| 22,005   | M22 x 1    | 18,000 | 14,500 | 21,00 | 125,000 | 12,000 | 44,000 |
| 22,007   | M22 x 1,5  | 18,000 | 14,500 | 20,50 | 125,000 | 16,000 | 44,000 |
| 22,008   | M22 x 2    | 18,000 | 14,500 | 20,00 | 140,000 | 22,000 | 62,000 |
| 24,005   | M24 x 1    | 18,000 | 14,500 | 23,00 | 140,000 | 15,000 | 48,000 |
| 24,007   | M24 x 1,5  | 18,000 | 14,500 | 22,50 | 140,000 | 16,000 | 48,000 |
| 24,008   | M24 x 2    | 18,000 | 14,500 | 22,00 | 140,000 | 22,000 | 48,000 |



## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Feingewinde



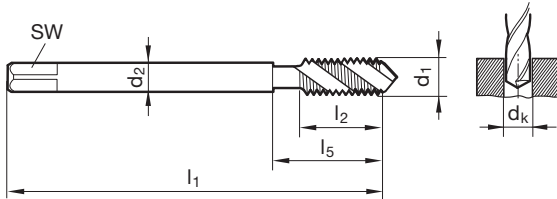
Katalog-Nr. 53791



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| Code-Nr. | d1         | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|----------|------------|----------|----------|----------|----------|----------|----------|
| 8,005    | M8 x 1     | 6,000    | 4,900    | 7,00     | 90,000   | 11,000   | 35,000   |
| 10,005   | M10 x 1    | 7,000    | 5,500    | 9,00     | 90,000   | 11,000   | 35,000   |
| 10,006   | M10 x 1,25 | 7,000    | 5,500    | 8,80     | 100,000  | 14,000   | 39,000   |
| 12,005   | M12 x 1    | 9,000    | 7,000    | 11,00    | 100,000  | 11,000   | 40,000   |
| 12,006   | M12 x 1,25 | 9,000    | 7,000    | 10,80    | 100,000  | 16,000   | 40,000   |
| 12,007   | M12 x 1,5  | 9,000    | 7,000    | 10,50    | 100,000  | 16,000   | 40,000   |
| 14,007   | M14 x 1,5  | 11,000   | 9,000    | 12,50    | 100,000  | 15,000   | 40,000   |
| 16,007   | M16 x 1,5  | 12,000   | 9,000    | 14,50    | 100,000  | 15,000   | 44,000   |
| 18,007   | M18 x 1,5  | 14,000   | 11,000   | 16,50    | 110,000  | 16,000   | 44,000   |
| 20,007   | M20 x 1,5  | 16,000   | 12,000   | 18,50    | 125,000  | 16,000   | 44,000   |
| 24,007   | M24 x 1,5  | 18,000   | 14,500   | 22,50    | 140,000  | 16,000   | 48,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Feingewinde



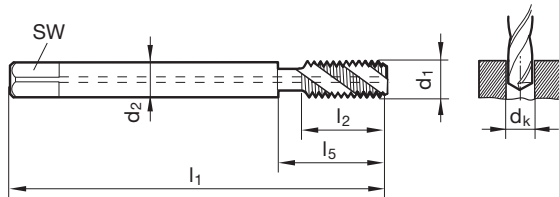
Katalog-Nr. 53792



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- mit axialem Kühlkanal
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



Gewindewerkzeuge

| Code-Nr. | d1         | d2     | SW     | dk    | l1      | l2     | l5     |
|----------|------------|--------|--------|-------|---------|--------|--------|
|          |            | mm     | mm     | mm    | mm      | mm     | mm     |
| 8,005    | M8 x 1     | 6,000  | 4,900  | 7,00  | 90,000  | 11,000 | 35,000 |
| 10,005   | M10 x 1    | 7,000  | 5,500  | 9,00  | 90,000  | 11,000 | 35,000 |
| 10,006   | M10 x 1,25 | 7,000  | 5,500  | 8,80  | 100,000 | 14,000 | 39,000 |
| 12,005   | M12 x 1    | 9,000  | 7,000  | 11,00 | 100,000 | 11,000 | 40,000 |
| 12,006   | M12 x 1,25 | 9,000  | 7,000  | 10,80 | 100,000 | 16,000 | 40,000 |
| 12,007   | M12 x 1,5  | 9,000  | 7,000  | 10,50 | 100,000 | 16,000 | 40,000 |
| 14,007   | M14 x 1,5  | 11,000 | 9,000  | 12,50 | 100,000 | 15,000 | 40,000 |
| 16,007   | M16 x 1,5  | 12,000 | 9,000  | 14,50 | 100,000 | 15,000 | 44,000 |
| 18,007   | M18 x 1,5  | 14,000 | 11,000 | 16,50 | 110,000 | 16,000 | 44,000 |
| 20,007   | M20 x 1,5  | 16,000 | 12,000 | 18,50 | 125,000 | 16,000 | 44,000 |
| 24,007   | M24 x 1,5  | 18,000 | 14,500 | 22,50 | 140,000 | 16,000 | 48,000 |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Feingewinde



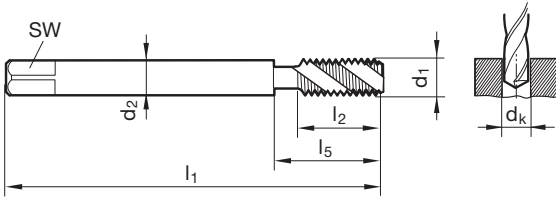
Katalog-Nr. 53770



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- kurzer Anschnitt für Gewindetiefen nahe Bohrungsgrund
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



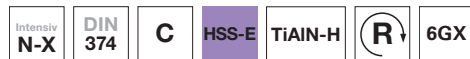
| Code-Nr. | d1         | d2     | SW     | dk    | l1      | l2     | l5     |
|----------|------------|--------|--------|-------|---------|--------|--------|
|          |            | mm     | mm     | mm    | mm      | mm     | mm     |
| 6,004    | M6 x 0,75  | 4,500  | 3,400  | 5,20  | 80,000  | 8,000  | 30,000 |
| 8,004    | M8 x 0,75  | 6,000  | 4,900  | 7,20  | 80,000  | 8,000  | 30,000 |
| 8,005    | M8 x 1     | 6,000  | 4,900  | 7,00  | 90,000  | 11,000 | 35,000 |
| 10,005   | M10 x 1    | 7,000  | 5,500  | 9,00  | 90,000  | 11,000 | 35,000 |
| 10,006   | M10 x 1,25 | 7,000  | 5,500  | 8,80  | 100,000 | 14,000 | 39,000 |
| 12,005   | M12 x 1    | 9,000  | 7,000  | 11,00 | 100,000 | 11,000 | 40,000 |
| 12,006   | M12 x 1,25 | 9,000  | 7,000  | 10,80 | 100,000 | 16,000 | 40,000 |
| 12,007   | M12 x 1,5  | 9,000  | 7,000  | 10,50 | 100,000 | 16,000 | 40,000 |
| 14,007   | M14 x 1,5  | 11,000 | 9,000  | 12,50 | 100,000 | 15,000 | 40,000 |
| 16,007   | M16 x 1,5  | 12,000 | 9,000  | 14,50 | 100,000 | 15,000 | 44,000 |
| 18,007   | M18 x 1,5  | 14,000 | 11,000 | 16,50 | 110,000 | 16,000 | 44,000 |
| 20,007   | M20 x 1,5  | 16,000 | 12,000 | 18,50 | 125,000 | 16,000 | 44,000 |
| 24,007   | M24 x 1,5  | 18,000 | 14,500 | 22,50 | 140,000 | 16,000 | 48,000 |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Feingewinde



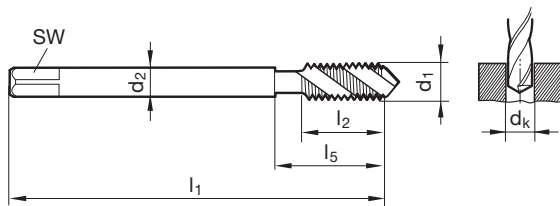
Katalog-Nr. 53781



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



Gewindewerkzeuge

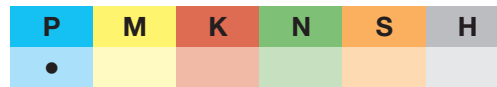
| Code-Nr. | d1         | d2     | SW     | dk    | l1      | l2     | l5     |
|----------|------------|--------|--------|-------|---------|--------|--------|
|          |            | mm     | mm     | mm    | mm      | mm     | mm     |
| 6,004    | M6 x 0,75  | 4,500  | 3,400  | 5,20  | 80,000  | 8,000  | 30,000 |
| 8,004    | M8 x 0,75  | 6,000  | 4,900  | 7,20  | 80,000  | 8,000  | 30,000 |
| 8,005    | M8 x 1     | 6,000  | 4,900  | 7,00  | 90,000  | 11,000 | 35,000 |
| 10,005   | M10 x 1    | 7,000  | 5,500  | 9,00  | 90,000  | 11,000 | 35,000 |
| 10,006   | M10 x 1,25 | 7,000  | 5,500  | 8,80  | 100,000 | 14,000 | 39,000 |
| 12,005   | M12 x 1    | 9,000  | 7,000  | 11,00 | 100,000 | 11,000 | 40,000 |
| 12,006   | M12 x 1,25 | 9,000  | 7,000  | 10,80 | 100,000 | 16,000 | 40,000 |
| 12,007   | M12 x 1,5  | 9,000  | 7,000  | 10,50 | 100,000 | 16,000 | 40,000 |
| 14,007   | M14 x 1,5  | 11,000 | 9,000  | 12,50 | 100,000 | 15,000 | 40,000 |
| 16,007   | M16 x 1,5  | 12,000 | 9,000  | 14,50 | 100,000 | 15,000 | 44,000 |
| 18,007   | M18 x 1,5  | 14,000 | 11,000 | 16,50 | 110,000 | 16,000 | 44,000 |
| 20,007   | M20 x 1,5  | 16,000 | 12,000 | 18,50 | 125,000 | 16,000 | 44,000 |
| 24,007   | M24 x 1,5  | 18,000 | 14,500 | 22,50 | 140,000 | 16,000 | 48,000 |

## Maschinen-Gewindebohrer

### Gewindebohrer für Metrische ISO-Feingewinde

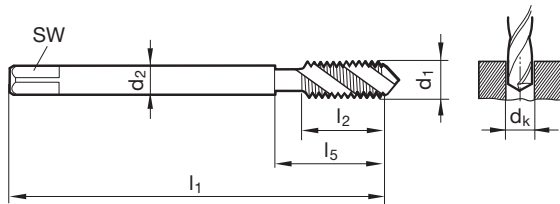


Katalog-Nr. 73647



Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- hochfeste Werkstoffe
- Stähle 1100 bis 1200 N/mm<sup>2</sup>



| Code-Nr. | d1        | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|----------|-----------|----------|----------|----------|----------|----------|----------|
| 8,004    | M8 x 0,75 | 6,000    | 4,900    | 7,20     | 80,000   | 8,000    | 30,000   |
| 8,005    | M8 x 1    | 6,000    | 4,900    | 7,00     | 90,000   | 11,000   | 35,000   |
| 10,005   | M10 x 1   | 7,000    | 5,500    | 9,00     | 90,000   | 11,000   | 35,000   |
| 12,005   | M12 x 1   | 9,000    | 7,000    | 11,00    | 100,000  | 11,000   | 40,000   |
| 12,007   | M12 x 1,5 | 9,000    | 7,000    | 10,50    | 100,000  | 15,000   | 40,000   |
| 14,007   | M14 x 1,5 | 11,000   | 9,000    | 12,50    | 100,000  | 15,000   | 40,000   |
| 16,007   | M16 x 1,5 | 12,000   | 9,000    | 14,50    | 100,000  | 15,000   | 44,000   |
| 18,007   | M18 x 1,5 | 14,000   | 11,000   | 16,50    | 110,000  | 16,000   | 44,000   |
| 20,007   | M20 x 1,5 | 16,000   | 12,000   | 18,50    | 125,000  | 16,000   | 44,000   |
| 22,007   | M22 x 1,5 | 18,000   | 14,500   | 20,50    | 125,000  | 16,000   | 44,000   |
| 24,007   | M24 x 1,5 | 18,000   | 14,500   | 22,50    | 140,000  | 16,000   | 48,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für UNC-Gewinde



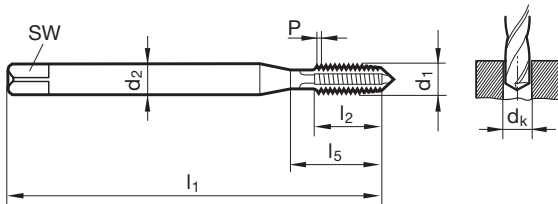
Katalog-Nr. 53782



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



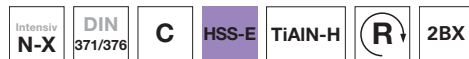
| Code-Nr. | d1        | d2     | SW     | dk    | l1      | l2     | l5     |
|----------|-----------|--------|--------|-------|---------|--------|--------|
|          |           | mm     | mm     | mm    | mm      | mm     | mm     |
| 2,184    | 2 - 56    | 2,800  | 2,100  | 1,85  | 45,000  | 9,000  | 14,500 |
| 2,845    | 4 - 40    | 3,500  | 2,700  | 2,35  | 56,000  | 11,000 | 18,000 |
| 3,505    | 6 - 32    | 4,000  | 3,000  | 2,85  | 56,000  | 12,000 | 20,000 |
| 4,166    | 8 - 32    | 4,500  | 3,400  | 3,50  | 63,000  | 12,000 | 21,000 |
| 4,826    | 10 - 24   | 6,000  | 4,900  | 3,90  | 70,000  | 14,000 | 25,000 |
| 5,486    | 12 - 24   | 6,000  | 4,900  | 4,50  | 80,000  | 16,000 | 30,000 |
| 6,350    | 1/4 - 20  | 7,000  | 5,500  | 5,10  | 80,000  | 16,000 | 30,000 |
| 7,938    | 5/16 - 18 | 8,000  | 6,200  | 6,60  | 90,000  | 18,000 | 35,000 |
| 9,525    | 3/8 - 16  | 10,000 | 8,000  | 8,00  | 100,000 | 20,000 | 39,000 |
| 11,113   | 7/16 - 14 | 8,000  | 6,200  | 9,40  | 100,000 | 22,000 | 42,000 |
| 12,700   | 1/2 - 13  | 9,000  | 7,000  | 10,80 | 110,000 | 25,000 | 49,000 |
| 14,288   | 9/16 - 12 | 11,000 | 9,000  | 12,20 | 110,000 | 28,000 | 53,000 |
| 15,875   | 5/8 - 11  | 12,000 | 9,000  | 13,50 | 110,000 | 30,000 | 53,000 |
| 19,050   | 3/4 - 10  | 14,000 | 11,000 | 16,50 | 125,000 | 33,000 | 62,000 |
| 22,225   | 7/8 - 9   | 18,000 | 14,500 | 19,50 | 140,000 | 35,000 | 62,000 |
| 25,400   | 1 - 8     | 18,000 | 14,500 | 22,25 | 160,000 | 38,000 | 73,000 |

## Maschinen-Gewindebohrer

### Gewindebohrer für UNC-Gewinde

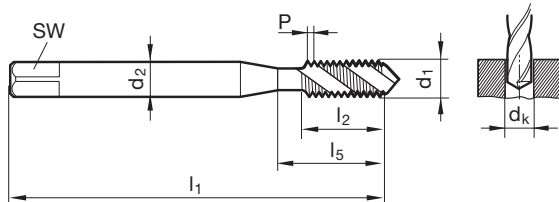


Katalog-Nr. 53783



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279



- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe

| Code-Nr. | d1        | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|----------|-----------|----------|----------|----------|----------|----------|----------|
| 2,184    | 2 - 56    | 2,800    | 2,100    | 1,85     | 45,000   | 5,000    | 14,500   |
| 2,845    | 4 - 40    | 3,500    | 2,700    | 2,35     | 56,000   | 7,000    | 18,000   |
| 3,505    | 6 - 32    | 4,000    | 3,000    | 2,85     | 56,000   | 8,000    | 20,000   |
| 4,166    | 8 - 32    | 4,500    | 3,400    | 3,50     | 63,000   | 8,000    | 21,000   |
| 4,826    | 10 - 24   | 6,000    | 4,900    | 3,90     | 70,000   | 11,000   | 25,000   |
| 5,486    | 12 - 24   | 6,000    | 4,900    | 4,50     | 80,000   | 11,000   | 30,000   |
| 6,350    | 1/4 - 20  | 7,000    | 5,500    | 5,10     | 80,000   | 13,000   | 30,000   |
| 7,938    | 5/16 - 18 | 8,000    | 6,200    | 6,60     | 90,000   | 14,000   | 35,000   |
| 9,525    | 3/8 - 16  | 10,000   | 8,000    | 8,00     | 100,000  | 16,000   | 39,000   |
| 11,113   | 7/16 - 14 | 8,000    | 6,200    | 9,40     | 100,000  | 18,000   | 42,000   |
| 12,700   | 1/2 - 13  | 9,000    | 7,000    | 10,80    | 110,000  | 20,000   | 49,000   |
| 14,288   | 9/16 - 12 | 11,000   | 9,000    | 12,20    | 110,000  | 21,000   | 53,000   |
| 15,875   | 5/8 - 11  | 12,000   | 9,000    | 13,50    | 110,000  | 24,000   | 53,000   |
| 19,050   | 3/4 - 10  | 14,000   | 11,000   | 16,50    | 125,000  | 25,000   | 62,000   |
| 22,225   | 7/8 - 9   | 18,000   | 14,500   | 19,50    | 140,000  | 28,000   | 62,000   |
| 25,400   | 1 - 8     | 18,000   | 14,500   | 22,25    | 160,000  | 32,000   | 73,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für UNF-Gewinde



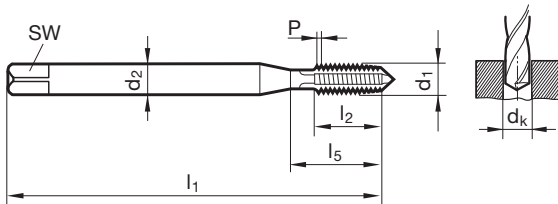
Katalog-Nr. 53784



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangsgewinde
- mit Schälanschnitt
- Spanförderung in Vorschubrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| Code-Nr. | d1        | d2     | SW     | dk    | l1      | l2     | l5     |
|----------|-----------|--------|--------|-------|---------|--------|--------|
|          |           | mm     | mm     | mm    | mm      | mm     | mm     |
| 2,184    | 2 - 64    | 2,800  | 2,100  | 1,85  | 45,000  | 9,000  | 14,500 |
| 2,845    | 4 - 48    | 3,500  | 2,700  | 2,40  | 56,000  | 10,000 | 18,000 |
| 3,505    | 6 - 40    | 4,000  | 3,000  | 2,95  | 56,000  | 11,000 | 20,000 |
| 4,166    | 8 - 36    | 4,500  | 3,400  | 3,50  | 63,000  | 12,000 | 21,000 |
| 4,826    | 10 - 32   | 6,000  | 4,900  | 4,10  | 70,000  | 14,000 | 25,000 |
| 5,486    | 12 - 28   | 6,000  | 4,900  | 4,60  | 80,000  | 16,000 | 30,000 |
| 6,350    | 1/4 - 28  | 7,000  | 5,500  | 5,50  | 80,000  | 16,000 | 30,000 |
| 7,938    | 5/16 - 24 | 8,000  | 6,200  | 6,90  | 90,000  | 17,000 | 35,000 |
| 9,525    | 3/8 - 24  | 10,000 | 8,000  | 8,50  | 90,000  | 18,000 | 35,000 |
| 11,113   | 7/16 - 20 | 8,000  | 6,200  | 9,90  | 100,000 | 22,000 | 42,000 |
| 12,700   | 1/2 - 20  | 9,000  | 7,000  | 11,50 | 100,000 | 20,000 | 40,000 |
| 14,288   | 9/16 - 18 | 11,000 | 9,000  | 12,90 | 100,000 | 22,000 | 40,000 |
| 15,875   | 5/8 - 18  | 12,000 | 9,000  | 14,50 | 100,000 | 22,000 | 44,000 |
| 19,050   | 3/4 - 16  | 14,000 | 11,000 | 17,50 | 110,000 | 25,000 | 44,000 |
| 22,225   | 7/8 - 14  | 18,000 | 14,500 | 20,40 | 125,000 | 25,000 | 44,000 |
| 25,400   | 1 - 12    | 18,000 | 14,500 | 23,25 | 140,000 | 28,000 | 50,000 |

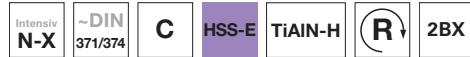


## Maschinen-Gewindebohrer

### Gewindebohrer für UNF-Gewinde



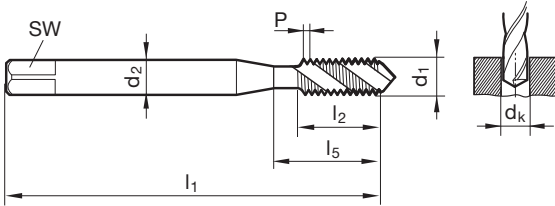
Katalog-Nr. 53785



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| Code-Nr. | d1        | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|----------|-----------|----------|----------|----------|----------|----------|----------|
| 2,184    | 2 - 64    | 2,800    | 2,100    | 1,85     | 45,000   | 5,000    | 14,500   |
| 2,845    | 4 - 48    | 3,500    | 2,700    | 2,40     | 56,000   | 6,000    | 18,000   |
| 3,505    | 6 - 40    | 4,000    | 3,000    | 2,95     | 56,000   | 6,500    | 20,000   |
| 4,166    | 8 - 36    | 4,500    | 3,400    | 3,50     | 63,000   | 7,000    | 21,000   |
| 4,826    | 10 - 32   | 6,000    | 4,900    | 4,10     | 70,000   | 8,500    | 25,000   |
| 5,486    | 12 - 28   | 6,000    | 4,900    | 4,60     | 80,000   | 9,500    | 30,000   |
| 6,350    | 1/4 - 28  | 7,000    | 5,500    | 5,50     | 80,000   | 9,500    | 30,000   |
| 7,938    | 5/16 - 24 | 8,000    | 6,200    | 6,90     | 90,000   | 11,500   | 35,000   |
| 9,525    | 3/8 - 24  | 10,000   | 8,000    | 8,50     | 90,000   | 11,500   | 35,000   |
| 11,113   | 7/16 - 20 | 8,000    | 6,200    | 9,90     | 100,000  | 13,000   | 42,000   |
| 12,700   | 1/2 - 20  | 9,000    | 7,000    | 11,50    | 100,000  | 13,000   | 40,000   |
| 14,288   | 9/16 - 18 | 11,000   | 9,000    | 12,90    | 100,000  | 14,000   | 40,000   |
| 15,875   | 5/8 - 18  | 12,000   | 9,000    | 14,50    | 100,000  | 15,000   | 44,000   |
| 19,050   | 3/4 - 16  | 14,000   | 11,000   | 17,50    | 110,000  | 16,000   | 44,000   |
| 22,225   | 7/8 - 14  | 18,000   | 14,500   | 20,40    | 125,000  | 19,000   | 44,000   |
| 25,400   | 1 - 12    | 18,000   | 14,500   | 23,25    | 140,000  | 22,000   | 50,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für BSW-Gewinde



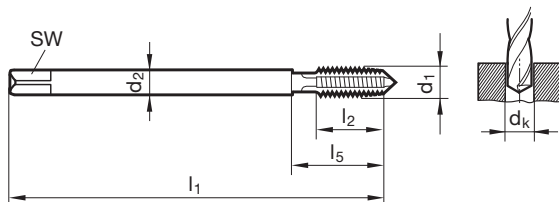
Katalog-Nr. 53793



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- universell einsetzbar
- Spanförderung in Vorschubrichtung
- mit Schälanschnitt
- für Durchgangsgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| Code-Nr. | d1    | P<br>G/inch | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|----------|-------|-------------|----------|----------|----------|----------|----------|----------|
| 3,175    | W1/8  | 40          | 3,500    | 2,700    | 2,50     | 56,000   | 11,000   | 18,000   |
| 4,762    | W3/16 | 24          | 6,000    | 4,900    | 3,60     | 70,000   | 14,000   | 25,000   |
| 6,350    | W1/4  | 20          | 7,000    | 5,500    | 5,10     | 80,000   | 16,000   | 30,000   |
| 7,938    | W5/16 | 18          | 8,000    | 6,200    | 6,50     | 90,000   | 18,000   | 35,000   |
| 9,525    | W3/8  | 16          | 10,000   | 8,000    | 7,90     | 100,000  | 20,000   | 39,000   |
| 11,113   | W7/16 | 14          | 8,000    | 6,200    | 9,20     | 100,000  | 22,000   | 42,000   |
| 12,700   | W1/2  | 12          | 9,000    | 7,000    | 10,50    | 110,000  | 25,000   | 49,000   |
| 15,876   | W5/8  | 11          | 12,000   | 9,000    | 13,50    | 110,000  | 30,000   | 53,000   |
| 22,226   | W7/8  | 9           | 18,000   | 14,500   | 19,25    | 140,000  | 35,000   | 62,000   |
| 25,401   | W1    | 8           | 18,000   | 14,500   | 22,00    | 160,000  | 38,000   | 73,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für BSW-Gewinde



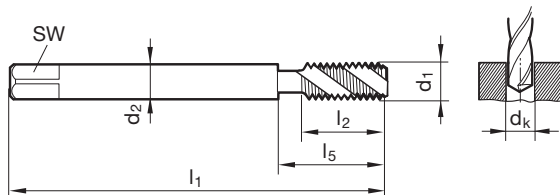
Katalog-Nr. 53794



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|---|---|---|---|---|---|
| P | M | K | N | S | H |
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Arbeitsrichtwerte  
Seite 258-279

- universell einsetzbar
- Spanförderung in Schafrichtung
- Nuten mit ca. 45° Rechtsdrall
- für Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| Code-Nr. | d1    | P<br>G/inch | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|----------|-------|-------------|----------|----------|----------|----------|----------|----------|
| 3,175    | W1/8  | 40          | 3,500    | 2,700    | 2,50     | 56,000   | 7,000    | 18,000   |
| 4,762    | W3/16 | 24          | 6,000    | 4,900    | 3,60     | 70,000   | 11,000   | 25,000   |
| 6,350    | W1/4  | 20          | 7,000    | 5,500    | 5,10     | 80,000   | 13,000   | 30,000   |
| 7,938    | W5/16 | 18          | 8,000    | 6,200    | 6,50     | 90,000   | 14,000   | 35,000   |
| 9,525    | W3/8  | 16          | 10,000   | 8,000    | 7,90     | 100,000  | 16,000   | 39,000   |
| 11,113   | W7/16 | 14          | 8,000    | 6,200    | 9,20     | 100,000  | 18,000   | 42,000   |
| 12,700   | W1/2  | 12          | 9,000    | 7,000    | 10,50    | 110,000  | 20,000   | 49,000   |
| 15,876   | W5/8  | 11          | 12,000   | 9,000    | 13,50    | 110,000  | 24,000   | 53,000   |
| 22,226   | W7/8  | 9           | 18,000   | 14,500   | 19,25    | 140,000  | 28,000   | 62,000   |
| 25,401   | W1    | 8           | 18,000   | 14,500   | 22,00    | 160,000  | 32,000   | 73,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Whitworth-Rohrgewinde



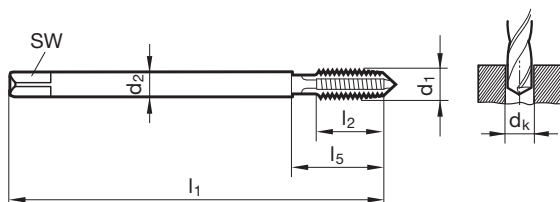
Katalog-Nr. 53795



|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ●        | ●        | ○        | ○        | ○        |          |

Arbeitsrichtwerte  
Seite 258-279

- universell einsetzbar
- Spanförderung in Vorschubrichtung
- mit Schälanschnitt
- für Durchgangsgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| Code-Nr. | d1     | P      | d2     | SW     | dk    | l1      | l2     | l5     |
|----------|--------|--------|--------|--------|-------|---------|--------|--------|
|          |        | G/inch | mm     | mm     | mm    | mm      | mm     | mm     |
| 7,723    | Rp1/16 | 28     | 6,000  | 4,900  | 6,55  | 90,000  | 18,000 | 30,000 |
| 9,728    | Rp1/8  | 28     | 7,000  | 5,500  | 8,60  | 90,000  | 18,000 | 35,000 |
| 13,157   | Rp1/4  | 19     | 11,000 | 9,000  | 11,50 | 100,000 | 20,000 | 40,000 |
| 16,662   | Rp3/8  | 19     | 12,000 | 9,000  | 15,00 | 100,000 | 22,000 | 44,000 |
| 20,955   | Rp1/2  | 14     | 16,000 | 12,000 | 18,50 | 125,000 | 25,000 | 44,000 |
| 26,441   | Rp3/4  | 14     | 20,000 | 16,000 | 24,00 | 140,000 | 28,000 | 53,000 |

## Maschinen-Gewindebohrer

### Gewindebohrer für Whitworth-Rohrgewinde



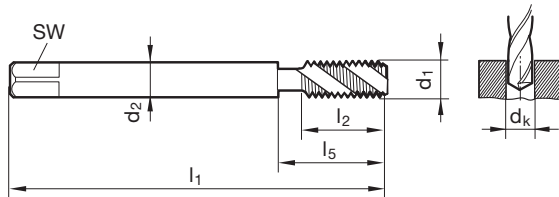
Katalog-Nr. 53796



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| P | M | K | N | S | H |
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Arbeitsrichtwerte  
Seite 258-279

- universell einsetzbar
- Spanförderung in Schafrichtung
- Nuten mit ca. 45° Rechtsdrall
- für Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



| Code-Nr. | d1     | P<br>G/inch | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|----------|--------|-------------|----------|----------|----------|----------|----------|----------|
| 7,723    | Rp1/16 | 28          | 6,000    | 4,900    | 6,55     | 90,000   | 11,000   | 30,000   |
| 9,728    | Rp1/8  | 28          | 7,000    | 5,500    | 8,60     | 90,000   | 11,000   | 35,000   |
| 13,157   | Rp1/4  | 19          | 11,000   | 9,000    | 11,50    | 100,000  | 14,000   | 40,000   |
| 16,662   | Rp3/8  | 19          | 12,000   | 9,000    | 15,00    | 100,000  | 14,000   | 44,000   |
| 20,955   | Rp1/2  | 14          | 16,000   | 12,000   | 18,50    | 125,000  | 18,000   | 44,000   |
| 26,441   | Rp3/4  | 14          | 20,000   | 16,000   | 24,00    | 140,000  | 20,000   | 53,000   |

## Maschinen-Gewindebohrer

### Gewindebohrer für Whitworth-Rohrgewinde



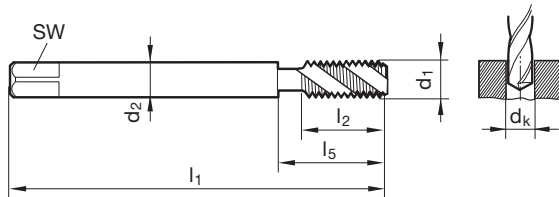
Katalog-Nr. 53775



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|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- für Grundgewinde
- Nuten mit ca. 45° Rechtsdrall
- Spanförderung in Schafrichtung
- kurzer Anschnitt für Gewindetiefen nahe Bohrungsgrund
- universell einsetzbar
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- NE-Metalle
- Gusswerkstoffe



Gewindewerkzeuge

| Code-Nr. | d1    | P<br>G/inch | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|----------|-------|-------------|----------|----------|----------|----------|----------|----------|
| 7,723    | G1/16 | 28          | 6,000    | 4,900    | 6,80     | 90,000   | 11,000   | 30,000   |
| 9,728    | G1/8  | 28          | 7,000    | 5,500    | 8,80     | 90,000   | 11,000   | 35,000   |
| 13,157   | G1/4  | 19          | 11,000   | 9,000    | 11,80    | 100,000  | 14,000   | 40,000   |
| 16,662   | G3/8  | 19          | 12,000   | 9,000    | 15,25    | 100,000  | 14,000   | 44,000   |
| 20,955   | G1/2  | 14          | 16,000   | 12,000   | 19,00    | 125,000  | 18,000   | 44,000   |
| 22,911   | G5/8  | 14          | 18,000   | 14,500   | 21,00    | 125,000  | 18,000   | 48,000   |
| 26,441   | G3/4  | 14          | 20,000   | 16,000   | 24,50    | 140,000  | 20,000   | 53,000   |
| 30,201   | G7/8  | 14          | 22,000   | 18,000   | 28,25    | 150,000  | 22,000   | 53,000   |
| 33,249   | G1    | 11          | 25,000   | 20,000   | 30,75    | 160,000  | 24,000   | 56,000   |

## Gewindeformer mit Schmiernuten

### Gewindeformer für Metrische ISO-Gewinde



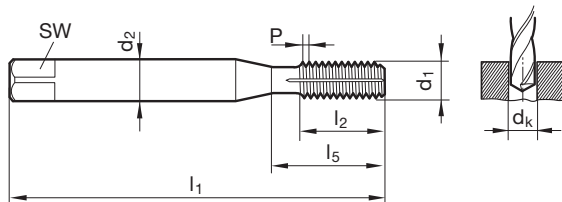
Katalog-Nr. 53630



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| P | M | K | N | S | H |
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Arbeitsrichtwerte  
Seite 258-279

- für Durchgangs- und Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- formbare Gusswerkstoffe
- formbare Nichteisenmetalle
- Sonderlegierungen



| d1   | P     | d2     | SW     | dk    | l1      | l2     | l5     |
|------|-------|--------|--------|-------|---------|--------|--------|
|      | mm    | mm     | mm     | mm    | mm      | mm     | mm     |
| M1   | 0,250 | 2,500  | 2,100  | 0,90  | 40,000  | 4,000  | 4,000  |
| M1,2 | 0,250 | 2,500  | 2,100  | 1,10  | 40,000  | 4,800  | 4,800  |
| M1,4 | 0,300 | 2,500  | 2,100  | 1,25  | 40,000  | 5,600  | 5,600  |
| M1,6 | 0,350 | 2,500  | 2,100  | 1,45  | 40,000  | 6,400  | 6,400  |
| M1,7 | 0,350 | 2,500  | 2,100  | 1,55  | 40,000  | 6,800  | 6,800  |
| M1,8 | 0,350 | 2,500  | 2,100  | 1,65  | 40,000  | 7,300  | 7,300  |
| M2   | 0,400 | 2,800  | 2,100  | 1,85  | 45,000  | 8,000  | 13,500 |
| M2,5 | 0,450 | 2,800  | 2,100  | 2,30  | 50,000  | 9,000  | 14,500 |
| M3   | 0,500 | 3,500  | 2,700  | 2,80  | 56,000  | 10,000 | 18,000 |
| M3,5 | 0,600 | 4,000  | 3,000  | 3,25  | 56,000  | 12,000 | 20,000 |
| M4   | 0,700 | 4,500  | 3,400  | 3,70  | 63,000  | 12,000 | 21,000 |
| M4,5 | 0,750 | 6,000  | 4,900  | 4,20  | 70,000  | 14,000 | 25,000 |
| M5   | 0,800 | 6,000  | 4,900  | 4,65  | 70,000  | 14,000 | 25,000 |
| M6   | 1,000 | 6,000  | 4,900  | 5,55  | 80,000  | 16,000 | 30,000 |
| M7   | 1,000 | 7,000  | 5,500  | 6,55  | 80,000  | 16,000 | 30,000 |
| M8   | 1,250 | 8,000  | 6,200  | 7,40  | 90,000  | 17,000 | 35,000 |
| M9   | 1,250 | 9,000  | 7,000  | 8,40  | 90,000  | 17,000 | 35,000 |
| M10  | 1,500 | 10,000 | 8,000  | 9,30  | 100,000 | 20,000 | 39,000 |
| M11  | 1,500 | 8,000  | 6,200  | 10,30 | 100,000 | 20,000 | 42,000 |
| M12  | 1,750 | 9,000  | 7,000  | 11,20 | 110,000 | 24,000 | 49,000 |
| M14  | 2,000 | 11,000 | 9,000  | 13,10 | 110,000 | 26,000 | 53,000 |
| M16  | 2,000 | 12,000 | 9,000  | 15,10 | 110,000 | 26,000 | 54,000 |
| M20  | 2,500 | 16,000 | 12,000 | 18,90 | 140,000 | 32,000 | 62,000 |

## Gewindeformer mit Schmiernuten

### Gewindeformer für Metrische ISO-Gewinde



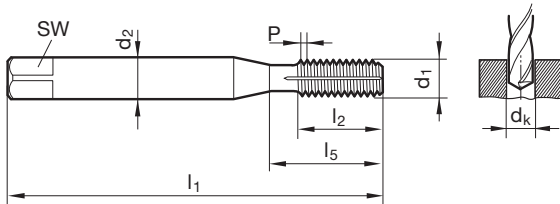
Katalog-Nr. 53631



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| P | M | K | N | S | H |
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Arbeitsrichtwerte  
Seite 258-279

- für Durchgangs- und Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- formbare Gusswerkstoffe
- formbare Nichteisenmetalle
- Sonderlegierungen



| d1   | P     | d2     | SW     | dk    | l1      | l2     | l5     |
|------|-------|--------|--------|-------|---------|--------|--------|
|      | mm    | mm     | mm     | mm    | mm      | mm     | mm     |
| M2   | 0,400 | 2,800  | 2,100  | 1,85  | 45,000  | 8,000  | 13,500 |
| M2,5 | 0,450 | 2,800  | 2,100  | 2,30  | 50,000  | 9,000  | 14,500 |
| M3   | 0,500 | 3,500  | 2,700  | 2,80  | 56,000  | 10,000 | 18,000 |
| M4   | 0,700 | 4,500  | 3,400  | 3,70  | 63,000  | 12,000 | 21,000 |
| M5   | 0,800 | 6,000  | 4,900  | 4,65  | 70,000  | 14,000 | 25,000 |
| M6   | 1,000 | 6,000  | 4,900  | 5,55  | 80,000  | 16,000 | 30,000 |
| M8   | 1,250 | 8,000  | 6,200  | 7,40  | 90,000  | 17,000 | 35,000 |
| M10  | 1,500 | 10,000 | 8,000  | 9,30  | 100,000 | 20,000 | 39,000 |
| M12  | 1,750 | 9,000  | 7,000  | 11,20 | 110,000 | 24,000 | 49,000 |
| M14  | 2,000 | 11,000 | 9,000  | 13,10 | 110,000 | 26,000 | 53,000 |
| M16  | 2,000 | 12,000 | 9,000  | 15,10 | 110,000 | 26,000 | 54,000 |
| M20  | 2,500 | 16,000 | 12,000 | 18,90 | 140,000 | 32,000 | 62,000 |



## Gewindeformer mit Schmiernuten

### Gewindeformer für Metrische ISO-Feingewinde



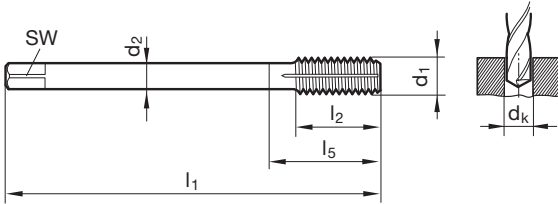
Katalog-Nr. 53632



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|---|---|---|---|---|---|
| P | M | K | N | S | H |
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Arbeitsrichtwerte  
Seite 258-279

- für Durchgangs- und Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- formbare Gusswerkstoffe
- formbare Nichteisenmetalle
- Sonderlegierungen



| Code-Nr. | d1         | d2     | SW     | dk    | l1      | l2     | l5     |
|----------|------------|--------|--------|-------|---------|--------|--------|
|          |            | mm     | mm     | mm    | mm      | mm     | mm     |
| 3,002    | M3 x 0,35  | 2,200  | 1,800  | 2,85  | 56,000  | 7,000  | 18,000 |
| 4,002    | M4 x 0,35  | 2,800  | 2,100  | 3,85  | 63,000  | 8,000  | 21,000 |
| 4,003    | M4 x 0,5   | 2,800  | 2,100  | 3,80  | 63,000  | 8,000  | 21,000 |
| 5,003    | M5 x 0,5   | 3,500  | 2,700  | 4,80  | 70,000  | 10,000 | 25,000 |
| 6,003    | M6 x 0,5   | 4,500  | 3,400  | 5,75  | 80,000  | 13,000 | 30,000 |
| 6,004    | M6 x 0,75  | 4,500  | 3,400  | 5,65  | 80,000  | 13,000 | 30,000 |
| 8,004    | M8 x 0,75  | 6,000  | 4,900  | 7,65  | 80,000  | 14,000 | 30,000 |
| 8,005    | M8 x 1     | 6,000  | 4,900  | 7,55  | 90,000  | 17,000 | 35,000 |
| 9,005    | M9 x 1     | 7,000  | 5,500  | 8,55  | 90,000  | 16,000 | 35,000 |
| 10,004   | M10 x 0,75 | 7,000  | 5,500  | 9,65  | 90,000  | 16,000 | 35,000 |
| 10,005   | M10 x 1    | 7,000  | 5,500  | 9,55  | 90,000  | 16,000 | 35,000 |
| 10,006   | M10 x 1,25 | 7,000  | 5,500  | 9,40  | 100,000 | 20,000 | 39,000 |
| 11,005   | M11 x 1    | 8,000  | 6,200  | 10,55 | 90,000  | 20,000 | 33,000 |
| 12,005   | M12 x 1    | 9,000  | 7,000  | 11,55 | 100,000 | 20,000 | 40,000 |
| 12,006   | M12 x 1,25 | 9,000  | 7,000  | 11,40 | 100,000 | 20,000 | 40,000 |
| 12,007   | M12 x 1,5  | 9,000  | 7,000  | 11,30 | 100,000 | 20,000 | 40,000 |
| 14,005   | M14 x 1    | 11,000 | 9,000  | 13,55 | 100,000 | 20,000 | 40,000 |
| 14,006   | M14 x 1,25 | 11,000 | 9,000  | 13,40 | 100,000 | 20,000 | 40,000 |
| 14,007   | M14 x 1,5  | 11,000 | 9,000  | 13,30 | 100,000 | 20,000 | 40,000 |
| 16,005   | M16 x 1    | 12,000 | 9,000  | 15,55 | 100,000 | 22,000 | 44,000 |
| 16,007   | M16 x 1,5  | 12,000 | 9,000  | 15,30 | 100,000 | 22,000 | 44,000 |
| 18,005   | M18 x 1    | 14,000 | 11,000 | 17,55 | 110,000 | 25,000 | 44,000 |
| 18,007   | M18 x 1,5  | 14,000 | 11,000 | 17,30 | 110,000 | 25,000 | 44,000 |
| 18,008   | M18 x 2    | 14,000 | 11,000 | 17,10 | 125,000 | 30,000 | 58,000 |
| 20,005   | M20 x 1    | 16,000 | 12,000 | 19,55 | 125,000 | 25,000 | 44,000 |
| 20,007   | M20 x 1,5  | 16,000 | 12,000 | 19,30 | 125,000 | 25,000 | 44,000 |
| 20,008   | M20 x 2    | 16,000 | 12,000 | 19,10 | 140,000 | 32,000 | 60,000 |
| 22,005   | M22 x 1    | 18,000 | 14,500 | 21,55 | 125,000 | 25,000 | 44,000 |
| 22,007   | M22 x 1,5  | 18,000 | 14,500 | 21,30 | 125,000 | 25,000 | 44,000 |
| 22,008   | M22 x 2    | 18,000 | 14,500 | 21,10 | 140,000 | 32,000 | 62,000 |
| 24,005   | M24 x 1    | 18,000 | 14,500 | 23,55 | 140,000 | 28,000 | 48,000 |
| 24,007   | M24 x 1,5  | 18,000 | 14,500 | 23,30 | 140,000 | 28,000 | 48,000 |
| 24,008   | M24 x 2    | 18,000 | 14,500 | 23,10 | 140,000 | 28,000 | 48,000 |

## Gewindeformer mit Schmiernuten

### Gewindeformer für UNC-Gewinde



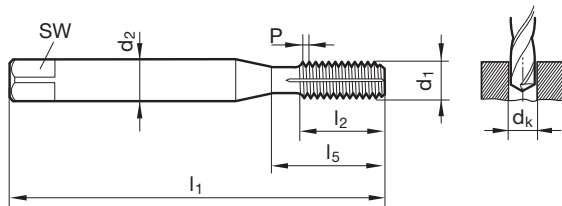
Katalog-Nr. 53633



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|---|---|---|---|---|---|
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Arbeitsrichtwerte  
Seite 258-279

- für Durchgangs- und Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- formbare Gusswerkstoffe
- formbare Nichteisenmetalle
- Sonderlegierungen



| Code-Nr. | d1        | d2     | SW     | dk    | l1      | l2     | l5     |
|----------|-----------|--------|--------|-------|---------|--------|--------|
|          | mm        | mm     | mm     | mm    | mm      | mm     | mm     |
| 2,845    | 4 - 40    | 3,500  | 2,700  | 2,55  | 56,000  | 11,000 | 18,000 |
| 3,505    | 6 - 32    | 4,000  | 3,000  | 3,15  | 56,000  | 12,000 | 20,000 |
| 4,166    | 8 - 32    | 4,500  | 3,400  | 3,80  | 63,000  | 12,000 | 21,000 |
| 4,826    | 10 - 24   | 6,000  | 4,900  | 4,35  | 70,000  | 14,000 | 25,000 |
| 5,486    | 12 - 24   | 6,000  | 4,900  | 5,00  | 80,000  | 16,000 | 30,000 |
| 6,350    | 1/4 - 20  | 7,000  | 5,500  | 5,75  | 80,000  | 16,000 | 30,000 |
| 7,938    | 5/16 - 18 | 8,000  | 6,200  | 7,30  | 90,000  | 18,000 | 35,000 |
| 9,525    | 3/8 - 16  | 10,000 | 8,000  | 8,80  | 90,000  | 20,000 | 35,000 |
| 11,113   | 7/16 - 14 | 8,000  | 6,200  | 10,30 | 100,000 | 22,000 | 42,000 |
| 12,700   | 1/2 - 13  | 9,000  | 7,000  | 11,80 | 100,000 | 25,000 | 40,000 |
| 14,288   | 9/16 - 12 | 11,000 | 9,000  | 13,30 | 100,000 | 28,000 | 40,000 |
| 15,875   | 5/8 - 11  | 12,000 | 9,000  | 14,80 | 100,000 | 30,000 | 44,000 |
| 19,050   | 3/4 - 10  | 14,000 | 11,000 | 17,90 | 110,000 | 33,000 | 44,000 |

## Gewindeformer mit Schmiernuten

### Gewindeformer für UNF-Gewinde



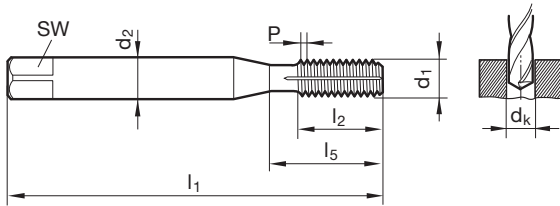
Katalog-Nr. 53634



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | • | ○ | • |   |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangs- und Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- formbare Gusswerkstoffe
- formbare Nichteisenmetalle
- Sonderlegierungen



| Code-Nr. | d1        | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|----------|-----------|----------|----------|----------|----------|----------|----------|
| 2,845    | 4 - 48    | 3,500    | 2,700    | 2,60     | 56,000   | 10,000   | 18,000   |
| 3,505    | 6 - 40    | 4,000    | 3,000    | 3,20     | 56,000   | 11,000   | 20,000   |
| 4,166    | 8 - 36    | 4,500    | 3,400    | 3,85     | 63,000   | 12,000   | 21,000   |
| 4,826    | 10 - 32   | 6,000    | 4,900    | 4,45     | 70,000   | 14,000   | 25,000   |
| 5,486    | 12 - 28   | 6,000    | 4,900    | 5,10     | 80,000   | 16,000   | 30,000   |
| 6,350    | 1/4 - 28  | 7,000    | 5,500    | 5,95     | 80,000   | 16,000   | 30,000   |
| 7,938    | 5/16 - 24 | 8,000    | 6,200    | 7,45     | 90,000   | 18,000   | 35,000   |
| 9,525    | 3/8 - 24  | 10,000   | 8,000    | 9,05     | 100,000  | 18,000   | 39,000   |
| 11,113   | 7/16 - 20 | 8,000    | 6,200    | 10,55    | 100,000  | 22,000   | 42,000   |
| 12,700   | 1/2 - 20  | 9,000    | 7,000    | 12,10    | 100,000  | 20,000   | 40,000   |
| 14,288   | 9/16 - 18 | 11,000   | 9,000    | 13,65    | 100,000  | 22,000   | 40,000   |
| 15,875   | 5/8 - 18  | 12,000   | 9,000    | 15,25    | 100,000  | 22,000   | 44,000   |
| 19,050   | 3/4 - 16  | 14,000   | 11,000   | 18,35    | 110,000  | 25,000   | 44,000   |

## Gewindeformer ohne Schmiernuten

### Gewindeformer für Whitworth-Rohrgewinde



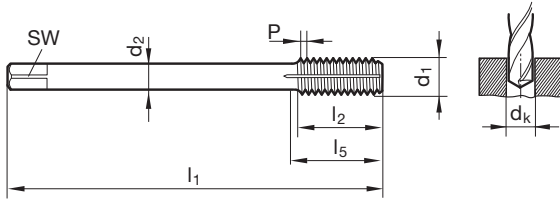
Katalog-Nr. 53635



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | • | ○ | • |   |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangs- und Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- formbare Gusswerkstoffe
- formbare Nichteisenmetalle
- Sonderlegierungen



| Code-Nr. | d1   | P<br>G/inch | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|----------|------|-------------|----------|----------|----------|----------|----------|----------|
| 9,728    | G1/8 | 28          | 7,000    | 5,500    | 9,30     | 90,000   | 18,000   | 35,000   |
| 13,157   | G1/4 | 19          | 11,000   | 9,000    | 12,50    | 100,000  | 20,000   | 40,000   |
| 16,662   | G3/8 | 19          | 12,000   | 9,000    | 16,00    | 100,000  | 22,000   | 44,000   |
| 20,955   | G1/2 | 14          | 16,000   | 12,000   | 20,00    | 125,000  | 25,000   | 44,000   |

## Gewindeformer mit Schmiernuten

### Kühlkanal-Gewindeformer für Metr. ISO-Gewinde



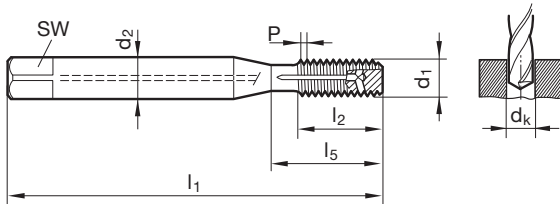
Katalog-Nr. 53610

|                       |                 |          |              |      |          |     |
|-----------------------|-----------------|----------|--------------|------|----------|-----|
| Durativ<br><b>N-X</b> | ~DIN<br>371/376 | <b>C</b> | HSS-E-<br>PM | TiCN | <b>R</b> | 6HX |
|-----------------------|-----------------|----------|--------------|------|----------|-----|

|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| •        | •        | •        | ○        | •        |          |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangs- und Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- formbare Gusswerkstoffe
- formbare Nichteisenmetalle
- Sonderlegierungen
- radialer Kühlmittelaustritt



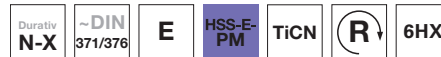
| d1         | P     | d2     | SW     | dk    | l1      | l2     | l5     |
|------------|-------|--------|--------|-------|---------|--------|--------|
|            | mm    | mm     | mm     | mm    | mm      | mm     | mm     |
| <b>M5</b>  | 0,800 | 6,000  | 4,900  | 4,65  | 70,000  | 8,500  | 25,000 |
| <b>M6</b>  | 1,000 | 6,000  | 4,900  | 5,55  | 80,000  | 11,000 | 30,000 |
| <b>M8</b>  | 1,250 | 8,000  | 6,200  | 7,40  | 90,000  | 14,000 | 35,000 |
| <b>M10</b> | 1,500 | 10,000 | 8,000  | 9,30  | 100,000 | 16,000 | 39,000 |
| <b>M12</b> | 1,750 | 9,000  | 7,000  | 11,20 | 110,000 | 18,500 | 49,000 |
| <b>M14</b> | 2,000 | 11,000 | 9,000  | 13,10 | 110,000 | 20,000 | 53,000 |
| <b>M16</b> | 2,000 | 12,000 | 9,000  | 15,10 | 110,000 | 20,000 | 54,000 |
| <b>M20</b> | 2,500 | 16,000 | 12,000 | 18,90 | 140,000 | 25,000 | 62,000 |

## Gewindeformer mit Schmiernuten

### Kühlkanal-Gewindeformer für Metr. ISO-Gewinde



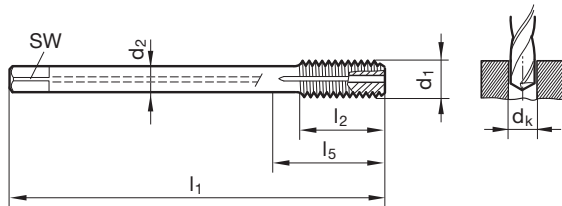
Katalog-Nr. 53618



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ○ | ● |   |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangs- und Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- formbare Gusswerkstoffe
- formbare Nichteisenmetalle
- Sonderlegierungen
- mit innenliegendem Kühlkanal ≥ M5
- kurzer Anschnitt für Gewindetiefen nahe Bohrungsgrund



| d1   | P     | d2     | SW     | dk    | l1      | l2     | l5     |
|------|-------|--------|--------|-------|---------|--------|--------|
|      | mm    | mm     | mm     | mm    | mm      | mm     | mm     |
| M2   | 0,400 | 2,800  | 2,100  | 1,85  | 45,000  | 8,000  | 13,500 |
| M2,5 | 0,450 | 2,800  | 2,100  | 2,30  | 50,000  | 9,000  | 14,500 |
| M3   | 0,500 | 3,500  | 2,700  | 2,80  | 56,000  | 10,000 | 18,000 |
| M4   | 0,700 | 4,500  | 3,400  | 3,70  | 63,000  | 12,000 | 21,000 |
| M5   | 0,800 | 6,000  | 4,900  | 4,65  | 70,000  | 8,500  | 25,000 |
| M6   | 1,000 | 6,000  | 4,900  | 5,55  | 80,000  | 11,000 | 30,000 |
| M8   | 1,250 | 8,000  | 6,200  | 7,40  | 90,000  | 14,000 | 35,000 |
| M10  | 1,500 | 10,000 | 8,000  | 9,30  | 100,000 | 16,000 | 39,000 |
| M12  | 1,750 | 9,000  | 7,000  | 11,20 | 110,000 | 18,500 | 49,000 |
| M14  | 2,000 | 11,000 | 9,000  | 13,10 | 110,000 | 20,000 | 53,000 |
| M16  | 2,000 | 12,000 | 9,000  | 15,10 | 110,000 | 20,000 | 54,000 |
| M20  | 2,500 | 16,000 | 12,000 | 18,90 | 140,000 | 25,000 | 62,000 |

## Gewindeformer mit Schmiernuten

### Kühlkanal-Gewindeformer für Metr. ISO-Feingewinde



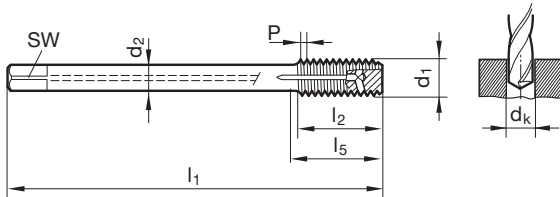
Katalog-Nr. 53612

|                       |                    |          |              |      |          |     |
|-----------------------|--------------------|----------|--------------|------|----------|-----|
| Durativ<br><b>N-X</b> | ~DIN<br><b>374</b> | <b>C</b> | HSS-E-<br>PM | TiCN | <b>R</b> | 6HX |
|-----------------------|--------------------|----------|--------------|------|----------|-----|

|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| •        | •        | •        | ○        | •        |          |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangs- und Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- formbare Gusswerkstoffe
- formbare Nichteisenmetalle
- Sonderlegierungen
- radialer Kühlmittelaustritt



| Code-Nr. | d1         | d2<br>mm | SW<br>mm | d <sub>k</sub><br>mm | l <sub>1</sub><br>mm | l <sub>2</sub><br>mm | l <sub>5</sub><br>mm |
|----------|------------|----------|----------|----------------------|----------------------|----------------------|----------------------|
| 8,005    | M8 x 1     | 6,000    | 4,900    | 7,55                 | 90,000               | 11,000               | 35,000               |
| 10,005   | M10 x 1    | 7,000    | 5,500    | 9,55                 | 90,000               | 11,000               | 35,000               |
| 10,006   | M10 x 1,25 | 7,000    | 5,500    | 9,40                 | 100,000              | 14,000               | 39,000               |
| 12,006   | M12 x 1,25 | 9,000    | 7,000    | 11,40                | 100,000              | 16,000               | 40,000               |
| 12,007   | M12 x 1,5  | 9,000    | 7,000    | 11,30                | 100,000              | 16,000               | 40,000               |
| 14,006   | M14 x 1,25 | 11,000   | 9,000    | 13,40                | 100,000              | 15,000               | 40,000               |
| 14,007   | M14 x 1,5  | 11,000   | 9,000    | 13,30                | 100,000              | 15,000               | 40,000               |
| 16,007   | M16 x 1,5  | 12,000   | 9,000    | 15,30                | 100,000              | 15,000               | 44,000               |
| 20,007   | M20 x 1,5  | 16,000   | 12,000   | 19,30                | 125,000              | 16,000               | 44,000               |

## Gewindeformer mit Schmiernuten

### Kühlkanal-Gewindeformer für Metr. ISO-Feingewinde



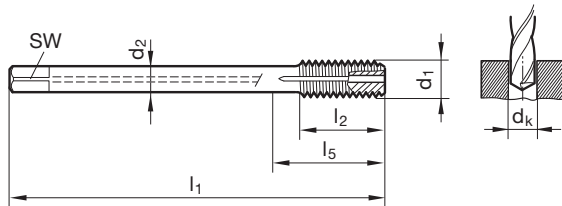
Katalog-Nr. 53619

|                       |                    |          |              |      |          |     |
|-----------------------|--------------------|----------|--------------|------|----------|-----|
| Durativ<br><b>N-X</b> | ~DIN<br><b>374</b> | <b>E</b> | HSS-E-<br>PM | TiCN | <b>R</b> | 6HX |
|-----------------------|--------------------|----------|--------------|------|----------|-----|

|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| •        | •        | •        | ○        | •        |          |

Arbeitsrichtwerte  
Seite 258-279

- für Durchgangs- und Grundgewinde
- Stahlwerkstoffe bis 1200 N/mm<sup>2</sup>
- rost-/säurebeständige Stähle
- formbare Gusswerkstoffe
- formbare Nichteisenmetalle
- Sonderlegierungen
- mit axialem Kühlkanal



| Code-Nr.      | d1         | d2<br>mm | SW<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm |
|---------------|------------|----------|----------|----------|----------|----------|----------|
| <b>8,005</b>  | M8 x 1     | 6,000    | 4,900    | 7,55     | 90,000   | 11,000   | 35,000   |
| <b>10,005</b> | M10 x 1    | 7,000    | 5,500    | 9,55     | 90,000   | 11,000   | 35,000   |
| <b>10,006</b> | M10 x 1,25 | 7,000    | 5,500    | 9,40     | 100,000  | 14,000   | 39,000   |
| <b>12,006</b> | M12 x 1,25 | 9,000    | 7,000    | 11,40    | 100,000  | 16,000   | 40,000   |
| <b>12,007</b> | M12 x 1,5  | 9,000    | 7,000    | 11,30    | 100,000  | 16,000   | 40,000   |
| <b>14,006</b> | M14 x 1,25 | 11,000   | 9,000    | 13,40    | 100,000  | 15,000   | 40,000   |
| <b>14,007</b> | M14 x 1,5  | 11,000   | 9,000    | 13,30    | 100,000  | 15,000   | 40,000   |
| <b>16,007</b> | M16 x 1,5  | 12,000   | 9,000    | 15,30    | 100,000  | 15,000   | 44,000   |
| <b>20,007</b> | M20 x 1,5  | 16,000   | 12,000   | 19,30    | 125,000  | 16,000   | 44,000   |



## Bohrgewindefräser

### Bohrgewindefräser für Metrische ISO-Gewinde



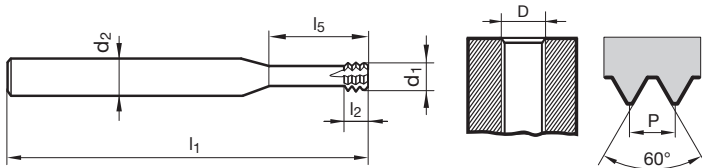
Katalog-Nr. 53948



|   |   |   |   |   |      |
|---|---|---|---|---|------|
| P | M | K | N | S | H    |
| • | • | • | • | • | ≤ 66 |

Arbeitsrichtwerte  
Seite 258-279

- zirkulares Gewindefräsen, Kernloch und Gewinde in einem Arbeitsgang
- universeller Einsatz, auch für gehärtete Stähle bis 66 HRC
- linksschneidendes Werkzeug für höchste Stabilität beim Gleichlaufräsen
- mit Kühlrillen am Schaft
- für Gewindetiefen bis 2,5xD



| Code-Nr. | D               | P<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l5<br>mm | Z |
|----------|-----------------|---------|----------|----------|----------|----------|----------|---|
| 2,000    | M2              | 0,400   | 1,400    | 3,000    | 39,000   | 1,200    | 5,000    | 4 |
| 2,500    | M2,5            | 0,450   | 1,800    | 3,000    | 39,000   | 1,300    | 6,500    | 4 |
| 3,000    | M3              | 0,500   | 2,400    | 6,000    | 58,000   | 1,500    | 7,500    | 4 |
| 3,500    | M3,5            | 0,600   | 2,700    | 6,000    | 58,000   | 1,800    | 9,000    | 4 |
| 4,000    | M4              | 0,700   | 3,100    | 6,000    | 58,000   | 2,100    | 10,000   | 4 |
| 5,000    | M5              | 0,800   | 3,800    | 6,000    | 58,000   | 2,400    | 12,500   | 4 |
| 6,000    | M6              | 1,000   | 4,600    | 8,000    | 64,000   | 3,000    | 15,000   | 4 |
| 6,003    | M5x0,5/M6x0,5   | 0,500   | 3,800    | 8,000    | 58,000   | 1,500    | 15,000   | 4 |
| 8,000    | M8              | 1,250   | 6,200    | 8,000    | 64,000   | 3,600    | 20,000   | 4 |
| 8,004    | M6x0,75/M8x0,75 | 0,750   | 4,600    | 8,000    | 64,000   | 2,300    | 20,000   | 4 |
| 10,000   | M10             | 1,500   | 7,500    | 10,000   | 73,000   | 4,500    | 25,000   | 4 |
| 12,000   | M12             | 1,750   | 9,000    | 10,000   | 73,000   | 5,200    | 30,000   | 4 |
| 12,005   | M10x1/M12x1     | 1,000   | 7,500    | 10,000   | 64,000   | 3,000    | 25,000   | 4 |
| 16,000   | M16             | 2,000   | 11,500   | 12,000   | 90,000   | 6,000    | 40,000   | 4 |
| 16,007   | M14x1,5/M16x1,5 | 1,500   | 11,500   | 12,000   | 90,000   | 4,500    | 40,000   | 4 |

## Bohrgewindefräser

### Bohrgewindefräser für UNC-/UNF-Gewinde

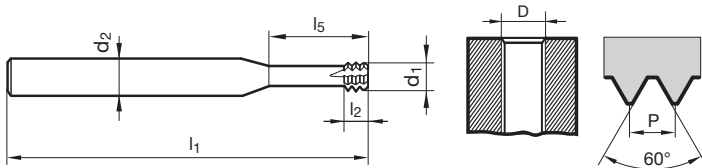


Katalog-Nr. 53949



|   |   |   |   |   |      |
|---|---|---|---|---|------|
| P | M | K | N | S | H    |
| • | • | • | • | • | ≤ 66 |

Arbeitsrichtwerte  
Seite 258-279



- zirkulares Gewindefräsen, Kernloch und Gewinde in einem Arbeitsgang
- universeller Einsatz, auch für gehärtete Stähle bis 66 HRC
- linksschneidendes Werkzeug für höchste Stabilität beim Gleichlaufräsen
- mit Kühlrillen am Schaft
- für Gewindetiefen bis 2,5xD

| Code-Nr. | D                 | P<br>G/inch | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l5<br>mm | Z |
|----------|-------------------|-------------|----------|----------|----------|----------|----------|---|
| 1,853    | UNF No 1          | 72          | 1,400    | 3,000    | 39,000   | 1,100    | 5,000    | 4 |
| 1,854    | UNC No 1+UNF No 2 | 64          | 1,400    | 3,000    | 39,000   | 1,200    | 5,000    | 4 |
| 2,184    | UNC No 2+UNF No 3 | 56          | 1,600    | 3,000    | 39,000   | 1,400    | 5,500    | 4 |
| 2,515    | UNC No 3+UNF No 4 | 48          | 1,900    | 3,000    | 39,000   | 1,600    | 6,500    | 4 |
| 2,845    | UNC No 4          | 40          | 2,100    | 6,000    | 58,000   | 1,900    | 7,500    | 4 |
| 3,175    | UNC No 5+UNF No 6 | 40          | 2,400    | 6,000    | 58,000   | 1,900    | 8,000    | 4 |
| 3,505    | UNC No 6          | 32          | 2,600    | 6,000    | 58,000   | 2,400    | 9,000    | 4 |
| 4,165    | UNF No 8          | 36          | 3,200    | 6,000    | 58,000   | 2,100    | 10,500   | 4 |
| 4,166    | UNC No 8          | 32          | 3,100    | 6,000    | 58,000   | 2,400    | 10,500   | 4 |
| 4,825    | UNF No10          | 32          | 3,600    | 6,000    | 58,000   | 2,400    | 12,500   | 4 |
| 4,826    | UNC No10+UNC No12 | 24          | 3,600    | 6,000    | 58,000   | 3,200    | 12,500   | 4 |
| 5,485    | UNF No12          | 28          | 4,100    | 6,000    | 58,000   | 2,700    | 14,000   | 4 |
| 6,349    | UNF 1/4           | 28          | 4,800    | 6,000    | 58,000   | 2,700    | 16,000   | 4 |
| 6,350    | UNC 1/4           | 20          | 4,800    | 6,000    | 58,000   | 3,800    | 16,000   | 4 |
| 7,937    | UNF 5/16+UNF 3/8  | 24          | 6,300    | 8,000    | 64,000   | 3,200    | 20,000   | 4 |
| 7,938    | UNC 5/16          | 18          | 6,300    | 8,000    | 64,000   | 4,200    | 20,000   | 4 |
| 9,525    | UNC 3/8           | 16          | 7,200    | 8,000    | 64,000   | 4,800    | 24,000   | 4 |
| 11,112   | UNF 7/16          | 20          | 8,300    | 10,000   | 73,000   | 3,800    | 28,000   | 4 |
| 11,113   | UNC 7/16          | 14          | 8,300    | 10,000   | 73,000   | 5,400    | 28,000   | 4 |
| 12,700   | UNF 1/2           | 20          | 9,700    | 10,000   | 73,000   | 3,800    | 31,000   | 4 |
| 15,874   | UNF 5/8           | 18          | 11,800   | 12,000   | 90,000   | 4,200    | 40,000   | 4 |

## Bohrgewindefräser

### Bohrgewindefräser für Rohrgewinde



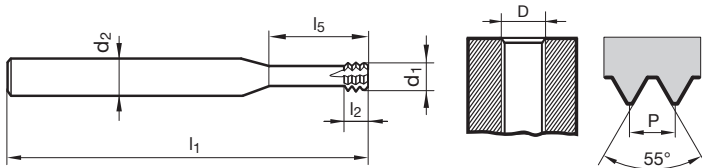
Katalog-Nr. 53950



|   |   |   |   |   |      |
|---|---|---|---|---|------|
| P | M | K | N | S | H    |
| • | • | • | • | • | ≤ 66 |

Arbeitsrichtwerte  
Seite 258-279

- zirkulares Gewindefräsen, Kernloch und Gewinde in einem Arbeitsgang
- universeller Einsatz, auch für gehärtete Stähle bis 66 HRC
- linksschneidendes Werkzeug für höchste Stabilität beim Gleichlaufräsen
- mit Kühlrillen am Schaft
- für Gewindetiefen bis  $2,5 \times D$



| Code-Nr. | D              | P<br>G/inch | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l5<br>mm | Z |
|----------|----------------|-------------|----------|----------|----------|----------|----------|---|
| 9,728    | G1/16-G1/8     | 28          | 6,100    | 8,000    | 64,000   | 2,700    | 24,000   | 4 |
| 16,662   | G1/4-G3/8      | 19          | 10,300   | 12,000   | 90,000   | 4,000    | 40,000   | 4 |
| 26,441   | G1/2-G5/8-G3/4 | 14          | 15,700   | 16,000   | 105,000  | 5,400    | 50,000   | 4 |

## Gewindefräser

### Gewindefräser mit Senkfase für Metrische ISO-Gewinde



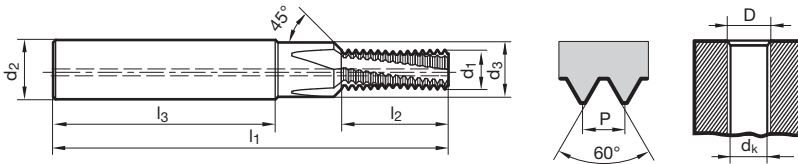
Katalog-Nr. 53890



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 258-279

- universelle Verwendung
- mit Innenkühlung ab M4
- erhöhte Schneidenzahl für kürzeste Bearbeitungszeiten
- sehr hohe Prozesssicherheit durch neue Geometrie
- für Gewindetiefen bis 2xD



| Code-Nr. | D          | P<br>mm | d1<br>mm | d2<br>mm | d3<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | Z |
|----------|------------|---------|----------|----------|----------|----------|----------|----------|----------|---|
| 3,000    | M3         | 0,500   | 2,300    | 6,000    | 3,400    | 2,50     | 48,000   | 6,800    | 36,000   | 5 |
| 4,000    | M4         | 0,700   | 3,100    | 6,000    | 4,500    | 3,30     | 48,000   | 8,800    | 36,000   | 5 |
| 4,003    | M4 x 0,5   | 0,500   | 3,100    | 6,000    | 4,500    | 3,50     | 48,000   | 8,800    | 36,000   | 5 |
| 5,000    | M5         | 0,800   | 4,000    | 6,000    | 5,500    | 4,20     | 54,000   | 10,800   | 36,000   | 5 |
| 5,003    | M5 x 0,5   | 0,500   | 4,000    | 6,000    | 5,500    | 4,50     | 54,000   | 10,800   | 36,000   | 5 |
| 6,000    | M6         | 1,000   | 4,700    | 8,000    | 6,600    | 5,00     | 62,000   | 13,500   | 36,000   | 6 |
| 6,003    | M6 x 0,5   | 0,500   | 4,700    | 8,000    | 6,600    | 5,50     | 62,000   | 12,800   | 36,000   | 6 |
| 6,004    | M6 x 0,75  | 0,750   | 4,700    | 8,000    | 6,600    | 5,20     | 62,000   | 13,100   | 36,000   | 6 |
| 8,000    | M8         | 1,250   | 6,300    | 10,000   | 9,000    | 6,80     | 74,000   | 18,100   | 40,000   | 7 |
| 8,005    | M8 x 1     | 1,000   | 6,300    | 10,000   | 9,000    | 7,00     | 74,000   | 17,500   | 40,000   | 7 |
| 10,000   | M10        | 1,500   | 7,800    | 12,000   | 11,000   | 8,50     | 80,000   | 21,800   | 45,000   | 7 |
| 10,005   | M10 x 1    | 1,000   | 7,800    | 12,000   | 11,000   | 9,00     | 80,000   | 21,500   | 45,000   | 7 |
| 10,006   | M10 x 1,25 | 1,250   | 7,800    | 12,000   | 11,000   | 8,80     | 80,000   | 21,900   | 45,000   | 7 |
| 12,000   | M12        | 1,750   | 9,500    | 14,000   | 13,500   | 10,20    | 90,000   | 25,400   | 45,000   | 7 |
| 12,005   | M12 x 1    | 1,000   | 9,500    | 14,000   | 13,500   | 11,00    | 90,000   | 25,500   | 45,000   | 7 |
| 12,007   | M12 x 1,5  | 1,500   | 9,500    | 14,000   | 13,500   | 10,50    | 90,000   | 26,300   | 45,000   | 7 |
| 14,000   | M14        | 2,000   | 10,800   | 16,000   | 15,500   | 12,00    | 102,000  | 31,000   | 48,000   | 7 |
| 14,007   | M14 x 1,5  | 1,500   | 10,800   | 16,000   | 15,500   | 12,50    | 102,000  | 30,800   | 48,000   | 7 |
| 16,000   | M16        | 2,000   | 12,700   | 18,000   | 17,500   | 14,00    | 102,000  | 35,000   | 48,000   | 8 |
| 16,007   | M16 x 1,5  | 1,500   | 12,700   | 18,000   | 17,500   | 14,50    | 102,000  | 33,800   | 48,000   | 8 |

## Gewindefräser

### Gewindefräser ohne Senkfase für Metr. ISO-Gewinde



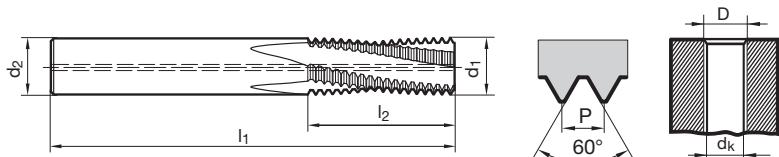
Katalog-Nr. 53860



|   |   |   |   |   |      |
|---|---|---|---|---|------|
| P | M | K | N | S | H    |
| ● | ○ | ● | ● | ○ | ≤ 55 |

Arbeitsrichtwerte  
Seite 258-279

- Gewindefräser ohne Senkfase, mit Spiralnut und innerer Kühlmittelzufuhr mit axialem Austritt
- universelle Verwendung
- extralange Ausführung für Gewindetiefen bis 2,5xD



| Code-Nr. | D   | P<br>mm | d1<br>mm | d2<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | Z |
|----------|-----|---------|----------|----------|----------|----------|----------|---|
| 6,000    | M6  | 1,000   | 4,800    | 6,000    | 5,00     | 54,000   | 16,500   | 3 |
| 8,000    | M8  | 1,250   | 6,400    | 8,000    | 6,80     | 62,000   | 21,900   | 3 |
| 10,000   | M10 | 1,500   | 7,950    | 10,000   | 8,50     | 74,000   | 26,300   | 3 |
| 12,000   | M12 | 1,750   | 9,950    | 10,000   | 10,20    | 74,000   | 32,400   | 4 |
| 14,000   | M14 | 2,000   | 11,200   | 12,000   | 12,00    | 90,000   | 37,000   | 4 |
| 16,000   | M16 | 2,000   | 12,800   | 14,000   | 14,00    | 90,000   | 43,000   | 4 |
| 20,000   | M20 | 2,500   | 14,950   | 16,000   | 17,50    | 102,000  | 48,800   | 4 |

Gewindewerkzeuge

## Gewindefräser

### Gewindefräser ohne Senkfase für Metr. ISO-Gewinde



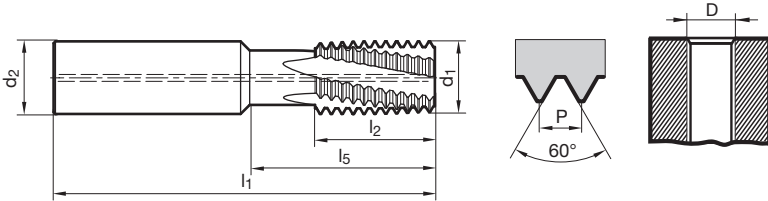
Katalog-Nr. 73830



|   |   |   |   |   |      |
|---|---|---|---|---|------|
| P | M | K | N | S | H    |
| • | • | • | • | • | ≤ 55 |

Arbeitsrichtwerte  
Seite 258-279

- Gewindefräser ohne Senkfase, mit Spiralnut und innerer Kühlmittelzufuhr mit axialem Austritt
- Universalgewindefräser für Innengewinde M / MF
- für Gewindetiefen bis 2xD



| Code-Nr. | D    | P<br>mm | d1<br>mm | d2<br>mm | l1<br>mm | l2<br>mm | l5<br>mm | Z |
|----------|------|---------|----------|----------|----------|----------|----------|---|
| 8,050    | > 10 | 0,500   | 7,950    | 8,000    | 64,000   | 20,000   | 20,000   | 4 |
| 10,100   | > 12 | 1,000   | 9,950    | 10,000   | 70,000   | 16,000   | 25,000   | 4 |
| 10,125   | > 14 | 1,250   | 9,950    | 10,000   | 70,000   | 16,000   | 25,000   | 4 |
| 10,150   | > 14 | 1,500   | 9,950    | 10,000   | 70,000   | 16,000   | 25,000   | 4 |
| 12,100   | > 16 | 1,000   | 11,950   | 12,000   | 80,000   | 20,000   | 31,000   | 4 |
| 12,125   | > 16 | 1,250   | 11,950   | 12,000   | 80,000   | 20,000   | 31,000   | 4 |
| 12,150   | > 16 | 1,500   | 11,950   | 12,000   | 80,000   | 20,000   | 31,000   | 4 |
| 16,100   | > 18 | 1,000   | 15,950   | 16,000   | 90,000   | 25,000   | 40,000   | 5 |
| 16,150   | > 20 | 1,500   | 15,950   | 16,000   | 90,000   | 25,000   | 40,000   | 5 |
| 16,200   | > 22 | 2,000   | 15,950   | 16,000   | 90,000   | 25,000   | 40,000   | 5 |
| 18,300   | > 24 | 3,000   | 17,950   | 18,000   | 102,000  | 33,000   | 50,000   | 5 |
| 20,100   | > 24 | 1,000   | 19,950   | 20,000   | 105,000  | 33,000   | 50,000   | 5 |
| 20,150   | > 26 | 1,500   | 19,950   | 20,000   | 105,000  | 33,000   | 50,000   | 5 |
| 20,200   | > 26 | 2,000   | 19,950   | 20,000   | 105,000  | 33,000   | 50,000   | 5 |
| 20,250   | > 26 | 2,500   | 19,950   | 20,000   | 105,000  | 33,000   | 50,000   | 5 |
| 20,300   | > 27 | 3,000   | 19,950   | 20,000   | 105,000  | 33,000   | 50,000   | 5 |
| 20,350   | > 30 | 3,500   | 19,950   | 20,000   | 105,000  | 33,000   | 50,000   | 5 |

## Gewindefräser

### Gewindefräser ohne Senkfase für Whitworth-Rohrgewinde



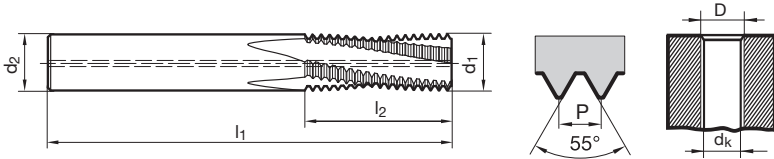
Katalog-Nr. 53831



|          |   |   |   |   |      |
|----------|---|---|---|---|------|
| <b>P</b> | ○ | ● | ● | ○ | ≤ 55 |
|----------|---|---|---|---|------|

Arbeitsrichtwerte  
Seite 258-279

- Gewindefräser ohne Senkfase, mit Spiralnut und innerer Kühlmittelzufuhr mit axialem Austritt
- universelle Verwendung
- für Gewindetiefen bis 2xD



| Code-Nr. | D    | P<br>G/inch | d1<br>mm | d2<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | Z |
|----------|------|-------------|----------|----------|----------|----------|----------|---|
| 9,728    | G1/8 | 28          | 7,950    | 8,000    | 8,80     | 64,000   | 21,300   | 3 |
| 13,157   | G1/4 | 19          | 10,500   | 12,000   | 11,80    | 90,000   | 28,700   | 4 |
| 16,662   | G3/8 | 19          | 13,600   | 14,000   | 15,25    | 90,000   | 35,400   | 4 |

## Gewindefräser

### Mehrbereichsgewindefräser für Whitworth-Rohrgewinde



Katalog-Nr. 53832

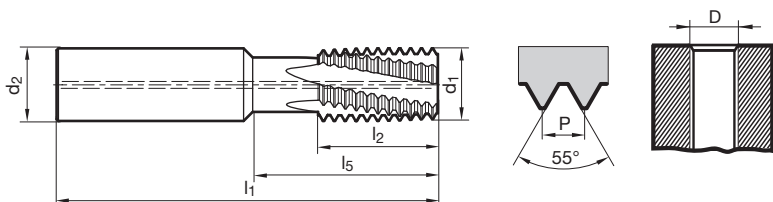


|   |   |   |   |   |      |
|---|---|---|---|---|------|
| P | M | K | N | S | H    |
| • | • | • | • | • | ≤ 55 |

Arbeitsrichtwerte  
Seite 258-279

- Gewindefräser ohne Senkfase, mit Spiralnut und innerer Kühlmittelzufuhr mit axialem Austritt
- Universalgewindefräser für Innengewinde
- für Gewindetiefen bis 2xD

Gewindewerkzeuge



| Code-Nr. | D     | P<br>G/inch | d1<br>mm | d2<br>mm | l1<br>mm | l5<br>mm | l2<br>mm | Z |
|----------|-------|-------------|----------|----------|----------|----------|----------|---|
| 10,190   | ≥ 1/4 | 19          | 9,950    | 10,000   | 70,000   | 25,000   | 16,000   | 4 |
| 16,140   | ≥ 1/2 | 14          | 15,950   | 16,000   | 90,000   | 40,000   | 25,000   | 5 |
| 20,110   | ≥ 1   | 11          | 19,950   | 20,000   | 105,000  | 50,000   | 33,000   | 5 |



## Gewindefräser

### Mikrogewindefräser für Metrische ISO-Gewinde



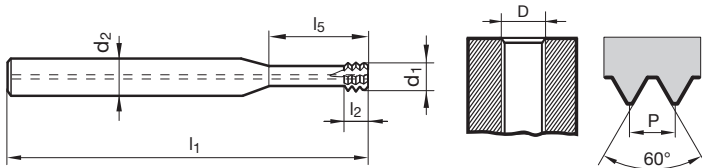
Katalog-Nr. 53892



|   |   |   |   |   |      |
|---|---|---|---|---|------|
| P | M | K | N | S | H    |
| • | • | • | • | • | ≤ 55 |

Arbeitsrichtwerte  
Seite 258-279

- universelle Verwendung
- M1.6 - M3 mit 2 Kühlrillen
- mit Innenkühlung ab M3.5
- linksschneidende Geometrie
- erhöhte Schneidzahl für kürzeste Bearbeitungszeiten



| Code-Nr. | D    | P<br>mm | d1<br>mm | d2<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm | Z |
|----------|------|---------|----------|----------|----------|----------|----------|----------|---|
| 1,600    | M1,6 | 0,350   | 1,200    | 3,000    | 1,25     | 39,000   | 1,100    | 4,800    | 3 |
| 1,800    | M1,8 | 0,350   | 1,400    | 3,000    | 1,45     | 39,000   | 1,100    | 5,400    | 4 |
| 2,000    | M2   | 0,400   | 1,550    | 3,000    | 1,60     | 39,000   | 1,200    | 6,000    | 4 |
| 2,500    | M2,5 | 0,450   | 1,950    | 3,000    | 2,05     | 39,000   | 1,400    | 7,500    | 4 |
| 3,000    | M3   | 0,500   | 2,400    | 3,000    | 2,50     | 39,000   | 1,500    | 9,500    | 5 |
| 3,500    | M3,5 | 0,600   | 2,800    | 6,000    | 2,90     | 58,000   | 1,800    | 11,000   | 5 |
| 4,000    | M4   | 0,700   | 3,200    | 6,000    | 3,30     | 58,000   | 2,100    | 12,500   | 5 |
| 5,000    | M5   | 0,800   | 4,000    | 6,000    | 4,20     | 58,000   | 2,400    | 16,000   | 6 |
| 6,000    | M6   | 1,000   | 4,800    | 6,000    | 5,00     | 58,000   | 3,000    | 20,000   | 6 |
| 8,000    | M8   | 1,250   | 5,950    | 8,000    | 6,80     | 73,000   | 3,800    | 24,000   | 7 |
| 10,000   | M10  | 1,500   | 7,800    | 8,000    | 8,50     | 73,000   | 4,500    | 33,000   | 7 |
| 12,000   | M12  | 1,750   | 9,000    | 10,000   | 10,20    | 84,000   | 5,300    | 38,000   | 7 |
| 16,000   | M16  | 2,000   | 11,800   | 12,000   | 14,00    | 100,000  | 6,000    | 48,000   | 8 |
| 20,000   | M20  | 2,500   | 15,000   | 16,000   | 17,50    | 105,000  | 7,500    | 60,000   | 8 |

## Gewindefräser

### Mikrogewindefräser für Metrische ISO-Gewinde



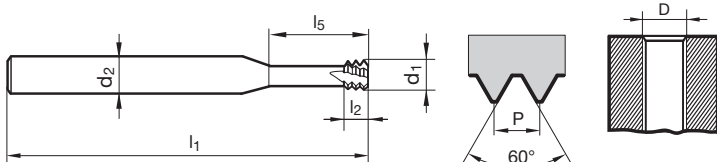
Katalog-Nr. 53840



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | • | • | • |   |

Arbeitsrichtwerte  
Seite 258-279

- universelle Verwendung
- lange Ausführung
- für Gewindetiefen bis 3xD



| Code-Nr. | D    | P<br>mm | d1<br>mm | d2<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm | Z |
|----------|------|---------|----------|----------|----------|----------|----------|----------|---|
| 1,600    | M1,6 | 0,350   | 1,200    | 3,000    | 1,25     | 39,000   | 1,100    | 4,800    | 3 |
| 1,800    | M1,8 | 0,350   | 1,400    | 3,000    | 1,45     | 39,000   | 1,100    | 5,400    | 3 |
| 2,000    | M2   | 0,400   | 1,550    | 3,000    | 1,60     | 39,000   | 1,200    | 6,000    | 4 |
| 2,500    | M2,5 | 0,450   | 1,950    | 3,000    | 2,05     | 39,000   | 1,400    | 7,500    | 4 |
| 3,000    | M3   | 0,500   | 2,400    | 6,000    | 2,50     | 58,000   | 1,500    | 9,500    | 4 |
| 3,500    | M3,5 | 0,600   | 2,800    | 6,000    | 2,90     | 58,000   | 1,800    | 11,000   | 4 |
| 4,000    | M4   | 0,700   | 3,200    | 6,000    | 3,30     | 58,000   | 2,100    | 12,500   | 4 |
| 5,000    | M5   | 0,800   | 4,000    | 6,000    | 4,20     | 58,000   | 2,400    | 16,000   | 4 |
| 6,000    | M6   | 1,000   | 4,800    | 6,000    | 5,00     | 58,000   | 3,000    | 20,000   | 4 |
| 8,000    | M8   | 1,250   | 5,950    | 6,000    | 6,80     | 58,000   | 3,800    | 24,000   | 4 |
| 10,000   | M10  | 1,500   | 7,800    | 8,000    | 8,50     | 73,000   | 4,500    | 33,000   | 4 |
| 12,000   | M12  | 1,750   | 9,000    | 10,000   | 10,20    | 84,000   | 5,300    | 38,000   | 4 |
| 16,000   | M16  | 2,000   | 11,800   | 12,000   | 14,00    | 84,000   | 6,000    | 35,000   | 5 |

## Gewindefräser

### Mikrogewindefräser für Metrische ISO-Gewinde



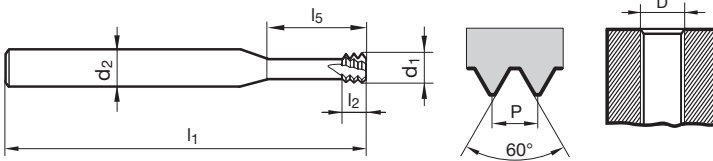
Katalog-Nr. 53850



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
|   |   |   |   | ○ | ● |

Arbeitsrichtwerte  
Seite 258-279

- für die Hartbearbeitung 45-65 HRC
- lange Ausführung
- für Gewindetiefen bis 3xD



| Code-Nr. | D    | P<br>mm | d1<br>mm | d2<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm | Z |
|----------|------|---------|----------|----------|----------|----------|----------|----------|---|
| 2,000    | M2   | 0,400   | 1,550    | 3,000    | 1,60     | 39,000   | 1,200    | 6,000    | 4 |
| 2,500    | M2,5 | 0,450   | 1,950    | 3,000    | 2,05     | 39,000   | 1,400    | 7,500    | 4 |
| 3,000    | M3   | 0,500   | 2,350    | 6,000    | 2,50     | 58,000   | 1,500    | 9,500    | 4 |
| 4,000    | M4   | 0,700   | 3,100    | 6,000    | 3,30     | 58,000   | 2,100    | 12,500   | 4 |
| 5,000    | M5   | 0,800   | 3,800    | 6,000    | 4,20     | 58,000   | 2,400    | 16,000   | 4 |
| 6,000    | M6   | 1,000   | 4,800    | 6,000    | 5,00     | 58,000   | 3,000    | 20,000   | 4 |
| 8,000    | M8   | 1,250   | 5,950    | 6,000    | 6,80     | 58,000   | 3,800    | 24,000   | 4 |
| 10,000   | M10  | 1,500   | 7,800    | 8,000    | 8,50     | 64,000   | 4,500    | 23,000   | 4 |
| 12,000   | M12  | 1,750   | 9,000    | 10,000   | 10,20    | 73,000   | 5,300    | 26,000   | 5 |

## Gewindefräser

### Mikrogewindefräser für Whitworth-Rohrgewinde



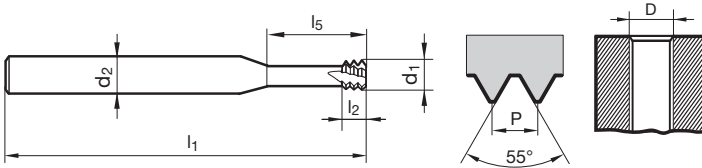
Katalog-Nr. 53841



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | • | • | • |   |

Arbeitsrichtwerte  
Seite 258-279

- universelle Verwendung
- lange Ausführung
- für Gewindetiefen bis 3xD



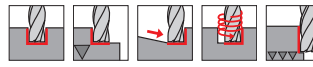
| Code-Nr. | D          | P<br>G/inch | d1<br>mm | d2<br>mm | dk<br>mm | l1<br>mm | l2<br>mm | l5<br>mm | Z |
|----------|------------|-------------|----------|----------|----------|----------|----------|----------|---|
| 9,728    | G1/16-G1/8 | 28          | 6,200    | 8,000    | 8,80     | 64,000   | 2,700    | 19,500   | 4 |
| 16,662   | G1/4-G3/8  | 19          | 9,950    | 10,000   | 15,25    | 73,000   | 4,000    | 25,000   | 4 |
| 30,201   | G1/2-G7/8  | 14          | 11,950   | 12,000   | 28,25    | 84,000   | 5,400    | 37,000   | 4 |
| 59,614   | G1-G2      | 11          | 15,950   | 16,000   | 57,00    | 105,000  | 6,900    | 44,000   | 5 |

## SuperF-UT-Fräser

### SuperF-UT-Fräser Z



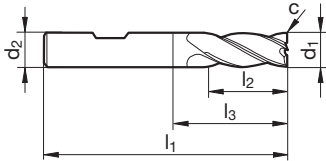
Katalog-Nr. 54577



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • |   |   | • |   |

Arbeitsrichtwerte  
Seite 280-293

- besonders stabil durch Kernsprung
- universell einsetzbar
- Werkstoffe bis 1400 N/mm<sup>2</sup>
- Mikroeckenschutz
- Zentrumschnitt
- ungleiche Teilung
- HPC-Bearbeitung in zähen, niedrig- und hochlegierten Stählen und in schwer bearbeitbaren Sonderwerkstoffen
- auch als Satz 78882 1.000 und 78882 2.000 erhältlich



| d1 h10<br>mm | d2 h6<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|--------------|-------------|----------|----------|----------|---------------|---|---------------|
| 3,000        | 6,000       | 57,000   | 8,000    | 10,900   | 0,060         | 4 | <b>3,000</b>  |
| 4,000        | 6,000       | 57,000   | 11,000   | 13,900   | 0,080         | 4 | <b>4,000</b>  |
| 5,000        | 6,000       | 57,000   | 13,000   | 15,900   | 0,100         | 4 | <b>5,000</b>  |
| 6,000        | 6,000       | 57,000   | 15,000   | 21,000   | 0,120         | 4 | <b>6,000</b>  |
| 8,000        | 8,000       | 63,000   | 20,000   | 27,000   | 0,160         | 4 | <b>8,000</b>  |
| 10,000       | 10,000      | 72,000   | 24,000   | 32,000   | 0,200         | 4 | <b>10,000</b> |
| 12,000       | 12,000      | 83,000   | 28,000   | 38,000   | 0,240         | 4 | <b>12,000</b> |
| 16,000       | 16,000      | 92,000   | 36,000   | 44,000   | 0,320         | 4 | <b>16,000</b> |
| 20,000       | 20,000      | 104,000  | 45,000   | 54,000   | 0,400         | 4 | <b>20,000</b> |

Fräswerkzeuge

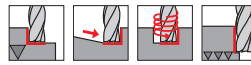
| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|----------------|-------------------------|-------|-------|-------|-------|------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   |                | 20                      | 3     | 6     | 8     | 10    | 12   | 16   | 20   |
| P   | ≤ 850 N/mm <sup>2</sup> | <b>340</b>     | 0,036                   | 0,072 | 0,096 | 0,138 | 0,17 | 0,22 | 0,28           | <b>360</b>              | 0,017 | 0,034 | 0,046 | 0,066 | 0,08 | 0,11 | 0,13 |
|     | ≥ 850 N/mm <sup>2</sup> | <b>250</b>     | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23           | <b>270</b>              | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
| M   | ≤ 750 N/mm <sup>2</sup> | <b>220</b>     | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23           | <b>240</b>              | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
|     | ≥ 750 N/mm <sup>2</sup> | <b>110</b>     | 0,024                   | 0,048 | 0,064 | 0,092 | 0,11 | 0,15 | 0,18           | <b>120</b>              | 0,011 | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 | 0,08 |
| S   | Ni-Basis                | <b>60</b>      | 0,019                   | 0,039 | 0,052 | 0,074 | 0,09 | 0,12 | 0,15           | <b>60</b>               | 0,008 | 0,017 | 0,022 | 0,032 | 0,04 | 0,05 | 0,06 |
|     | Ti-Basis                | <b>110</b>     | 0,028                   | 0,055 | 0,074 | 0,104 | 0,12 | 0,17 | 0,21           | <b>120</b>              | 0,013 | 0,026 | 0,035 | 0,050 | 0,06 | 0,08 | 0,10 |

# SuperF-UT-Fräser

## SuperF-UT-Fräser ZS



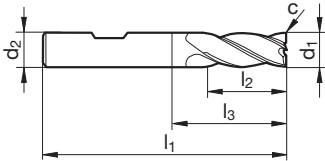
Katalog-Nr. 54578



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● |   |   | ● |   |

Arbeitsrichtwerte  
Seite 280-293

- besonders stabil durch Kernsprung
- mit Spanteiler
- universell einsetzbar
- Werkstoffe bis 1400 N/mm<sup>2</sup>
- Mikroeckenschutz
- Zentrumschnitt
- ungleiche Teilung
- HPC-Bearbeitung in zähen, niedrig- und hochlegierten Stählen und in schwer bearbeitbaren Sonderwerkstoffen



| d1 h10<br>mm | d2 h6<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|--------------|-------------|----------|----------|----------|---------------|---|---------------|
| 3,000        | 6,000       | 57,000   | 12,000   | 14,900   | 0,060         | 4 | <b>3,000</b>  |
| 4,000        | 6,000       | 65,000   | 16,000   | 18,900   | 0,080         | 4 | <b>4,000</b>  |
| 5,000        | 6,000       | 65,000   | 20,000   | 22,900   | 0,100         | 4 | <b>5,000</b>  |
| 6,000        | 6,000       | 65,000   | 24,000   | 29,000   | 0,120         | 4 | <b>6,000</b>  |
| 8,000        | 8,000       | 75,000   | 32,000   | 39,000   | 0,160         | 4 | <b>8,000</b>  |
| 10,000       | 10,000      | 90,000   | 40,000   | 50,000   | 0,200         | 4 | <b>10,000</b> |
| 12,000       | 12,000      | 100,000  | 46,000   | 55,000   | 0,240         | 4 | <b>12,000</b> |
| 16,000       | 16,000      | 108,000  | 55,000   | 60,000   | 0,320         | 4 | <b>16,000</b> |
| 20,000       | 20,000      | 126,000  | 65,000   | 76,000   | 0,400         | 4 | <b>20,000</b> |

Fräszeuge

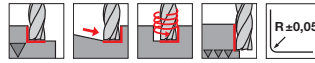
| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|-------|------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12    | 16   | 20   |      |
| P   | ≤ 850 N/mm <sup>2</sup> | <b>340</b>     | 0,036                   | 0,072 | 0,096 | 0,138 | 0,17 | 0,22 | 0,28 |                | <b>360</b>              | 0,017 | 0,034 | 0,046 | 0,066 | 0,08 | 0,11 | 0,13 |
|     | ≥ 850 N/mm <sup>2</sup> | <b>250</b>     | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 |                | <b>270</b>              | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
| M   | ≤ 750 N/mm <sup>2</sup> | <b>220</b>     | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 |                | <b>240</b>              | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
|     | ≥ 750 N/mm <sup>2</sup> | <b>110</b>     | 0,024                   | 0,048 | 0,064 | 0,092 | 0,11 | 0,15 | 0,18 |                | <b>120</b>              | 0,011 | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 | 0,08 |
| S   | Ni-Basis                | <b>60</b>      | 0,019                   | 0,039 | 0,052 | 0,074 | 0,09 | 0,12 | 0,15 |                | <b>60</b>               | 0,008 | 0,017 | 0,022 | 0,032 | 0,04 | 0,05 | 0,06 |
|     | Ti-Basis                | <b>110</b>     | 0,028                   | 0,055 | 0,074 | 0,104 | 0,12 | 0,17 | 0,21 |                | <b>120</b>              | 0,013 | 0,026 | 0,035 | 0,050 | 0,06 | 0,08 | 0,10 |

## SuperF-UT-Fräser

### SuperF-UT-Fräser ZS-r



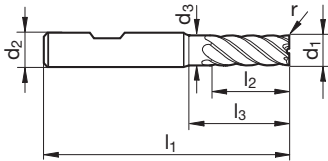
Katalog-Nr. 54555



| P | M | K | N | S | H |
|---|---|---|---|---|---|
| ● | ● | ● | ○ | ● |   |

Arbeitsrichtwerte  
Seite 280-293

- mit Spanteiler
- universell einsetzbar
- Werkstoffe bis 1400 N/mm<sup>2</sup>
- mit definierten Eckradien
- ohne Zentrumschnitt
- ungleiche Teilung
- Halsfreischliff



| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | r     | Z | Code-Nr. |
|--------------|-------------|----------|----------|----------|----------|-------|---|----------|
| 6,000        | 6,000       | 5,700    | 65,000   | 20,000   | 28,000   | 0,200 | 5 | 6,002    |
| 6,000        | 6,000       | 5,700    | 65,000   | 20,000   | 28,000   | 0,500 | 5 | 6,005    |
| 6,000        | 6,000       | 5,700    | 65,000   | 20,000   | 28,000   | 1,000 | 5 | 6,010    |
| 8,000        | 8,000       | 7,700    | 75,000   | 26,000   | 38,000   | 0,300 | 5 | 8,003    |
| 8,000        | 8,000       | 7,700    | 75,000   | 26,000   | 38,000   | 0,500 | 5 | 8,005    |
| 8,000        | 8,000       | 7,700    | 75,000   | 26,000   | 38,000   | 1,000 | 5 | 8,010    |
| 8,000        | 8,000       | 7,700    | 75,000   | 26,000   | 38,000   | 1,500 | 5 | 8,015    |
| 10,000       | 10,000      | 9,500    | 80,000   | 32,000   | 38,000   | 0,500 | 5 | 10,005   |
| 10,000       | 10,000      | 9,500    | 80,000   | 32,000   | 38,000   | 1,000 | 5 | 10,010   |
| 10,000       | 10,000      | 9,500    | 80,000   | 32,000   | 38,000   | 1,500 | 5 | 10,015   |
| 10,000       | 10,000      | 9,500    | 80,000   | 32,000   | 38,000   | 2,000 | 5 | 10,020   |
| 12,000       | 12,000      | 11,500   | 93,000   | 40,000   | 46,000   | 0,500 | 5 | 12,005   |
| 12,000       | 12,000      | 11,500   | 93,000   | 40,000   | 46,000   | 1,000 | 5 | 12,010   |
| 12,000       | 12,000      | 11,500   | 93,000   | 40,000   | 46,000   | 1,500 | 5 | 12,015   |
| 12,000       | 12,000      | 11,500   | 93,000   | 40,000   | 46,000   | 2,000 | 5 | 12,020   |
| 16,000       | 16,000      | 15,500   | 108,000  | 50,000   | 58,000   | 0,500 | 5 | 16,005   |
| 16,000       | 16,000      | 15,500   | 108,000  | 50,000   | 58,000   | 1,000 | 5 | 16,010   |
| 16,000       | 16,000      | 15,500   | 108,000  | 50,000   | 58,000   | 1,500 | 5 | 16,015   |
| 16,000       | 16,000      | 15,500   | 108,000  | 50,000   | 58,000   | 2,000 | 5 | 16,020   |
| 16,000       | 16,000      | 15,500   | 108,000  | 50,000   | 58,000   | 3,000 | 5 | 16,030   |
| 20,000       | 20,000      | 19,500   | 126,000  | 62,000   | 74,000   | 1,000 | 5 | 20,010   |
| 20,000       | 20,000      | 19,500   | 126,000  | 62,000   | 74,000   | 1,500 | 5 | 20,015   |
| 20,000       | 20,000      | 19,500   | 126,000  | 62,000   | 74,000   | 2,000 | 5 | 20,020   |
| 20,000       | 20,000      | 19,500   | 126,000  | 62,000   | 74,000   | 3,000 | 5 | 20,030   |

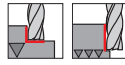
| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|-------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12    | 16   | 20   |
| P   | ≤ 850 N/mm <sup>2</sup> | 340            | 0,036                   | 0,072 | 0,096 | 0,138 | 0,17 | 0,22 | 0,28 | 360            | 0,017                   | 0,034 | 0,046 | 0,066 | 0,08  | 0,11 | 0,13 |
|     | ≥ 850 N/mm <sup>2</sup> | 250            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 |                | 270                     | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 |
| M   | ≤ 750 N/mm <sup>2</sup> | 220            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 | 240            | 0,015                   | 0,030 | 0,040 | 0,055 | 0,07  | 0,09 | 0,11 |
|     | ≥ 750 N/mm <sup>2</sup> | 110            | 0,024                   | 0,048 | 0,064 | 0,092 | 0,11 | 0,15 | 0,18 |                | 120                     | 0,011 | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 |
| S   | Ni-Basis                | 60             | 0,019                   | 0,039 | 0,052 | 0,074 | 0,09 | 0,12 | 0,15 | 60             | 0,008                   | 0,017 | 0,022 | 0,032 | 0,04  | 0,05 | 0,06 |
|     | Ti-Basis                | 110            | 0,028                   | 0,055 | 0,074 | 0,104 | 0,12 | 0,17 | 0,21 |                | 120                     | 0,013 | 0,026 | 0,035 | 0,050 | 0,06 | 0,08 |

## SuperF-UT-Fräser

### SuperF-UT-Fräser ZS-7



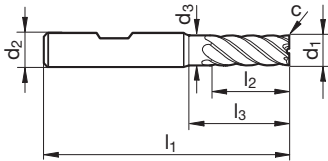
Katalog-Nr. 54581



| P | M | K | N | S | H |
|---|---|---|---|---|---|
| ● | ● | ● | ○ | ● |   |

Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- mit Spanteiler
- universell einsetzbar
- Werkstoffe bis 1400 N/mm<sup>2</sup>
- Mikroeckenschutz
- ohne Zentrumschnitt
- ungleiche Teilung
- HPC-Bearbeitung in zähen, niedrig- und hochlegierten Stählen und in schwer bearbeitbaren Sonderwerkstoffen



| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|--------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 6,000        | 6,000       | 5,700    | 65,000   | 20,000   | 28,000   | 0,120         | 7 | <b>6,000</b>  |
| 8,000        | 8,000       | 7,700    | 75,000   | 26,000   | 38,000   | 0,160         | 7 | <b>8,000</b>  |
| 10,000       | 10,000      | 9,500    | 80,000   | 32,000   | 38,000   | 0,200         | 7 | <b>10,000</b> |
| 12,000       | 12,000      | 11,500   | 93,000   | 40,000   | 46,000   | 0,240         | 7 | <b>12,000</b> |
| 16,000       | 16,000      | 15,500   | 108,000  | 50,000   | 58,000   | 0,320         | 7 | <b>16,000</b> |
| 20,000       | 20,000      | 19,500   | 126,000  | 62,000   | 74,000   | 0,400         | 7 | <b>20,000</b> |

Fräswerkzeuge

| ISO      | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |
|----------|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|-------|------|------|
|          |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12    | 16   | 20   |
| <b>P</b> | ≤ 850 N/mm <sup>2</sup> | <b>340</b>     | 0,036                   | 0,072 | 0,096 | 0,138 | 0,17 | 0,22 | 0,28 | <b>360</b>     | 0,017                   | 0,034 | 0,046 | 0,066 | 0,08  | 0,11 | 0,13 |
|          | ≥ 850 N/mm <sup>2</sup> | <b>250</b>     | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 |                | <b>270</b>              | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 |
| <b>M</b> | ≤ 750 N/mm <sup>2</sup> | <b>220</b>     | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 | <b>240</b>     | 0,015                   | 0,030 | 0,040 | 0,055 | 0,07  | 0,09 | 0,11 |
|          | ≥ 750 N/mm <sup>2</sup> | <b>110</b>     | 0,024                   | 0,048 | 0,064 | 0,092 | 0,11 | 0,15 | 0,18 |                | <b>120</b>              | 0,011 | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 |
| <b>S</b> | Ni-Basis                | <b>60</b>      | 0,019                   | 0,039 | 0,052 | 0,074 | 0,09 | 0,12 | 0,15 | <b>60</b>      | 0,008                   | 0,017 | 0,022 | 0,032 | 0,04  | 0,05 | 0,06 |
|          | Ti-Basis                | <b>110</b>     | 0,028                   | 0,055 | 0,074 | 0,104 | 0,12 | 0,17 | 0,21 |                | <b>120</b>              | 0,013 | 0,026 | 0,035 | 0,050 | 0,06 | 0,08 |

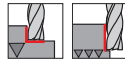


## SuperF-UT-Fräser

### SuperF-UT-Fräser N-5



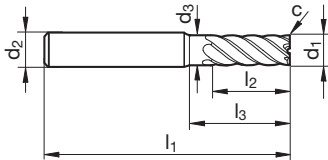
Katalog-Nr. 54583



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | • | • | • |   |

Arbeitsrichtwerte  
Seite 280-293

- größtmögliche Vorteile bei Schlicht- und Semischrupp-Operationen speziell unter HPC Bedingungen
- ungleiche Teilung
- bis 1600 N/mm<sup>2</sup>
- Mikroeckenschutz
- Halsfreischliff
- Zentrumschnitt



| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr. |
|--------------|-------------|----------|----------|----------|----------|---------------|---|----------|
| 4,000        | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 0,050         | 5 | 4,000    |
| 5,000        | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,050         | 5 | 5,000    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,050         | 5 | 6,000    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,100         | 5 | 8,000    |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,100         | 5 | 10,000   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,100         | 5 | 12,000   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,150         | 5 | 16,000   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 0,150         | 5 | 20,000   |

Fräswerkzeuge

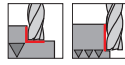
| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|-------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12    | 16   | 20   |
| P   | ≤ 850 N/mm <sup>2</sup> | 340            | 0,036                   | 0,072 | 0,096 | 0,138 | 0,17 | 0,22 | 0,28 | 360            | 0,017                   | 0,034 | 0,046 | 0,066 | 0,08  | 0,11 | 0,13 |
|     | ≥ 850 N/mm <sup>2</sup> | 250            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 |                | 270                     | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 |
| M   | ≤ 750 N/mm <sup>2</sup> | 220            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 | 240            | 0,015                   | 0,030 | 0,040 | 0,055 | 0,07  | 0,09 | 0,11 |
|     | ≥ 750 N/mm <sup>2</sup> | 110            | 0,024                   | 0,048 | 0,064 | 0,092 | 0,11 | 0,15 | 0,18 |                | 120                     | 0,011 | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 |
| S   | Ni-Basis                | 60             | 0,019                   | 0,039 | 0,052 | 0,074 | 0,09 | 0,12 | 0,15 | 60             | 0,008                   | 0,017 | 0,022 | 0,032 | 0,04  | 0,05 | 0,06 |
|     | Ti-Basis                | 110            | 0,028                   | 0,055 | 0,074 | 0,104 | 0,12 | 0,17 | 0,21 |                | 120                     | 0,013 | 0,026 | 0,035 | 0,050 | 0,06 | 0,08 |
| K   | ≤ 240 HB                | 300            | 0,038                   | 0,076 | 0,101 | 0,150 | 0,18 | 0,24 | 0,30 | 320            | 0,018                   | 0,036 | 0,048 | 0,072 | 0,09  | 0,11 | 0,14 |
|     | ≥ 240 HB                | 260            | 0,035                   | 0,069 | 0,092 | 0,127 | 0,15 | 0,20 | 0,25 |                | 280                     | 0,017 | 0,033 | 0,044 | 0,061 | 0,07 | 0,10 |
| N   | ≤ 7 % Si                | 900            | 0,045                   | 0,090 | 0,120 | 0,184 | 0,22 | 0,29 | 0,37 | 1000           | 0,021                   | 0,043 | 0,057 | 0,088 | 0,11  | 0,14 | 0,18 |
|     | ≥ 7 % Si                | 430            | 0,038                   | 0,076 | 0,101 | 0,138 | 0,17 | 0,22 | 0,28 |                | 460                     | 0,018 | 0,036 | 0,048 | 0,066 | 0,08 | 0,11 |

## SuperF-UT-Fräser

### SuperF-UT-Fräser N-5



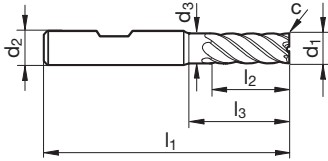
Katalog-Nr. 54584



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | • | • | • |   |

Arbeitsrichtwerte  
Seite 280-293

- größtmögliche Vorteile bei Schlicht- und Semischrupp-Operationen speziell unter HPC Bedingungen
- ungleiche Teilung
- bis 1600 N/mm<sup>2</sup>
- Mikroeckenschutz
- Halsfreischliff
- Zentrumschnitt



| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|--------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 4,000        | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 0,050         | 5 | <b>4,000</b>  |
| 5,000        | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,050         | 5 | <b>5,000</b>  |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,050         | 5 | <b>6,000</b>  |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,100         | 5 | <b>8,000</b>  |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,100         | 5 | <b>10,000</b> |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,100         | 5 | <b>12,000</b> |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,150         | 5 | <b>16,000</b> |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 0,150         | 5 | <b>20,000</b> |

Fräserwerkzeuge

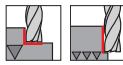
| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|-------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12    | 16   | 20   |
| P   | ≤ 850 N/mm <sup>2</sup> | <b>340</b>     | 0,036                   | 0,072 | 0,096 | 0,138 | 0,17 | 0,22 | 0,28 | <b>360</b>     | 0,017                   | 0,034 | 0,046 | 0,066 | 0,08  | 0,11 | 0,13 |
|     | ≥ 850 N/mm <sup>2</sup> | <b>250</b>     | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 |                | <b>270</b>              | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 |
| M   | ≤ 750 N/mm <sup>2</sup> | <b>220</b>     | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 | <b>240</b>     | 0,015                   | 0,030 | 0,040 | 0,055 | 0,07  | 0,09 | 0,11 |
|     | ≥ 750 N/mm <sup>2</sup> | <b>110</b>     | 0,024                   | 0,048 | 0,064 | 0,092 | 0,11 | 0,15 | 0,18 |                | <b>120</b>              | 0,011 | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 |
| S   | Ni-Basis                | <b>60</b>      | 0,019                   | 0,039 | 0,052 | 0,074 | 0,09 | 0,12 | 0,15 | <b>60</b>      | 0,008                   | 0,017 | 0,022 | 0,032 | 0,04  | 0,05 | 0,06 |
|     | Ti-Basis                | <b>110</b>     | 0,028                   | 0,055 | 0,074 | 0,104 | 0,12 | 0,17 | 0,21 |                | <b>120</b>              | 0,013 | 0,026 | 0,035 | 0,050 | 0,06 | 0,08 |
| K   | ≤ 240 HB                | <b>300</b>     | 0,038                   | 0,076 | 0,101 | 0,150 | 0,18 | 0,24 | 0,30 | <b>320</b>     | 0,018                   | 0,036 | 0,048 | 0,072 | 0,09  | 0,11 | 0,14 |
|     | ≥ 240 HB                | <b>260</b>     | 0,035                   | 0,069 | 0,092 | 0,127 | 0,15 | 0,20 | 0,25 |                | <b>280</b>              | 0,017 | 0,033 | 0,044 | 0,061 | 0,07 | 0,10 |
| N   | ≤ 7 % Si                | <b>900</b>     | 0,045                   | 0,090 | 0,120 | 0,184 | 0,22 | 0,29 | 0,37 | <b>1000</b>    | 0,021                   | 0,043 | 0,057 | 0,088 | 0,11  | 0,14 | 0,18 |
|     | ≥ 7 % Si                | <b>430</b>     | 0,038                   | 0,076 | 0,101 | 0,138 | 0,17 | 0,22 | 0,28 |                | <b>460</b>              | 0,018 | 0,036 | 0,048 | 0,066 | 0,08 | 0,11 |

## SuperF-UT-Fräser

### SuperF-UT-Fräser FS<sup>2</sup>

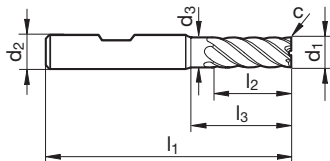


Katalog-Nr. 64560



| P | M | K | N | S | H | Arbeitsrichtwerte<br>Seite 280-293 |
|---|---|---|---|---|---|------------------------------------|
| ○ | ● | ○ | ● | ● | ○ |                                    |

- Halsfreischliff
- Zentrumschnitt
- größtmögliche Vorteile bei Schlicht- und Semischrupp-Operationen speziell unter HPC Bedingungen
- zum Feinschlichten in Werkstoffen bis 50 HRC
- Mikroeckenschutz
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung



| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|--------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,100         | 6 | <b>8,000</b>  |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,100         | 6 | <b>10,000</b> |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,100         | 6 | <b>12,000</b> |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,150         | 6 | <b>16,000</b> |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 0,150         | 6 | <b>20,000</b> |

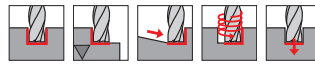
| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |
| P   | ≤ 850 N/mm <sup>2</sup> | 340            | 0,036                   | 0,072 | 0,096 | 0,138 | 0,17 | 0,22 | 0,28 | 360            | 0,017                   | 0,034 | 0,046 | 0,066 | 0,08 | 0,11 | 0,13 |
|     | ≥ 850 N/mm <sup>2</sup> | 250            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 | 270            | 0,015                   | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
| M   | ≤ 750 N/mm <sup>2</sup> | 220            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 | 240            | 0,015                   | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
|     | ≥ 750 N/mm <sup>2</sup> | 110            | 0,024                   | 0,048 | 0,064 | 0,092 | 0,11 | 0,15 | 0,18 | 120            | 0,011                   | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 | 0,08 |
| S   | Ni-Basis                | 60             | 0,019                   | 0,039 | 0,052 | 0,074 | 0,09 | 0,12 | 0,15 | 60             | 0,008                   | 0,017 | 0,022 | 0,032 | 0,04 | 0,05 | 0,06 |
|     | Ti-Basis                | 110            | 0,028                   | 0,055 | 0,074 | 0,104 | 0,12 | 0,17 | 0,21 | 120            | 0,013                   | 0,026 | 0,035 | 0,050 | 0,06 | 0,08 | 0,10 |
| N   | ≤ 7 % Si                | 900            | 0,045                   | 0,090 | 0,120 | 0,184 | 0,22 | 0,29 | 0,37 | 1000           | 0,021                   | 0,043 | 0,057 | 0,088 | 0,11 | 0,14 | 0,18 |
|     | ≥ 7 % Si                | 430            | 0,038                   | 0,076 | 0,101 | 0,138 | 0,17 | 0,22 | 0,28 | 460            | 0,018                   | 0,036 | 0,048 | 0,066 | 0,08 | 0,11 | 0,13 |

# SuperF-UT-Fräser

## SuperF-UT-Fräser NX-3



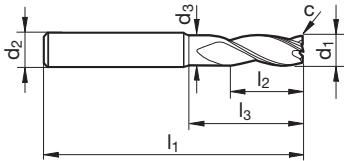
Katalog-Nr. 54586



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | • | • | • |   |

Arbeitsrichtwerte  
Seite 280-293

- angepasste Stir- und Nutengeometrie für höchste Schnittwerte und sehr gute Spanabfuhr
- extrem steile Tauchwinkel bis 45° möglich
- hohe Standzeiten durch hochharte Beschichtung
- 3-Schneider mit vergrößerten Spanräumen
- Werkstoffe bis 1400 N/mm<sup>2</sup>
- Mikroeckenschutz
- Halsfreischliff
- Zentrumschnitt



| d1 e8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|---------------|---|----------|
| 3,000       | 6,000       | 2,800    | 57,000   | 8,000    | 15,000   | 0,050         | 3 | 3,000    |
| 3,500       | 6,000       | 3,300    | 57,000   | 10,000   | 15,000   | 0,050         | 3 | 3,500    |
| 3,700       | 6,000       | 3,500    | 57,000   | 11,000   | 15,000   | 0,060         | 3 | 3,700    |
| 4,000       | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 0,060         | 3 | 4,000    |
| 4,500       | 6,000       | 4,300    | 57,000   | 11,000   | 18,000   | 0,070         | 3 | 4,500    |
| 4,700       | 6,000       | 4,500    | 57,000   | 13,000   | 18,000   | 0,070         | 3 | 4,700    |
| 5,000       | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,080         | 3 | 5,000    |
| 5,500       | 6,000       | 5,300    | 57,000   | 13,000   | 19,400   | 0,080         | 3 | 5,500    |
| 5,700       | 6,000       | 5,500    | 57,000   | 13,000   | 19,600   | 0,090         | 3 | 5,700    |
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,090         | 3 | 6,000    |
| 6,500       | 8,000       | 6,200    | 63,000   | 16,000   | 24,400   | 0,100         | 3 | 6,500    |
| 7,000       | 8,000       | 6,700    | 63,000   | 16,000   | 24,900   | 0,110         | 3 | 7,000    |
| 7,500       | 8,000       | 7,200    | 63,000   | 19,000   | 25,300   | 0,110         | 3 | 7,500    |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,120         | 3 | 8,000    |
| 8,500       | 10,000      | 8,200    | 72,000   | 19,000   | 29,400   | 0,130         | 3 | 8,500    |
| 9,000       | 10,000      | 8,700    | 72,000   | 19,000   | 29,900   | 0,140         | 3 | 9,000    |
| 9,500       | 10,000      | 9,200    | 72,000   | 22,000   | 30,300   | 0,140         | 3 | 9,500    |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,150         | 3 | 10,000   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,180         | 3 | 12,000   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,190         | 3 | 16,000   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 0,240         | 3 | 20,000   |

Fräswerkzeuge

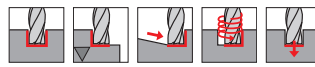
| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       | f <sub>z</sub> (mm/z)/Ø |                        |                             |       |       |       |       |       |       |       |       |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|-------------------------|------------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12    | 16    | 20    | 3                       | 6                      | 8                           | 10    | 12    | 16    | 20    |       |       |       |       |
| P   | ≤ 850 N/mm <sup>2</sup> | 270            | 0,017                   | 0,025 | 0,034 | 0,050 | 0,060 | 0,080 | 0,100 |                         | a <sub>p</sub> = 1,0xD | a <sub>e</sub> = 1,0xD      | 350   | 0,021 | 0,032 | 0,042 | 0,063 | 0,075 | 0,100 | 0,125 |
|     | ≥ 850 N/mm <sup>2</sup> | 180            | 0,014                   | 0,021 | 0,028 | 0,045 | 0,054 | 0,072 | 0,090 |                         |                        |                             | 260   | 0,018 | 0,027 | 0,036 | 0,059 | 0,070 | 0,094 | 0,117 |
| M   | ≤ 750 N/mm <sup>2</sup> | 120            | 0,014                   | 0,021 | 0,028 | 0,045 | 0,054 | 0,072 | 0,090 |                         | a <sub>p</sub> = 1,5xD | a <sub>e max</sub> = 0,33xD | 160   | 0,018 | 0,027 | 0,036 | 0,059 | 0,070 | 0,094 | 0,117 |
|     | ≥ 750 N/mm <sup>2</sup> | 80             | 0,013                   | 0,019 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080 |                         |                        |                             | 120   | 0,019 | 0,029 | 0,038 | 0,060 | 0,072 | 0,096 | 0,120 |
| S   | Ti-Basis                | 60             | 0,013                   | 0,019 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080 | 110                     | 0,017                  | 0,025                       | 0,033 | 0,052 | 0,062 | 0,083 | 0,104 |       |       |       |
| K   | ≤ 240 HB                | 150            | 0,017                   | 0,025 | 0,034 | 0,050 | 0,060 | 0,080 | 0,100 | 190                     | 0,021                  | 0,032                       | 0,042 | 0,063 | 0,075 | 0,100 | 0,125 |       |       |       |
| N   | ≥ 7 % Si                | 340            | 0,018                   | 0,027 | 0,036 | 0,055 | 0,066 | 0,088 | 0,110 | 440                     | 0,023                  | 0,034                       | 0,045 | 0,069 | 0,083 | 0,110 | 0,138 |       |       |       |

# SuperF-UT-Fräser

## SuperF-UT-Fräser NX-3



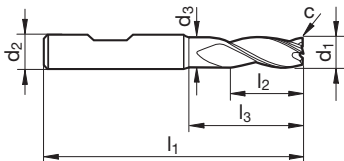
Katalog-Nr. 54587



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | • | • | • |   |

Arbeitsrichtwerte  
Seite 280-293

- angepasste Stir- und Nutengeometrie für höchste Schnittwerte und sehr gute Spanabfuhr
- extrem steile Tauchwinkel bis 45° möglich
- hohe Standzeiten durch hochharte Beschichtung
- 3-Schneider mit vergrößerten Spanräumen
- Werkstoffe bis 1400 N/mm<sup>2</sup>
- Mikroeckenschutz
- Halsfreischliff
- Zentrumschnitt



| d1 e8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|---------------|---|----------|
| 3,000       | 6,000       | 2,800    | 57,000   | 8,000    | 15,000   | 0,050         | 3 | 3,000    |
| 3,500       | 6,000       | 3,300    | 57,000   | 10,000   | 15,000   | 0,050         | 3 | 3,500    |
| 3,700       | 6,000       | 3,500    | 57,000   | 11,000   | 15,000   | 0,060         | 3 | 3,700    |
| 4,000       | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 0,060         | 3 | 4,000    |
| 4,500       | 6,000       | 4,300    | 57,000   | 11,000   | 18,000   | 0,070         | 3 | 4,500    |
| 4,700       | 6,000       | 4,500    | 57,000   | 13,000   | 18,000   | 0,070         | 3 | 4,700    |
| 5,000       | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,080         | 3 | 5,000    |
| 5,500       | 6,000       | 5,300    | 57,000   | 13,000   | 19,400   | 0,080         | 3 | 5,500    |
| 5,700       | 6,000       | 5,500    | 57,000   | 13,000   | 19,600   | 0,090         | 3 | 5,700    |
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,090         | 3 | 6,000    |
| 6,500       | 8,000       | 6,200    | 63,000   | 16,000   | 24,400   | 0,100         | 3 | 6,500    |
| 7,000       | 8,000       | 6,700    | 63,000   | 16,000   | 24,900   | 0,110         | 3 | 7,000    |
| 7,500       | 8,000       | 7,200    | 63,000   | 19,000   | 25,300   | 0,110         | 3 | 7,500    |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,120         | 3 | 8,000    |
| 8,500       | 10,000      | 8,200    | 72,000   | 19,000   | 29,400   | 0,130         | 3 | 8,500    |
| 9,000       | 10,000      | 8,700    | 72,000   | 19,000   | 29,900   | 0,140         | 3 | 9,000    |
| 9,500       | 10,000      | 9,200    | 72,000   | 22,000   | 30,300   | 0,140         | 3 | 9,500    |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,150         | 3 | 10,000   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,180         | 3 | 12,000   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,190         | 3 | 16,000   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 0,240         | 3 | 20,000   |

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       |       |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12    | 16    | 20    |                | 3                       | 6     | 8     | 10    | 12    | 16    | 20    |       |
| P   | ≤ 850 N/mm <sup>2</sup> | 270            | 0,017                   | 0,025 | 0,034 | 0,050 | 0,060 | 0,080 | 0,100 |                | 350                     | 0,021 | 0,032 | 0,042 | 0,063 | 0,075 | 0,100 | 0,125 |
|     | ≥ 850 N/mm <sup>2</sup> | 180            | 0,014                   | 0,021 | 0,028 | 0,045 | 0,054 | 0,072 | 0,090 |                | 260                     | 0,018 | 0,027 | 0,036 | 0,059 | 0,070 | 0,094 | 0,117 |
| M   | ≤ 750 N/mm <sup>2</sup> | 120            | 0,014                   | 0,021 | 0,028 | 0,045 | 0,054 | 0,072 | 0,090 |                | 160                     | 0,018 | 0,027 | 0,036 | 0,059 | 0,070 | 0,094 | 0,117 |
|     | ≥ 750 N/mm <sup>2</sup> | 80             | 0,013                   | 0,019 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080 |                | 120                     | 0,019 | 0,029 | 0,038 | 0,060 | 0,072 | 0,096 | 0,120 |
| S   | Ti-Basis                | 60             | 0,013                   | 0,019 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080 | 110            | 0,017                   | 0,025 | 0,033 | 0,052 | 0,062 | 0,083 | 0,104 |       |
| K   | ≤ 240 HB                | 150            | 0,017                   | 0,025 | 0,034 | 0,050 | 0,060 | 0,080 | 0,100 | 190            | 0,021                   | 0,032 | 0,042 | 0,063 | 0,075 | 0,100 | 0,125 |       |
| N   | ≥ 7 % Si                | 340            | 0,018                   | 0,027 | 0,036 | 0,055 | 0,066 | 0,088 | 0,110 | 440            | 0,023                   | 0,034 | 0,045 | 0,069 | 0,083 | 0,110 | 0,138 |       |

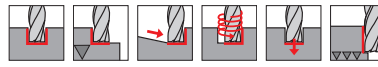
Fräswerkzeuge

# SuperF-UT-Fräser

## SuperF-UT-Fräser NX

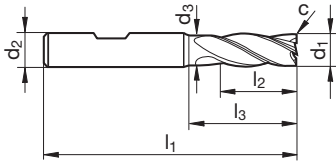


Katalog-Nr. 54589



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | • | • | • |   |

Arbeitsrichtwerte  
Seite 280-293



- kurze stabile Ausführung
- angepasste Stirn- und Nutengeometrie für höchste Schnittwerte und sehr gute Spanabfuhr
- extrem steile Tauchwinkel bis 45° möglich
- hohe Standzeiten durch hochharte Beschichtung
- hohe Prozesssicherheit bei gleichzeitiger Reduzierung der Bearbeitungszeiten
- Werkstoffe bis 1400 N/mm<sup>2</sup>
- Mikroeckenschutz
- Halsfreischliff
- Zentrumschnitt

Fräswerkzeuge

| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr. |
|--------------|-------------|----------|----------|----------|----------|---------------|---|----------|
| 3,000        | 6,000       | 2,800    | 50,000   | 5,000    | 12,000   | 0,030         | 4 | 3,000    |
| 3,700        | 6,000       | 3,500    | 54,000   | 8,000    | 12,000   | 0,040         | 4 | 3,700    |
| 4,000        | 6,000       | 3,800    | 54,000   | 8,000    | 15,000   | 0,040         | 4 | 4,000    |
| 4,700        | 6,000       | 4,500    | 54,000   | 9,000    | 15,000   | 0,050         | 4 | 4,700    |
| 5,000        | 6,000       | 4,800    | 54,000   | 9,000    | 15,000   | 0,050         | 4 | 5,000    |
| 5,700        | 6,000       | 5,500    | 54,000   | 10,000   | 16,600   | 0,060         | 4 | 5,700    |
| 6,000        | 6,000       | 5,700    | 54,000   | 10,000   | 17,000   | 0,060         | 4 | 6,000    |
| 7,000        | 8,000       | 6,700    | 58,000   | 11,000   | 19,900   | 0,070         | 4 | 7,000    |
| 7,700        | 8,000       | 7,400    | 58,000   | 12,000   | 20,500   | 0,080         | 4 | 7,700    |
| 8,000        | 8,000       | 7,700    | 58,000   | 12,000   | 21,000   | 0,080         | 4 | 8,000    |
| 9,000        | 10,000      | 8,700    | 66,000   | 13,000   | 23,900   | 0,090         | 4 | 9,000    |
| 9,700        | 10,000      | 9,400    | 66,000   | 14,000   | 24,500   | 0,100         | 4 | 9,700    |
| 10,000       | 10,000      | 9,500    | 66,000   | 14,000   | 24,000   | 0,100         | 4 | 10,000   |
| 11,700       | 12,000      | 11,200   | 73,000   | 16,000   | 25,300   | 0,120         | 4 | 11,700   |
| 12,000       | 12,000      | 11,500   | 73,000   | 16,000   | 26,000   | 0,120         | 4 | 12,000   |
| 15,600       | 16,000      | 15,100   | 82,000   | 22,000   | 31,200   | 0,160         | 4 | 15,600   |
| 16,000       | 16,000      | 15,500   | 82,000   | 22,000   | 32,000   | 0,160         | 4 | 16,000   |
| 19,000       | 20,000      | 18,500   | 92,000   | 26,000   | 38,700   | 0,190         | 4 | 19,000   |
| 20,000       | 20,000      | 19,500   | 92,000   | 26,000   | 40,000   | 0,200         | 4 | 20,000   |

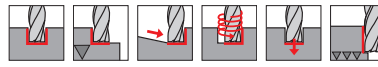
| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|-------|-------|-------|-------|------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12    | 16    | 20    |                | 3                       | 6     | 8     | 10    | 12    | 16   | 20   |      |
| P   | ≤ 850 N/mm <sup>2</sup> | 270            | 0,017                   | 0,025 | 0,034 | 0,050 | 0,060 | 0,080 | 0,100 | HPC            | 450                     | 0,027 | 0,040 | 0,054 | 0,080 | 0,10 | 0,13 | 0,16 |
|     | ≥ 850 N/mm <sup>2</sup> | 180            | 0,014                   | 0,021 | 0,028 | 0,045 | 0,054 | 0,072 | 0,090 |                | 300                     | 0,022 | 0,034 | 0,045 | 0,072 | 0,09 | 0,12 | 0,14 |
| M   | ≤ 750 N/mm <sup>2</sup> | 120            | 0,014                   | 0,021 | 0,028 | 0,045 | 0,054 | 0,072 | 0,090 | HPC            | 200                     | 0,022 | 0,034 | 0,045 | 0,072 | 0,09 | 0,12 | 0,14 |
|     | ≥ 750 N/mm <sup>2</sup> | 80             | 0,013                   | 0,019 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080 |                | 140                     | 0,020 | 0,031 | 0,041 | 0,064 | 0,08 | 0,10 | 0,13 |
| S   | Ti-Basis                | 60             | 0,013                   | 0,019 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080 | 110            | 0,020                   | 0,031 | 0,041 | 0,064 | 0,08  | 0,10 | 0,13 |      |
| K   | ≤ 240 HB                | 150            | 0,017                   | 0,025 | 0,034 | 0,050 | 0,060 | 0,080 | 0,100 | 250            | 0,027                   | 0,040 | 0,054 | 0,080 | 0,10  | 0,13 | 0,16 |      |
| N   | ≥ 7 % Si                | 340            | 0,018                   | 0,027 | 0,036 | 0,055 | 0,066 | 0,088 | 0,110 | 570            | 0,029                   | 0,043 | 0,058 | 0,088 | 0,11  | 0,14 | 0,18 |      |

## SuperF-UT-Fräser

### SuperF-UT-Fräser NX-IK



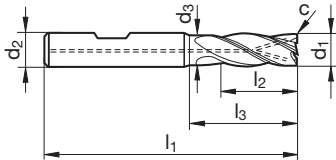
Katalog-Nr. 54585



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | • | • | • |   |

Arbeitsrichtwerte  
Seite 280-293

- angepasste Schneidengeometrie und Beschichtung
- mit Innenkühlung: radiale und axiale Austritte
- extrem steile Tauchwinkel bis 45° möglich
- hohe Standzeiten durch hochharte Beschichtung
- hohe Prozesssicherheit bei gleichzeitiger Reduzierung der Bearbeitungszeiten
- Werkstoffe bis 1400 N/mm<sup>2</sup>
- Mikroeckenschutz
- Halsfreischliff
- Zentrumschnitt
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung



| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|--------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,060         | 4 | <b>6,000</b>  |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,080         | 4 | <b>8,000</b>  |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,100         | 4 | <b>10,000</b> |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,120         | 4 | <b>12,000</b> |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,160         | 4 | <b>16,000</b> |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 0,200         | 4 | <b>20,000</b> |
| 25,000       | 25,000      | 24,000   | 121,000  | 45,000   | 63,000   | 0,250         | 4 | <b>25,000</b> |

Fräswerkzeuge

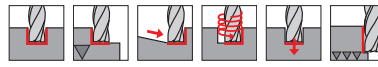
| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       |       |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|-------|-------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|
|     |                         |                | 4                       | 6     | 8     | 10    | 12    | 20    |                | 4                       | 6     | 8     | 10    | 12    | 16    | 20    |       |
| P   | ≤ 850 N/mm <sup>2</sup> | 270            | 0,017                   | 0,025 | 0,034 | 0,050 | 0,060 | 0,080 | 0,100          | 270                     | 0,014 | 0,021 | 0,028 | 0,040 | 0,048 | 0,064 | 0,080 |
|     | ≥ 850 N/mm <sup>2</sup> | 180            | 0,014                   | 0,021 | 0,028 | 0,045 | 0,054 | 0,072 | 0,090          | 180                     | 0,008 | 0,012 | 0,016 | 0,025 | 0,030 | 0,040 | 0,050 |
| M   | ≤ 750 N/mm <sup>2</sup> | 120            | 0,014                   | 0,021 | 0,028 | 0,045 | 0,054 | 0,072 | 0,090          | 90                      | 0,007 | 0,011 | 0,014 | 0,023 | 0,027 | 0,036 | 0,045 |
|     | ≥ 750 N/mm <sup>2</sup> | 80             | 0,013                   | 0,019 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080          | 60                      | 0,006 | 0,010 | 0,013 | 0,020 | 0,024 | 0,032 | 0,040 |
| S   | Ti-Basis                | 60             | 0,013                   | 0,019 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080          | 50                      | 0,006 | 0,010 | 0,013 | 0,020 | 0,024 | 0,032 | 0,040 |
| K   | ≤ 240 HB                | 150            | 0,017                   | 0,025 | 0,034 | 0,050 | 0,060 | 0,080 | 0,100          | 150                     | 0,014 | 0,021 | 0,028 | 0,040 | 0,048 | 0,064 | 0,080 |
| N   | ≥ 7 % Si                | 340            | 0,018                   | 0,027 | 0,036 | 0,055 | 0,066 | 0,088 | 0,110          | 340                     | 0,014 | 0,021 | 0,028 | 0,040 | 0,048 | 0,064 | 0,080 |

# SuperF-UT-Fräser

## SuperF-UT-Fräser NX Micro



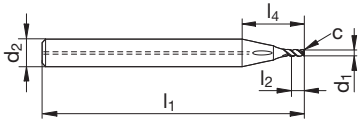
Katalog-Nr. 54594



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ● | ● | ○ |

Arbeitsrichtwerte  
Seite 280-293

- für extreme Schnittwerte und Zerspanleistung
- mit Innenkühlung: Peripheriekühlung 4 bzw. 6 Austritte
- Zentrumschnitt
- verbesserte Stirngeometrie
- Schneidenlänge 2,5xD



Fräserwerkzeuge

| d1 h8<br>mm | d2 h5<br>mm | l1<br>mm | l2<br>mm | l4<br>mm | c<br>mm x 45° | Z | Code-Nr.     |
|-------------|-------------|----------|----------|----------|---------------|---|--------------|
| 0,500       | 4,000       | 38,000   | 1,250    | 9,300    | 0,010         | 3 | <b>0,500</b> |
| 0,750       | 4,000       | 38,000   | 1,875    | 9,300    | 0,015         | 3 | <b>0,750</b> |
| 0,800       | 4,000       | 38,000   | 2,000    | 9,300    | 0,016         | 3 | <b>0,800</b> |
| 1,000       | 4,000       | 38,000   | 2,500    | 9,300    | 0,020         | 3 | <b>1,000</b> |
| 1,200       | 4,000       | 38,000   | 3,000    | 9,400    | 0,024         | 3 | <b>1,200</b> |
| 1,500       | 4,000       | 45,000   | 3,750    | 9,800    | 0,030         | 3 | <b>1,500</b> |
| 1,800       | 4,000       | 45,000   | 4,500    | 10,300   | 0,036         | 3 | <b>1,800</b> |
| 2,000       | 6,000       | 50,000   | 5,000    | 14,700   | 0,040         | 3 | <b>2,000</b> |
| 2,200       | 6,000       | 50,000   | 5,500    | 14,900   | 0,044         | 3 | <b>2,200</b> |
| 2,500       | 6,000       | 50,000   | 6,250    | 15,300   | 0,050         | 3 | <b>2,500</b> |
| 2,800       | 6,000       | 50,000   | 7,000    | 15,900   | 0,056         | 3 | <b>2,800</b> |
| 3,000       | 6,000       | 50,000   | 7,500    | 16,200   | 0,060         | 3 | <b>3,000</b> |

| ISO | Härte                  | a <sub>p</sub> |                |                |                |                |                |                |                |                |                |                | a <sub>e</sub> | a <sub>p</sub> |                |                |                |                |                |                |                |                |                |                |
|-----|------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|     |                        |                | Ø1,0           |                | Ø1,5           |                | Ø2,0           |                | Ø2,5           |                | Ø3,0           |                |                |                | Ø1,0           |                | Ø1,5           |                | Ø2,0           |                | Ø2,5           |                | Ø3,0           |                |
|     |                        |                | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> |                |                | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> |
| P   | ≤850 N/mm <sup>2</sup> | <b>1,00xØ</b>  | 140            | 0,009          | 168            | 0,014          | 182            | 0,018          | 182            | 0,023          | 196            | 0,027          | <b>0,25xØ</b>  | <b>2,0xØ</b>   | 170            | 0,014          | 204            | 0,021          | 221            | 0,028          | 221            | 0,035          | 238            | 0,043          |
|     | ≥850 N/mm <sup>2</sup> | <b>0,75xØ</b>  | 140            | 0,006          | 168            | 0,009          | 182            | 0,012          | 182            | 0,015          | 196            | 0,018          | <b>0,20xØ</b>  | <b>2,0xØ</b>   | 170            | 0,009          | 204            | 0,014          | 221            | 0,019          | 221            | 0,024          | 238            | 0,028          |
| M   | ≤750 N/mm <sup>2</sup> | <b>1,00xØ</b>  | 140            | 0,008          | 168            | 0,012          | 182            | 0,016          | 182            | 0,020          | 196            | 0,024          | <b>0,25xØ</b>  | <b>2,0xØ</b>   | 170            | 0,013          | 204            | 0,019          | 221            | 0,025          | 221            | 0,032          | 238            | 0,038          |
|     | ≥750 N/mm <sup>2</sup> | <b>0,75xØ</b>  | 90             | 0,006          | 108            | 0,009          | 117            | 0,012          | 117            | 0,015          | 126            | 0,018          | <b>0,20xØ</b>  | <b>2,0xØ</b>   | 105            | 0,010          | 126            | 0,014          | 137            | 0,019          | 137            | 0,024          | 147            | 0,029          |
| S   | Ni-Basis               | <b>0,50xØ</b>  | 60             | 0,004          | 72             | 0,005          | 78             | 0,007          | 78             | 0,009          | 84             | 0,011          | <b>0,15xØ</b>  | <b>2,0xØ</b>   | 70             | 0,006          | 84             | 0,009          | 91             | 0,012          | 91             | 0,014          | 98             | 0,017          |
|     | Ti-Basis               | <b>0,75xØ</b>  | 100            | 0,008          | 120            | 0,011          | 130            | 0,015          | 130            | 0,019          | 140            | 0,023          | <b>0,20xØ</b>  | <b>2,0xØ</b>   | 115            | 0,012          | 138            | 0,018          | 150            | 0,024          | 150            | 0,030          | 161            | 0,035          |
| K   | ≤240 HB                | <b>1,00xØ</b>  | 120            | 0,007          | 144            | 0,011          | 156            | 0,014          | 156            | 0,018          | 168            | 0,021          | <b>0,25xØ</b>  | <b>2,0xØ</b>   | 145            | 0,011          | 174            | 0,017          | 189            | 0,022          | 189            | 0,028          | 203            | 0,033          |
|     | ≥240 HB                | <b>1,00xØ</b>  | 100            | 0,006          | 120            | 0,009          | 130            | 0,012          | 130            | 0,016          | 140            | 0,019          | <b>0,25xØ</b>  | <b>2,0xØ</b>   | 120            | 0,010          | 144            | 0,015          | 156            | 0,020          | 156            | 0,024          | 168            | 0,029          |
| N   | Al                     | <b>1,00xØ</b>  | 170            | 0,012          | 204            | 0,018          | 221            | 0,024          | 221            | 0,030          | 238            | 0,036          | <b>0,25xØ</b>  | <b>2,0xØ</b>   | 200            | 0,019          | 240            | 0,028          | 260            | 0,038          | 260            | 0,047          | 280            | 0,057          |
|     | NE                     | <b>1,00xØ</b>  | 125            | 0,011          | 150            | 0,017          | 162,5          | 0,022          | 162,5          | 0,028          | 175            | 0,033          | <b>0,25xØ</b>  | <b>2,0xØ</b>   | 150            | 0,017          | 180            | 0,026          | 195            | 0,035          | 195            | 0,044          | 210            | 0,052          |

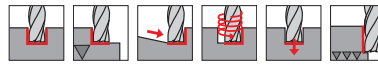


# SuperF-UT-Fräser

## SuperF-UT-Fräser NX Micro



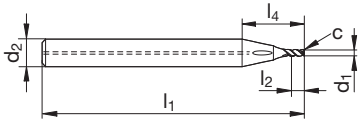
Katalog-Nr. 54595



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ● | ● | ○ |

Arbeitsrichtwerte  
Seite 280-293

- für extreme Schnittwerte und Zerspanleistung
- mit Innenkühlung: Peripheriekühlung 4 bzw. 6 Austritte
- Zentrumschnitt
- verbesserte Stirngeometrie
- Schneidenlänge 5xD



| d1 h8<br>mm | d2 h5<br>mm | l1<br>mm | l2<br>mm | l4<br>mm | c<br>mm x 45° | Z | Code-Nr.     |
|-------------|-------------|----------|----------|----------|---------------|---|--------------|
| 0,500       | 4,000       | 38,000   | 2,500    | 10,600   | 0,010         | 3 | <b>0,500</b> |
| 0,750       | 4,000       | 38,000   | 3,750    | 11,200   | 0,015         | 3 | <b>0,750</b> |
| 0,790       | 4,000       | 38,000   | 3,950    | 11,300   | 0,016         | 3 | <b>0,790</b> |
| 0,800       | 4,000       | 38,000   | 4,000    | 11,300   | 0,016         | 3 | <b>0,800</b> |
| 1,000       | 4,000       | 45,000   | 5,000    | 11,800   | 0,020         | 3 | <b>1,000</b> |
| 1,500       | 4,000       | 50,000   | 7,500    | 13,500   | 0,030         | 3 | <b>1,500</b> |
| 2,000       | 6,000       | 57,000   | 10,000   | 19,700   | 0,040         | 3 | <b>2,000</b> |
| 2,500       | 6,000       | 57,000   | 12,500   | 21,600   | 0,050         | 3 | <b>2,500</b> |
| 3,000       | 6,000       | 57,000   | 15,000   | 23,700   | 0,060         | 3 | <b>3,000</b> |

Fräswerkzeuge

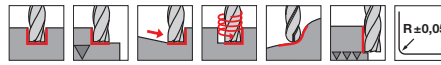
| ISO | Härte                 | a <sub>p</sub> |                |                |                |                |                |                |                |                |                |                | a <sub>e</sub> | a <sub>p</sub> |                |                |                |                |                |                |                |                |                |                |
|-----|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|     |                       |                | Ø1,0           |                | Ø1,5           |                | Ø2,0           |                | Ø2,5           |                | Ø3,0           |                |                |                | Ø1,0           |                | Ø1,5           |                | Ø2,0           |                | Ø2,5           |                | Ø3,0           |                |
|     |                       |                | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> |                |                | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> | v <sub>c</sub> | f <sub>z</sub> |
| P   | ≤850N/mm <sup>2</sup> | <b>0,50xØ</b>  | 112            | 0,008          | 134            | 0,012          | 146            | 0,016          | 146            | 0,020          | 157            | 0,024          | <b>0,10xØ</b>  | <b>5,0xØ</b>   | 134            | 0,013          | 161            | 0,019          | 174            | 0,026          | 174            | 0,032          | 188            | 0,038          |
|     | ≥850N/mm <sup>2</sup> | <b>0,25xØ</b>  | 112            | 0,005          | 134            | 0,008          | 146            | 0,011          | 146            | 0,014          | 157            | 0,016          | <b>0,08xØ</b>  | <b>5,0xØ</b>   | 134            | 0,009          | 161            | 0,013          | 174            | 0,017          | 174            | 0,021          | 188            | 0,026          |
| M   | ≤750N/mm <sup>2</sup> | <b>0,25xØ</b>  | 112            | 0,007          | 134            | 0,011          | 146            | 0,014          | 146            | 0,018          | 157            | 0,022          | <b>0,10xØ</b>  | <b>5,0xØ</b>   | 134            | 0,011          | 161            | 0,017          | 174            | 0,023          | 174            | 0,028          | 188            | 0,034          |
|     | ≥750N/mm <sup>2</sup> | <b>0,25xØ</b>  | 71             | 0,006          | 85             | 0,008          | 92             | 0,011          | 92             | 0,014          | 99             | 0,017          | <b>0,05xØ</b>  | <b>5,0xØ</b>   | 86             | 0,009          | 103            | 0,013          | 112            | 0,017          | 112            | 0,022          | 120            | 0,026          |
| S   | Ni-Basis              | <b>0,25xØ</b>  | 46             | 0,003          | 55             | 0,005          | 60             | 0,007          | 60             | 0,008          | 64             | 0,010          | <b>0,05xØ</b>  | <b>5,0xØ</b>   | 55             | 0,005          | 66             | 0,008          | 72             | 0,010          | 72             | 0,013          | 77             | 0,016          |
|     | Ti-Basis              | <b>0,25xØ</b>  | 72             | 0,007          | 86             | 0,010          | 94             | 0,014          | 94             | 0,017          | 101            | 0,020          | <b>0,08xØ</b>  | <b>5,0xØ</b>   | 86             | 0,011          | 103            | 0,016          | 112            | 0,021          | 112            | 0,027          | 120            | 0,032          |
| K   | ≤240HB                | <b>0,50xØ</b>  | 96             | 0,006          | 115            | 0,009          | 125            | 0,013          | 125            | 0,016          | 134            | 0,019          | <b>0,10xØ</b>  | <b>5,0xØ</b>   | 115            | 0,010          | 138            | 0,015          | 150            | 0,020          | 150            | 0,025          | 161            | 0,030          |
|     | ≥240HB                | <b>0,50xØ</b>  | 80             | 0,006          | 96             | 0,008          | 104            | 0,011          | 104            | 0,014          | 112            | 0,017          | <b>0,10xØ</b>  | <b>5,0xØ</b>   | 96             | 0,009          | 115            | 0,013          | 125            | 0,018          | 125            | 0,022          | 134            | 0,026          |
| N   | Al                    | <b>0,50xØ</b>  | 136            | 0,011          | 163            | 0,016          | 177            | 0,022          | 177            | 0,027          | 190            | 0,032          | <b>0,15xØ</b>  | <b>5,0xØ</b>   | 163            | 0,017          | 196            | 0,026          | 212            | 0,034          | 212            | 0,043          | 228            | 0,051          |
|     | NE                    | <b>0,50xØ</b>  | 100            | 0,010          | 120            | 0,015          | 130            | 0,020          | 130            | 0,025          | 140            | 0,030          | <b>0,12xØ</b>  | <b>5,0xØ</b>   | 120            | 0,016          | 144            | 0,023          | 156            | 0,031          | 156            | 0,039          | 168            | 0,047          |

# SuperF-UT-Fräser

## SuperF-UT-Fräser Ti



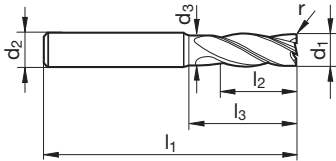
Katalog-Nr. 54560



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • |   |   | • |   |

Arbeitsrichtwerte  
Seite 280-293

- optimierte Schneidkantenausführung für hochfeste Titanlegierungen und Sonderwerkstoffe
- mit definierten Eckradien
- Halsfreischliff
- Zentrumschnitt
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung



Fräswerkzeuge

| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | r     | Z | Code-Nr. |
|--------------|-------------|----------|----------|----------|----------|-------|---|----------|
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,500 | 4 | 6,005    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,800 | 4 | 6,008    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 1,000 | 4 | 6,010    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 1,500 | 4 | 6,015    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 2,000 | 4 | 6,020    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,500 | 4 | 8,005    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,800 | 4 | 8,008    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 1,000 | 4 | 8,010    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 1,500 | 4 | 8,015    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 2,000 | 4 | 8,020    |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,500 | 4 | 10,005   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,800 | 4 | 10,008   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 1,000 | 4 | 10,010   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 1,500 | 4 | 10,015   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 2,000 | 4 | 10,020   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,500 | 4 | 12,005   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,800 | 4 | 12,008   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 1,000 | 4 | 12,010   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 1,500 | 4 | 12,015   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 2,000 | 4 | 12,020   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 2,500 | 4 | 12,025   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 3,000 | 4 | 12,030   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 4,000 | 4 | 12,040   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,500 | 4 | 16,005   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,800 | 4 | 16,008   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 1,000 | 4 | 16,010   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 1,500 | 4 | 16,015   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 2,000 | 4 | 16,020   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 2,500 | 4 | 16,025   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 3,000 | 4 | 16,030   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 4,000 | 4 | 16,040   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 1,000 | 4 | 20,010   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 2,000 | 4 | 20,020   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 4,000 | 4 | 20,040   |

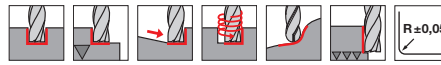
| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|-------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12    | 16   | 20   |
| P   | ≤ 850 N/mm <sup>2</sup> | 340            | 0,036                   | 0,072 | 0,096 | 0,138 | 0,17 | 0,22 | 0,28 | 360            | 0,017                   | 0,034 | 0,046 | 0,066 | 0,08  | 0,11 | 0,13 |
|     | ≥ 850 N/mm <sup>2</sup> | 250            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 |                | 270                     | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 |
| M   | ≤ 750 N/mm <sup>2</sup> | 220            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 | 240            | 0,015                   | 0,030 | 0,040 | 0,055 | 0,07  | 0,09 | 0,11 |
|     | ≥ 750 N/mm <sup>2</sup> | 110            | 0,024                   | 0,048 | 0,064 | 0,092 | 0,11 | 0,15 | 0,18 |                | 120                     | 0,011 | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 |
| S   | Ni-Basis                | 60             | 0,019                   | 0,039 | 0,052 | 0,074 | 0,09 | 0,12 | 0,15 | 60             | 0,008                   | 0,017 | 0,022 | 0,032 | 0,04  | 0,05 | 0,06 |
|     | Ti-Basis                | 110            | 0,028                   | 0,055 | 0,074 | 0,104 | 0,12 | 0,17 | 0,21 |                | 120                     | 0,013 | 0,026 | 0,035 | 0,050 | 0,06 | 0,08 |
| N   | ≤ 7 % Si                | 900            | 0,045                   | 0,090 | 0,120 | 0,184 | 0,22 | 0,29 | 0,37 | 1000           | 0,021                   | 0,043 | 0,057 | 0,088 | 0,11  | 0,14 | 0,18 |
|     | ≥ 7 % Si                | 430            | 0,038                   | 0,076 | 0,101 | 0,138 | 0,17 | 0,22 | 0,28 |                | 460                     | 0,018 | 0,036 | 0,048 | 0,066 | 0,08 | 0,11 |

# SuperF-UT-Fräser

## SuperF-UT-Fräser Ti



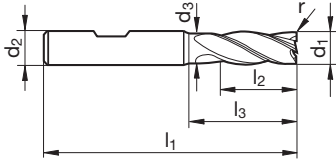
Katalog-Nr. 54561



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • |   |   | • |   |

Arbeitsrichtwerte  
Seite 280-293

- optimierte Schneidkantenausführung für hochfeste Titanlegierungen und Sonderwerkstoffe
- mit definierten Eckradien
- Halsfreischliff
- Zentrumschnitt
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung



| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | r     | Z | Code-Nr. |
|--------------|-------------|----------|----------|----------|----------|-------|---|----------|
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,500 | 4 | 6,005    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,800 | 4 | 6,008    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 1,000 | 4 | 6,010    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 1,500 | 4 | 6,015    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 2,000 | 4 | 6,020    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,500 | 4 | 8,005    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,800 | 4 | 8,008    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 1,000 | 4 | 8,010    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 1,500 | 4 | 8,015    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 2,000 | 4 | 8,020    |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,500 | 4 | 10,005   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,800 | 4 | 10,008   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 1,000 | 4 | 10,010   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 1,500 | 4 | 10,015   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 2,000 | 4 | 10,020   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,500 | 4 | 12,005   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,800 | 4 | 12,008   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 1,000 | 4 | 12,010   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 1,500 | 4 | 12,015   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 2,000 | 4 | 12,020   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 2,500 | 4 | 12,025   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 3,000 | 4 | 12,030   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 4,000 | 4 | 12,040   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,500 | 4 | 16,005   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,800 | 4 | 16,008   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 1,000 | 4 | 16,010   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 1,500 | 4 | 16,015   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 2,000 | 4 | 16,020   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 2,500 | 4 | 16,025   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 3,000 | 4 | 16,030   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 4,000 | 4 | 16,040   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 1,000 | 4 | 20,010   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 2,000 | 4 | 20,020   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 4,000 | 4 | 20,040   |

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø     |      |       |       |       |       |      |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-----------------------------|------|-------|-------|-------|-------|------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                           | 6    | 8     | 10    | 12    | 16    | 20   |      |      |
| P   | ≤ 850 N/mm <sup>2</sup> | 340            | 0,036                   | 0,072 | 0,096 | 0,138 | 0,17 | 0,22 | 0,28 |                | a <sub>p</sub> max = 0,10xD | 360  | 0,017 | 0,034 | 0,046 | 0,066 | 0,08 | 0,11 | 0,13 |
|     | ≥ 850 N/mm <sup>2</sup> | 250            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 |                |                             | 270  | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
| M   | ≤ 750 N/mm <sup>2</sup> | 220            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 |                | a <sub>p</sub> max = 0,02xD | 240  | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
|     | ≥ 750 N/mm <sup>2</sup> | 110            | 0,024                   | 0,048 | 0,064 | 0,092 | 0,11 | 0,15 | 0,18 |                |                             | 120  | 0,011 | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 | 0,08 |
| S   | Ni-Basis                | 60             | 0,019                   | 0,039 | 0,052 | 0,074 | 0,09 | 0,12 | 0,15 |                | a <sub>p</sub> max = 0,02xD | 60   | 0,008 | 0,017 | 0,022 | 0,032 | 0,04 | 0,05 | 0,06 |
|     | Ti-Basis                | 110            | 0,028                   | 0,055 | 0,074 | 0,104 | 0,12 | 0,17 | 0,21 |                |                             | 120  | 0,013 | 0,026 | 0,035 | 0,050 | 0,06 | 0,08 | 0,10 |
| N   | ≤ 7 % Si                | 900            | 0,045                   | 0,090 | 0,120 | 0,184 | 0,22 | 0,29 | 0,37 |                | a <sub>p</sub> max = 0,02xD | 1000 | 0,021 | 0,043 | 0,057 | 0,088 | 0,11 | 0,14 | 0,18 |
|     | ≥ 7 % Si                | 430            | 0,038                   | 0,076 | 0,101 | 0,138 | 0,17 | 0,22 | 0,28 |                |                             | 460  | 0,018 | 0,036 | 0,048 | 0,066 | 0,08 | 0,11 | 0,13 |

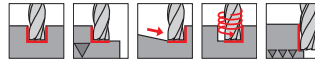
Fräswerkzeuge

## SuperF-UT-Fräser

### SuperF-UT-Fräser H-X



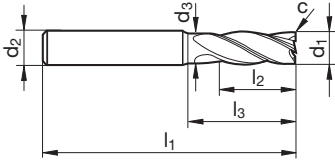
Katalog-Nr. 54340



|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ○        |          | ●        |          |          | ●        |

Arbeitsrichtwerte  
Seite 280-293

- Nuten bis max. 65 HRC
- Halsfreischliff
- Zentrumschnitt



| d1 f9<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|-------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 3,000       | 6,000       | 2,850    | 57,000   | 8,000    | 12,000   | 0,060         | 4 | <b>3,000</b>  |
| 4,000       | 6,000       | 3,800    | 57,000   | 11,000   | 15,000   | 0,080         | 4 | <b>4,000</b>  |
| 5,000       | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,100         | 4 | <b>5,000</b>  |
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,120         | 4 | <b>6,000</b>  |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,160         | 4 | <b>8,000</b>  |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 31,000   | 0,200         | 4 | <b>10,000</b> |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 37,000   | 0,240         | 4 | <b>12,000</b> |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 43,000   | 0,320         | 4 | <b>16,000</b> |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 53,000   | 0,400         | 4 | <b>20,000</b> |

Fräserwerkzeuge

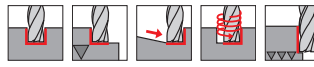
| ISO      | Härte                    | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      |
|----------|--------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|------|------|------|
|          |                          |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |
| <b>P</b> | ≥ 1000 N/mm <sup>2</sup> | <b>270</b>     | 0,034                   | 0,068 | 0,090 | 0,125 | 0,15 | 0,20 | 0,25 | <b>270</b>     | 0,015                   | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
| <b>K</b> | ≥ 300 HB                 | <b>280</b>     | 0,038                   | 0,075 | 0,100 | 0,138 | 0,17 | 0,22 | 0,28 | <b>280</b>     | 0,017                   | 0,033 | 0,044 | 0,061 | 0,07 | 0,10 | 0,12 |
| <b>H</b> | ≤ 55 HRC                 | <b>140</b>     | 0,026                   | 0,053 | 0,070 | 0,100 | 0,12 | 0,16 | 0,20 | <b>140</b>     | 0,011                   | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 | 0,08 |
|          | ≥ 55 HRC                 | <b>80</b>      | 0,021                   | 0,042 | 0,056 | 0,075 | 0,09 | 0,12 | 0,15 | <b>100</b>     | 0,008                   | 0,015 | 0,020 | 0,027 | 0,03 | 0,04 | 0,05 |

## SuperF-UT-Fräser

### SuperF-UT-Fräser H-X



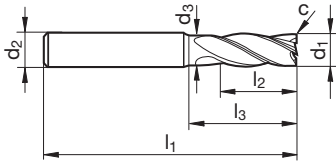
Katalog-Nr. 54341



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ |   | ● |   |   | ● |

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- Nuten bis max. 65 HRC
- Halsfreischliff
- Zentrumschnitt



| d1 f9<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|---------------|---|----------|
| 3,000       | 6,000       | 2,850    | 57,000   | 8,000    | 12,000   | 0,060         | 4 | 3,000    |
| 4,000       | 6,000       | 3,800    | 57,000   | 11,000   | 15,000   | 0,080         | 4 | 4,000    |
| 5,000       | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,100         | 4 | 5,000    |
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,120         | 4 | 6,000    |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,160         | 4 | 8,000    |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 31,000   | 0,200         | 4 | 10,000   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 37,000   | 0,240         | 4 | 12,000   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 43,000   | 0,320         | 4 | 16,000   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 53,000   | 0,400         | 4 | 20,000   |

Fräswerkzeuge

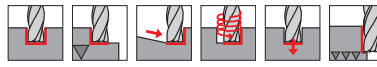
| ISO | Härte                    | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      |
|-----|--------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|------|------|------|
|     |                          |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |
| P   | ≥ 1000 N/mm <sup>2</sup> | 270            | 0,034                   | 0,068 | 0,090 | 0,125 | 0,15 | 0,20 | 0,25 | 270            | 0,015                   | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
|     | ≥ 300 HB                 | 280            | 0,038                   | 0,075 | 0,100 | 0,138 | 0,17 | 0,22 | 0,28 | 280            | 0,017                   | 0,033 | 0,044 | 0,061 | 0,07 | 0,10 | 0,12 |
| H   | ≤ 55 HRC                 | 140            | 0,026                   | 0,053 | 0,070 | 0,100 | 0,12 | 0,16 | 0,20 | 140            | 0,011                   | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 | 0,08 |
|     | ≥ 55 HRC                 | 80             | 0,021                   | 0,042 | 0,056 | 0,075 | 0,09 | 0,12 | 0,15 | 100            | 0,008                   | 0,015 | 0,020 | 0,027 | 0,03 | 0,04 | 0,05 |

## SuperF-UT-Fräser

### SuperF-UT-Fräser S



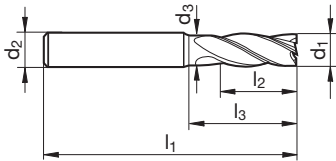
Katalog-Nr. 54556



|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ○        | ○        | ○        | ○        | ○        |          |

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- ohne Eckenschutzfase
- zum Feinstschlichten
- bis 1600 N/mm<sup>2</sup>
- Halsfreischliff
- Zentrumschnitt
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung
- HB Spannfläche auf Anfrage möglich



Fräswerkzeuge

| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | Z | Code-Nr.      |
|--------------|-------------|----------|----------|----------|----------|---|---------------|
| 3,000        | 6,000       | 2,800    | 57,000   | 8,000    | 15,000   | 4 | <b>3,000</b>  |
| 4,000        | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 4 | <b>4,000</b>  |
| 5,000        | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 4 | <b>5,000</b>  |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 4 | <b>6,000</b>  |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 4 | <b>8,000</b>  |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 4 | <b>10,000</b> |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 4 | <b>12,000</b> |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 4 | <b>16,000</b> |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 4 | <b>20,000</b> |

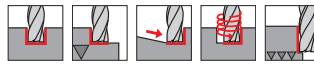
| ISO      | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      |
|----------|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|
|          |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |
| <b>P</b> | ≤ 850 N/mm <sup>2</sup> | <b>360</b>     | 0,017                   | 0,034 | 0,046 | 0,066 | 0,08 | 0,11 | 0,13 |
|          | ≥ 850 N/mm <sup>2</sup> | <b>270</b>     | 0,015                   | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
| <b>M</b> | ≤ 750 N/mm <sup>2</sup> | <b>240</b>     | 0,015                   | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
|          | ≥ 750 N/mm <sup>2</sup> | <b>120</b>     | 0,011                   | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 | 0,08 |
| <b>S</b> | Ni-Basis                | <b>60</b>      | 0,008                   | 0,017 | 0,022 | 0,032 | 0,04 | 0,05 | 0,06 |
|          | Ti-Basis                | <b>120</b>     | 0,013                   | 0,026 | 0,035 | 0,050 | 0,06 | 0,08 | 0,10 |

## SuperF-UT-Fräser

### SuperF-UT-Fräser N<sup>2</sup>



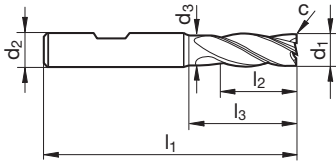
Katalog-Nr. 64552



| P | M | K | N | S | H |
|---|---|---|---|---|---|
| ● | ○ | ● | ○ | ○ | ○ |

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- sehr großes Materialspektrum = universeller Einsatzbereich
- extrem hohe Standzeiten durch hochharte TiAlZrN-Beschichtung
- bis 1600 N/mm<sup>2</sup>
- Mikroeckenschutz
- Halsfreischliff
- Zentrumschnitt
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung
- auch als Satz 78883 1,00 erhältlich



| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|--------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 3,000        | 6,000       | 2,800    | 57,000   | 8,000    | 15,000   | 0,100         | 4 | <b>3,000</b>  |
| 4,000        | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 0,100         | 4 | <b>4,000</b>  |
| 5,000        | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,100         | 4 | <b>5,000</b>  |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,150         | 4 | <b>6,000</b>  |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,150         | 4 | <b>8,000</b>  |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,200         | 4 | <b>10,000</b> |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,200         | 4 | <b>12,000</b> |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,350         | 4 | <b>16,000</b> |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 0,450         | 4 | <b>20,000</b> |
| 25,000       | 25,000      | 24,000   | 121,000  | 45,000   | 63,000   | 0,600         | 4 | <b>25,000</b> |

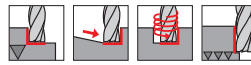
| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      | f <sub>z</sub> (mm/z)/Ø |                        |   |                        |            |       |       |       |       |      |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|-------------------------|------------------------|---|------------------------|------------|-------|-------|-------|-------|------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20                      | 3                      | 6 | 8                      | 10         | 12    | 16    | 20    |       |      |      |      |
| P   | ≤ 850 N/mm <sup>2</sup> | <b>180</b>     | 0,016                   | 0,031 | 0,042 | 0,060 | 0,07 | 0,10 | 0,12                    | a <sub>p</sub> = 1,0xD |   | a <sub>e</sub> = 1,0xD | <b>305</b> | 0,025 | 0,050 | 0,067 | 0,096 | 0,12 | 0,15 | 0,19 |
|     | ≥ 850 N/mm <sup>2</sup> | <b>135</b>     | 0,014                   | 0,027 | 0,036 | 0,050 | 0,06 | 0,08 | 0,10                    |                        |   |                        | <b>230</b> | 0,022 | 0,043 | 0,058 | 0,080 | 0,10 | 0,13 | 0,16 |
| K   | ≤ 240 HB                | <b>160</b>     | 0,017                   | 0,033 | 0,044 | 0,065 | 0,08 | 0,10 | 0,13                    | a <sub>p</sub> = 1,0xD |   | a <sub>e</sub> = 1,0xD | <b>270</b> | 0,026 | 0,053 | 0,070 | 0,104 | 0,12 | 0,17 | 0,21 |
|     | ≥ 240 HB                | <b>140</b>     | 0,015                   | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11                    |                        |   |                        | <b>240</b> | 0,024 | 0,048 | 0,064 | 0,088 | 0,11 | 0,14 | 0,18 |

# SuperF-UT-Fräser

## SuperF-UT-Fräser NL



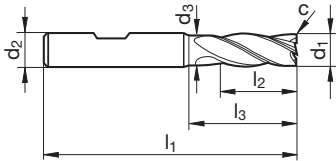
Katalog-Nr. 54553



| P | M | K | N | S | H |
|---|---|---|---|---|---|
| ● | ○ | ● | ○ | ○ | ○ |

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- universell einsetzbar
- bis 1600 N/mm<sup>2</sup>
- Mikroeckenschutz
- Halsfreischliff
- Zentrumschnitt
- HSC Schichten bis 4xD Schneidenlänge
- ungleiche Teilung, gleiche Drallsteigung



| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|--------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 6,000        | 6,000       | 5,700    | 65,000   | 24,000   | 28,000   | 0,120         | 4 | <b>6,000</b>  |
| 8,000        | 8,000       | 7,700    | 75,000   | 32,000   | 38,000   | 0,160         | 4 | <b>8,000</b>  |
| 10,000       | 10,000      | 9,500    | 100,000  | 40,000   | 58,000   | 0,200         | 4 | <b>10,000</b> |
| 12,000       | 12,000      | 11,500   | 100,000  | 48,000   | 53,000   | 0,240         | 4 | <b>12,000</b> |
| 16,000       | 16,000      | 15,500   | 125,000  | 64,000   | 75,000   | 0,320         | 4 | <b>16,000</b> |
| 20,000       | 20,000      | 19,500   | 150,000  | 80,000   | 98,000   | 0,400         | 4 | <b>20,000</b> |
| 25,000       | 25,000      | 24,000   | 175,000  | 100,000  | 117,000  | 0,500         | 4 | <b>25,000</b> |

Fräswerkzeuge

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|----------------|-------------------------|-------|-------|-------|-------|------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   |                | 20                      | 3     | 6     | 8     | 10    | 12   | 16   | 20   |
| P   | ≤ 850 N/mm <sup>2</sup> | 130            | 0,013                   | 0,025 | 0,012 | 0,048 | 0,06 | 0,08 | 0,10           | 160                     | 0,009 | 0,017 | 0,023 | 0,033 | 0,04 | 0,05 | 0,07 |
|     | ≥ 850 N/mm <sup>2</sup> | 100            | 0,011                   | 0,022 | 0,029 | 0,040 | 0,05 | 0,06 | 0,08           | 120                     | 0,007 | 0,015 | 0,020 | 0,028 | 0,03 | 0,04 | 0,06 |
| K   | ≤ 240 HB                | 120            | 0,013                   | 0,027 | 0,035 | 0,052 | 0,06 | 0,08 | 0,10           | 140                     | 0,009 | 0,018 | 0,024 | 0,036 | 0,04 | 0,06 | 0,07 |
|     | ≥ 240 HB                | 100            | 0,012                   | 0,024 | 0,032 | 0,044 | 0,05 | 0,07 | 0,09           | 120                     | 0,008 | 0,017 | 0,022 | 0,030 | 0,04 | 0,05 | 0,06 |

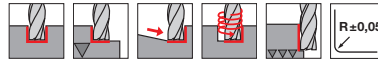


## SuperF-UT-Fräser

### SuperF-UT-Fräser N-r



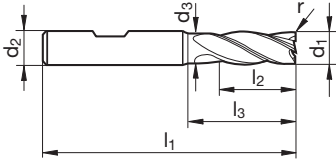
Katalog-Nr. 54550



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ○ |   | ● | ● |   |

Arbeitsrichtwerte  
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- sehr großes Materialspektrum = universeller Einsatzbereich
- optimiert für Fräsoperationen im HPC und HSC Bereich
- mit definierten Eckradien
- Halsfreischliff
- Zentrumschnitt
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung



| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | r     | Z | Code-Nr. |
|--------------|-------------|----------|----------|----------|----------|-------|---|----------|
| 3,000        | 6,000       | 2,850    | 57,000   | 8,000    | 15,000   | 0,200 | 4 | 3,002    |
| 3,000        | 6,000       | 2,800    | 57,000   | 8,000    | 15,000   | 0,500 | 4 | 3,005    |
| 4,000        | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 0,200 | 4 | 4,002    |
| 4,000        | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 0,500 | 4 | 4,005    |
| 4,000        | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 1,000 | 4 | 4,010    |
| 5,000        | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,200 | 4 | 5,002    |
| 5,000        | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,500 | 4 | 5,005    |
| 5,000        | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 1,000 | 4 | 5,010    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,200 | 4 | 6,002    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,500 | 4 | 6,005    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 1,000 | 4 | 6,010    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 1,500 | 4 | 6,015    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,300 | 4 | 8,003    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,500 | 4 | 8,005    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 1,000 | 4 | 8,010    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 1,500 | 4 | 8,015    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 2,000 | 4 | 8,020    |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,300 | 4 | 10,003   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,500 | 4 | 10,005   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 1,000 | 4 | 10,010   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 1,500 | 4 | 10,015   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 2,000 | 4 | 10,020   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 2,500 | 4 | 10,025   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,300 | 4 | 12,003   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,500 | 4 | 12,005   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 1,000 | 4 | 12,010   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 1,500 | 4 | 12,015   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 2,000 | 4 | 12,020   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 2,500 | 4 | 12,025   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 3,000 | 4 | 12,030   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,500 | 4 | 16,005   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 1,000 | 4 | 16,010   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 1,500 | 4 | 16,015   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 2,000 | 4 | 16,020   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 2,500 | 4 | 16,025   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 3,000 | 4 | 16,030   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 4,000 | 4 | 16,040   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 0,500 | 4 | 20,005   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 1,000 | 4 | 20,010   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 1,500 | 4 | 20,015   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 2,000 | 4 | 20,020   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 2,500 | 4 | 20,025   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 3,000 | 4 | 20,030   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 4,000 | 4 | 20,040   |

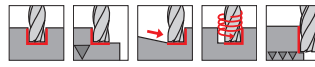
| ISO      | Härte                     | $v_c$      | $f_z$ (mm/z)/ $\emptyset$ |       |       |       |      |      |      | $v_c$      | $f_z$ (mm/z)/ $\emptyset$ |       |       |                            |      |      |      |
|----------|---------------------------|------------|---------------------------|-------|-------|-------|------|------|------|------------|---------------------------|-------|-------|----------------------------|------|------|------|
|          |                           |            | 3                         | 6     | 8     | 10    | 12   | 16   | 20   |            | 3                         | 6     | 8     | 10                         | 12   | 16   | 20   |
|          |                           |            | $a_p = 1,0xD$             |       |       |       |      |      |      |            | $a_p = 1,0xD$             |       |       | $a_e \text{ max} = 0,75xD$ |      |      |      |
| <b>P</b> | $\leq 850 \text{ N/mm}^2$ | <b>180</b> | 0,016                     | 0,031 | 0,042 | 0,060 | 0,07 | 0,10 | 0,12 | <b>210</b> | 0,018                     | 0,036 | 0,048 | 0,069                      | 0,08 | 0,11 | 0,14 |
|          | $\geq 850 \text{ N/mm}^2$ | <b>135</b> | 0,014                     | 0,027 | 0,036 | 0,050 | 0,06 | 0,08 | 0,10 | <b>160</b> | 0,016                     | 0,031 | 0,041 | 0,058                      | 0,07 | 0,09 | 0,12 |
| <b>M</b> | $\leq 750 \text{ N/mm}^2$ | <b>120</b> | 0,014                     | 0,027 | 0,036 | 0,050 | 0,06 | 0,08 | 0,10 | <b>140</b> | 0,016                     | 0,031 | 0,041 | 0,058                      | 0,07 | 0,09 | 0,12 |
|          | $\geq 750 \text{ N/mm}^2$ | <b>60</b>  | 0,011                     | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 | 0,08 | <b>80</b>  | 0,013                     | 0,025 | 0,034 | 0,048                      | 0,06 | 0,08 | 0,10 |
| <b>S</b> | Ni-Basis                  | <b>30</b>  | 0,008                     | 0,017 | 0,022 | 0,032 | 0,04 | 0,05 | 0,06 | <b>40</b>  | 0,010                     | 0,020 | 0,027 | 0,038                      | 0,05 | 0,06 | 0,08 |
|          | Ti-Basis                  | <b>60</b>  | 0,012                     | 0,024 | 0,032 | 0,045 | 0,05 | 0,07 | 0,09 | <b>80</b>  | 0,014                     | 0,029 | 0,038 | 0,054                      | 0,06 | 0,09 | 0,11 |
| <b>N</b> | $\leq 5\% \text{ Si}$     | <b>500</b> | 0,020                     | 0,039 | 0,052 | 0,080 | 0,10 | 0,13 | 0,16 | <b>600</b> | 0,022                     | 0,045 | 0,060 | 0,092                      | 0,11 | 0,15 | 0,18 |
|          | $\geq 5\% \text{ Si}$     | <b>230</b> | 0,017                     | 0,033 | 0,044 | 0,060 | 0,07 | 0,10 | 0,12 | <b>300</b> | 0,019                     | 0,038 | 0,051 | 0,069                      | 0,08 | 0,11 | 0,14 |

# SuperF-UT-Fräser

## SuperF-UT-Fräser U



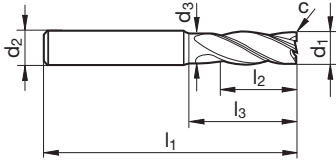
Katalog-Nr. 54500



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|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • |   | • | • |   |

Arbeitsrichtwerte  
Seite 280-293

- speziell für weich-zähe und hochlegierte Werkstoffe
- längere Schneide als DIN 6527 L
- Halsfreischliff
- Zentrumschnitt



| d1 e8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|---------------|---|----------|
| 1,000       | 4,000       | 0,920    | 50,000   | 3,000    | 4,000    | 0,020         | 4 | 1,000    |
| 1,500       | 4,000       | 1,400    | 50,000   | 4,500    | 6,000    | 0,030         | 4 | 1,500    |
| 2,000       | 6,000       | 1,850    | 50,000   | 6,000    | 8,000    | 0,040         | 4 | 2,000    |
| 2,500       | 6,000       | 2,350    | 50,000   | 7,500    | 10,000   | 0,050         | 4 | 2,500    |
| 3,000       | 6,000       | 2,850    | 57,000   | 10,000   | 15,000   | 0,060         | 4 | 3,000    |
| 4,000       | 6,000       | 3,800    | 57,000   | 14,000   | 18,000   | 0,080         | 4 | 4,000    |
| 5,000       | 6,000       | 4,800    | 57,000   | 15,000   | 20,000   | 0,100         | 4 | 5,000    |
| 6,000       | 6,000       | 5,700    | 57,000   | 16,000   | 20,000   | 0,120         | 4 | 6,000    |
| 8,000       | 8,000       | 7,700    | 63,000   | 21,000   | 26,000   | 0,160         | 4 | 8,000    |
| 10,000      | 10,000      | 9,500    | 72,000   | 25,000   | 31,000   | 0,200         | 4 | 10,000   |
| 12,000      | 12,000      | 11,500   | 83,000   | 28,000   | 37,000   | 0,240         | 4 | 12,000   |
| 14,000      | 14,000      | 13,500   | 83,000   | 28,000   | 37,000   | 0,280         | 4 | 14,000   |
| 16,000      | 16,000      | 15,500   | 92,000   | 36,000   | 43,000   | 0,320         | 4 | 16,000   |
| 20,000      | 20,000      | 19,500   | 104,000  | 41,000   | 53,000   | 0,400         | 4 | 20,000   |

Fräswerkzeuge

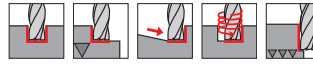
| ISO | Härte  | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |                        |       |       |       | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |                            |       |      |       |
|-----|--|----------------|-------------------------|-------|-------|-------|------------------------|-------|-------|-------|----------------|-------------------------|-------|-------|-------|----------------------------|-------|------|-------|
|     |  |                | 1                       | 3     | 6     | 8     | 10                     | 12    | 16    | 20    |                | 1                       | 3     | 6     | 8     | 10                         | 12    | 16   | 20    |
| P   | < 500 N/mm <sup>2</sup><br>500-900 N/mm <sup>2</sup> | 180            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> = 1,0xD |       |       |       | 210            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> max = 0,6xD |       |      |       |
|     |  |                | 0,010                   | 0,016 | 0,030 | 0,042 | 0,06                   | 0,072 | 0,1   | 0,12  |                | 0,011                   | 0,018 | 0,036 | 0,048 | 0,069                      | 0,08  | 0,11 | 0,14  |
| M   | < 500 N/mm <sup>2</sup><br>500-900 N/mm <sup>2</sup> | 120            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> = 1,0xD |       |       |       | 140            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> max = 0,6xD |       |      |       |
|     |  |                | 0,008                   | 0,014 | 0,027 | 0,036 | 0,05                   | 0,06  | 0,08  | 0,1   |                | 0,009                   | 0,016 | 0,031 | 0,041 | 0,058                      | 0,07  | 0,09 | 0,12  |
| S   | < 900 N/mm <sup>2</sup>                              | 80             | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> = 1,0xD |       |       |       | 100            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> max = 0,6xD |       |      |       |
|     |  |                | 0,006                   | 0,012 | 0,025 | 0,032 | 0,045                  | 0,055 | 0,075 | 0,085 |                | 0,007                   | 0,016 | 0,031 | 0,041 | 0,058                      | 0,07  | 0,09 | 0,12  |
| N   | > 250 N/mm <sup>2</sup>                              | 350            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> = 1,0xD |       |       |       | 60             | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> max = 0,6xD |       |      |       |
|     |  |                | 0,005                   | 0,010 | 0,021 | 0,028 | 0,04                   | 0,048 | 0,06  | 0,07  |                | 0,006                   | 0,013 | 0,025 | 0,034 | 0,048                      | 0,06  | 0,08 | 0,1   |
| N   | > 250 N/mm <sup>2</sup>                              | 45             | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> = 1,0xD |       |       |       | 600            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> max = 0,6xD |       |      |       |
|     |  |                | 0,004                   | 0,008 | 0,016 | 0,022 | 0,032                  | 0,04  | 0,05  | 0,065 |                | 0,005                   | 0,010 | 0,020 | 0,027 | 0,038                      | 0,05  | 0,06 | 0,085 |
| N   | > 250 N/mm <sup>2</sup>                              | 350            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> = 1,0xD |       |       |       | 600            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> max = 0,6xD |       |      |       |
|     |  |                | 0,012                   | 0,020 | 0,038 | 0,05  | 0,08                   | 0,095 | 0,13  | 0,16  |                | 0,013                   | 0,022 | 0,045 | 0,06  | 0,09                       | 0,012 | 0,15 | 0,18  |

## SuperF-UT-Fräser

### SuperF-UT-Fräser U



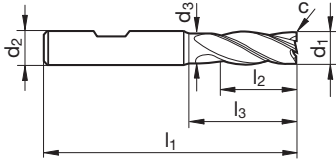
Katalog-Nr. 54501



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|---|---|---|---|---|---|
| P | M | K | N | S | H |
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Arbeitsrichtwerte  
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- speziell für weich-zähe und hochlegierte Werkstoffe
- längere Schneide als DIN 6527 L
- Halsfreischliff
- Zentrumschnitt



Fräswerkzeuge

| d1 e8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|---------------|---|----------|
| 4,000       | 6,000       | 3,800    | 57,000   | 14,000   | 18,000   | 0,080         | 4 | 4,000    |
| 5,000       | 6,000       | 4,800    | 57,000   | 15,000   | 20,000   | 0,100         | 4 | 5,000    |
| 6,000       | 6,000       | 5,700    | 57,000   | 16,000   | 20,000   | 0,120         | 4 | 6,000    |
| 8,000       | 8,000       | 7,700    | 63,000   | 21,000   | 26,000   | 0,160         | 4 | 8,000    |
| 10,000      | 10,000      | 9,500    | 72,000   | 25,000   | 31,000   | 0,200         | 4 | 10,000   |
| 12,000      | 12,000      | 11,500   | 83,000   | 28,000   | 37,000   | 0,240         | 4 | 12,000   |
| 14,000      | 14,000      | 13,500   | 83,000   | 28,000   | 37,000   | 0,280         | 4 | 14,000   |
| 16,000      | 16,000      | 15,500   | 92,000   | 36,000   | 43,000   | 0,320         | 4 | 16,000   |
| 20,000      | 20,000      | 19,500   | 104,000  | 41,000   | 53,000   | 0,400         | 4 | 20,000   |

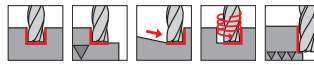
| ISO | Härte                     | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       |       | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       |      |       |
|-----|---------------------------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|------|-------|
|     |                           |                | 1                       | 3     | 6     | 8     | 10    | 12    | 16    | 20    |                | 1                       | 3     | 6     | 8     | 10    | 12    | 16    | 20   |       |
| P   | < 500 N/mm <sup>2</sup>   | 180            | 0,010                   | 0,016 | 0,030 | 0,042 | 0,06  | 0,072 | 0,1   | 0,12  |                | 210                     | 0,011 | 0,018 | 0,036 | 0,048 | 0,069 | 0,08  | 0,11 | 0,14  |
|     | 500-900 N/mm <sup>2</sup> | 140            | 0,008                   | 0,014 | 0,027 | 0,036 | 0,05  | 0,06  | 0,08  | 0,1   |                | 160                     | 0,009 | 0,016 | 0,031 | 0,041 | 0,058 | 0,07  | 0,09 | 0,12  |
| M   | < 500 N/mm <sup>2</sup>   | 120            | 0,006                   | 0,012 | 0,025 | 0,032 | 0,045 | 0,055 | 0,075 | 0,085 |                | 140                     | 0,007 | 0,016 | 0,031 | 0,041 | 0,058 | 0,07  | 0,09 | 0,12  |
|     | 500-900 N/mm <sup>2</sup> | 80             | 0,005                   | 0,010 | 0,021 | 0,028 | 0,04  | 0,048 | 0,06  | 0,07  |                | 100                     | 0,006 | 0,013 | 0,025 | 0,034 | 0,048 | 0,06  | 0,08 | 0,1   |
| S   | < 900 N/mm <sup>2</sup>   | 45             | 0,004                   | 0,008 | 0,016 | 0,022 | 0,032 | 0,04  | 0,05  | 0,065 |                | 60                      | 0,005 | 0,010 | 0,020 | 0,027 | 0,038 | 0,05  | 0,06 | 0,085 |
| N   | > 250 N/mm <sup>2</sup>   | 350            | 0,012                   | 0,020 | 0,038 | 0,05  | 0,08  | 0,095 | 0,13  | 0,16  |                | 600                     | 0,013 | 0,022 | 0,045 | 0,06  | 0,09  | 0,012 | 0,15 | 0,18  |

# SuperF-UT-Fräser

## SuperF-UT-Fräser UL



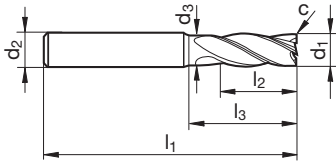
Katalog-Nr. 54502



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|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • |   | • | • |   |

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- speziell für weich-zähe und hochlegierte Werkstoffe
- mittellange Ausführung
- Halsfreischliff
- Zentrumschnitt



| d1 e8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|---------------|---|----------|
| 1,000       | 4,000       | 0,920    | 50,000   | 3,000    | 5,500    | 0,020         | 4 | 1,000    |
| 1,500       | 4,000       | 1,400    | 50,000   | 4,500    | 8,500    | 0,030         | 4 | 1,500    |
| 2,000       | 6,000       | 1,850    | 57,000   | 6,000    | 11,500   | 0,040         | 4 | 2,000    |
| 2,500       | 6,000       | 2,350    | 57,000   | 7,500    | 14,500   | 0,050         | 4 | 2,500    |
| 3,000       | 6,000       | 2,850    | 65,000   | 10,000   | 20,000   | 0,060         | 4 | 3,000    |
| 4,000       | 6,000       | 3,800    | 65,000   | 14,000   | 27,000   | 0,080         | 4 | 4,000    |
| 5,000       | 6,000       | 4,800    | 65,000   | 15,000   | 28,000   | 0,100         | 4 | 5,000    |
| 6,000       | 6,000       | 5,700    | 75,000   | 19,000   | 38,000   | 0,120         | 4 | 6,000    |
| 8,000       | 8,000       | 7,700    | 80,000   | 21,000   | 43,000   | 0,160         | 4 | 8,000    |
| 10,000      | 10,000      | 9,500    | 93,000   | 26,000   | 52,000   | 0,200         | 4 | 10,000   |
| 12,000      | 12,000      | 11,500   | 100,000  | 28,000   | 54,000   | 0,240         | 4 | 12,000   |
| 14,000      | 14,000      | 13,500   | 100,000  | 28,000   | 54,000   | 0,280         | 4 | 14,000   |
| 16,000      | 16,000      | 15,500   | 123,000  | 38,000   | 74,000   | 0,320         | 4 | 16,000   |
| 20,000      | 20,000      | 19,500   | 126,000  | 41,000   | 75,000   | 0,400         | 4 | 20,000   |

Fräswerkzeuge

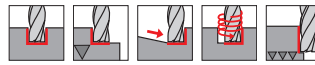
| ISO | Härte  | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |                        |       |       |       | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |                            |       |      |       |
|-----|--|----------------|-------------------------|-------|-------|-------|------------------------|-------|-------|-------|----------------|-------------------------|-------|-------|-------|----------------------------|-------|------|-------|
|     |  |                | 1                       | 3     | 6     | 8     | 10                     | 12    | 16    | 20    |                | 1                       | 3     | 6     | 8     | 10                         | 12    | 16   | 20    |
| P   | < 500 N/mm <sup>2</sup><br>500-900 N/mm <sup>2</sup> | 180            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> = 0,4xD |       |       |       | 210            | a <sub>p</sub> = 2,0xD  |       |       |       | a <sub>e</sub> max = 0,1xD |       |      |       |
|     |  |                | 0,010                   | 0,016 | 0,030 | 0,042 | 0,06                   | 0,072 | 0,1   | 0,12  |                | 0,011                   | 0,018 | 0,036 | 0,048 | 0,069                      | 0,08  | 0,11 | 0,14  |
| M   | < 500 N/mm <sup>2</sup><br>500-900 N/mm <sup>2</sup> | 120            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> = 0,4xD |       |       |       | 140            | a <sub>p</sub> = 2,0xD  |       |       |       | a <sub>e</sub> max = 0,1xD |       |      |       |
|     |  |                | 0,008                   | 0,014 | 0,027 | 0,036 | 0,05                   | 0,06  | 0,08  | 0,1   |                | 0,009                   | 0,016 | 0,031 | 0,041 | 0,058                      | 0,07  | 0,09 | 0,12  |
| S   | < 900 N/mm <sup>2</sup>                              | 80             | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> = 0,4xD |       |       |       | 100            | a <sub>p</sub> = 2,0xD  |       |       |       | a <sub>e</sub> max = 0,1xD |       |      |       |
|     |  |                | 0,006                   | 0,012 | 0,025 | 0,032 | 0,045                  | 0,055 | 0,075 | 0,085 |                | 0,007                   | 0,016 | 0,031 | 0,041 | 0,058                      | 0,07  | 0,09 | 0,12  |
| N   | > 250 N/mm <sup>2</sup>                              | 45             | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> = 0,4xD |       |       |       | 60             | a <sub>p</sub> = 2,0xD  |       |       |       | a <sub>e</sub> max = 0,1xD |       |      |       |
|     |  |                | 0,005                   | 0,010 | 0,021 | 0,028 | 0,04                   | 0,048 | 0,06  | 0,07  |                | 0,006                   | 0,013 | 0,025 | 0,034 | 0,048                      | 0,06  | 0,08 | 0,1   |
| N   | > 250 N/mm <sup>2</sup>                              | 350            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> = 0,4xD |       |       |       | 600            | a <sub>p</sub> = 2,0xD  |       |       |       | a <sub>e</sub> max = 0,1xD |       |      |       |
|     |  |                | 0,004                   | 0,008 | 0,016 | 0,022 | 0,032                  | 0,04  | 0,05  | 0,065 |                | 0,005                   | 0,010 | 0,020 | 0,027 | 0,038                      | 0,05  | 0,06 | 0,085 |
| N   | > 250 N/mm <sup>2</sup>                              | 350            | a <sub>p</sub> = 1,0xD  |       |       |       | a <sub>e</sub> = 0,4xD |       |       |       | 600            | a <sub>p</sub> = 2,0xD  |       |       |       | a <sub>e</sub> max = 0,1xD |       |      |       |
|     |  |                | 0,012                   | 0,020 | 0,038 | 0,05  | 0,08                   | 0,095 | 0,13  | 0,16  |                | 0,013                   | 0,022 | 0,045 | 0,06  | 0,09                       | 0,012 | 0,15 | 0,18  |

# SuperF-UT-Fräser

## SuperF-UT-Fräser UL



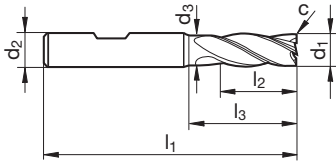
Katalog-Nr. 54503



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● |   | ● | ● |   |

Arbeitsrichtwerte  
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- speziell für weich-zähe und hochlegierte Werkstoffe
- mittellange Ausführung
- Halsfreischliff
- Zentrumschnitt



Fräswerkzeuge

| d1 e8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|---------------|---|----------|
| 4,000       | 6,000       | 3,800    | 65,000   | 14,000   | 27,000   | 0,080         | 4 | 4,000    |
| 5,000       | 6,000       | 4,800    | 65,000   | 15,000   | 28,000   | 0,100         | 4 | 5,000    |
| 6,000       | 6,000       | 5,700    | 75,000   | 19,000   | 38,000   | 0,120         | 4 | 6,000    |
| 8,000       | 8,000       | 7,700    | 80,000   | 21,000   | 43,000   | 0,160         | 4 | 8,000    |
| 10,000      | 10,000      | 9,500    | 93,000   | 26,000   | 52,000   | 0,200         | 4 | 10,000   |
| 12,000      | 12,000      | 11,500   | 100,000  | 28,000   | 54,000   | 0,240         | 4 | 12,000   |
| 14,000      | 14,000      | 13,500   | 100,000  | 28,000   | 54,000   | 0,280         | 4 | 14,000   |
| 16,000      | 16,000      | 15,500   | 123,000  | 38,000   | 74,000   | 0,320         | 4 | 16,000   |
| 20,000      | 20,000      | 19,500   | 126,000  | 41,000   | 75,000   | 0,400         | 4 | 20,000   |

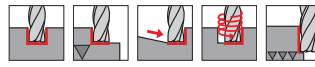
| ISO | Härte                     | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       |       | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       |      |       |
|-----|---------------------------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------------------------|-------|-------|-------|-------|-------|-------|------|-------|
|     |                           |                | 1                       | 3     | 6     | 8     | 10    | 12    | 16    | 20    | 1                       | 3     | 6     | 8     | 10    | 12    | 16    | 20   |       |
| P   | < 500 N/mm <sup>2</sup>   | 180            | 0,010                   | 0,016 | 0,030 | 0,042 | 0,06  | 0,072 | 0,1   | 0,12  | 210                     | 0,011 | 0,018 | 0,036 | 0,048 | 0,069 | 0,08  | 0,11 | 0,14  |
|     | 500-900 N/mm <sup>2</sup> | 140            | 0,008                   | 0,014 | 0,027 | 0,036 | 0,05  | 0,06  | 0,08  | 0,1   | 160                     | 0,009 | 0,016 | 0,031 | 0,041 | 0,058 | 0,07  | 0,09 | 0,12  |
| M   | < 500 N/mm <sup>2</sup>   | 120            | 0,006                   | 0,012 | 0,025 | 0,032 | 0,045 | 0,055 | 0,075 | 0,085 | 140                     | 0,007 | 0,016 | 0,031 | 0,041 | 0,058 | 0,07  | 0,09 | 0,12  |
|     | 500-900 N/mm <sup>2</sup> | 80             | 0,005                   | 0,010 | 0,021 | 0,028 | 0,04  | 0,048 | 0,06  | 0,07  | 100                     | 0,006 | 0,013 | 0,025 | 0,034 | 0,048 | 0,06  | 0,08 | 0,1   |
| S   | < 900 N/mm <sup>2</sup>   | 45             | 0,004                   | 0,008 | 0,016 | 0,022 | 0,032 | 0,04  | 0,05  | 0,065 | 60                      | 0,005 | 0,010 | 0,020 | 0,027 | 0,038 | 0,05  | 0,06 | 0,085 |
| N   | > 250 N/mm <sup>2</sup>   | 350            | 0,012                   | 0,020 | 0,038 | 0,05  | 0,08  | 0,095 | 0,13  | 0,16  | 600                     | 0,013 | 0,022 | 0,045 | 0,06  | 0,09  | 0,012 | 0,15 | 0,18  |

# SuperF-UT-Fräser

## SuperF-UT-Fräser VA-X<sup>2</sup>



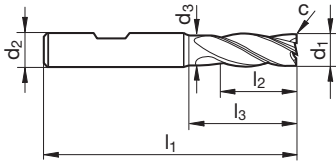
Katalog-Nr. 64553



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ | ● | ○ | ○ | ● | ○ |

Arbeitsrichtwerte  
Seite 280-293

- extrem hohe Standzeiten durch hochharte TiAlZrN-Beschichtung
- zur Bearbeitung von rost- und säurebeständigen Stählen sowie Nickelbasislegierungen
- Mikroeckenschutz
- Halsfreischliff
- Zentrumschnitt
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung



| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr. |
|--------------|-------------|----------|----------|----------|----------|---------------|---|----------|
| 3,000        | 6,000       | 2,800    | 57,000   | 8,000    | 15,000   | 0,100         | 4 | 3,000    |
| 3,500        | 6,000       | 3,300    | 57,000   | 10,000   | 15,000   | 0,100         | 4 | 3,500    |
| 4,000        | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 0,150         | 4 | 4,000    |
| 4,500        | 6,000       | 4,300    | 57,000   | 11,000   | 18,000   | 0,150         | 4 | 4,500    |
| 5,000        | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,150         | 4 | 5,000    |
| 5,500        | 6,000       | 5,300    | 57,000   | 13,000   | 19,400   | 0,200         | 4 | 5,500    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,200         | 4 | 6,000    |
| 6,500        | 8,000       | 6,200    | 63,000   | 16,000   | 24,400   | 0,250         | 4 | 6,500    |
| 7,000        | 8,000       | 6,700    | 63,000   | 16,000   | 24,900   | 0,250         | 4 | 7,000    |
| 7,500        | 8,000       | 7,200    | 63,000   | 19,000   | 25,300   | 0,250         | 4 | 7,500    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,250         | 4 | 8,000    |
| 8,500        | 10,000      | 8,200    | 72,000   | 19,000   | 29,400   | 0,300         | 4 | 8,500    |
| 9,000        | 10,000      | 8,700    | 72,000   | 19,000   | 29,900   | 0,300         | 4 | 9,000    |
| 9,500        | 10,000      | 9,200    | 72,000   | 22,000   | 30,300   | 0,300         | 4 | 9,500    |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,300         | 4 | 10,000   |
| 11,000       | 12,000      | 10,500   | 83,000   | 26,000   | 34,700   | 0,350         | 4 | 11,000   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,350         | 4 | 12,000   |
| 14,000       | 14,000      | 13,500   | 83,000   | 26,000   | 36,000   | 0,400         | 4 | 14,000   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,500         | 4 | 16,000   |
| 18,000       | 18,000      | 17,500   | 92,000   | 32,000   | 42,000   | 0,600         | 4 | 18,000   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 0,600         | 4 | 20,000   |
| 25,000       | 25,000      | 24,000   | 121,000  | 45,000   | 63,000   | 0,750         | 4 | 25,000   |

Fräswerkzeuge

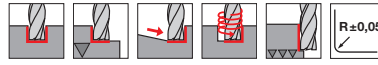
| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø     |      |       |       |       |       |      |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-----------------------------|------|-------|-------|-------|-------|------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                           | 6    | 8     | 10    | 12    | 16    | 20   |      |      |
| P   | ≤ 850 N/mm <sup>2</sup> | 340            | 0,036                   | 0,072 | 0,096 | 0,138 | 0,17 | 0,22 | 0,28 |                | a <sub>e</sub> max = 0,10xD | 360  | 0,017 | 0,034 | 0,046 | 0,066 | 0,08 | 0,11 | 0,13 |
|     | ≥ 850 N/mm <sup>2</sup> | 250            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 |                |                             | 270  | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
| M   | ≤ 750 N/mm <sup>2</sup> | 220            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18 | 0,23 |                | a <sub>e</sub> max = 0,02xD | 240  | 0,015 | 0,030 | 0,040 | 0,055 | 0,07 | 0,09 | 0,11 |
|     | ≥ 750 N/mm <sup>2</sup> | 110            | 0,024                   | 0,048 | 0,064 | 0,092 | 0,11 | 0,15 | 0,18 |                |                             | 120  | 0,011 | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 | 0,08 |
| S   | Ni-Basis                | 60             | 0,019                   | 0,039 | 0,052 | 0,074 | 0,09 | 0,12 | 0,15 |                | a <sub>e</sub> max = 0,02xD | 60   | 0,008 | 0,017 | 0,022 | 0,032 | 0,04 | 0,05 | 0,06 |
|     | Ti-Basis                | 110            | 0,028                   | 0,055 | 0,074 | 0,104 | 0,12 | 0,17 | 0,21 |                |                             | 120  | 0,013 | 0,026 | 0,035 | 0,050 | 0,06 | 0,08 | 0,10 |
| N   | ≤ 7 % Si                | 900            | 0,045                   | 0,090 | 0,120 | 0,184 | 0,22 | 0,29 | 0,37 |                | a <sub>e</sub> max = 0,02xD | 1000 | 0,021 | 0,043 | 0,057 | 0,088 | 0,11 | 0,14 | 0,18 |
|     | ≥ 7 % Si                | 430            | 0,038                   | 0,076 | 0,101 | 0,138 | 0,17 | 0,22 | 0,28 |                |                             | 460  | 0,018 | 0,036 | 0,048 | 0,066 | 0,08 | 0,11 | 0,13 |

## SuperF-UT-Fräser

### SuperF-UT-Fräser VA-r



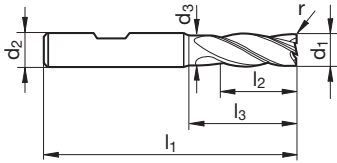
Katalog-Nr. 54542



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ | ● |   | ○ | ● |   |

Arbeitsrichtwerte  
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- rost-/säurebeständige Stähle
- optimiert für Fräsoperationen im HPC und HSC Bereich
- mit definierten Eckradien
- Halsfreischliff
- Zentrumschnitt
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung



| d1 h10<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | r     | Z | Code-Nr. |
|--------------|-------------|----------|----------|----------|----------|-------|---|----------|
| 3,000        | 6,000       | 2,850    | 57,000   | 8,000    | 15,000   | 0,200 | 4 | 3,002    |
| 3,000        | 6,000       | 2,800    | 57,000   | 8,000    | 15,000   | 0,500 | 4 | 3,005    |
| 4,000        | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 0,200 | 4 | 4,002    |
| 4,000        | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 0,500 | 4 | 4,005    |
| 4,000        | 6,000       | 3,800    | 57,000   | 11,000   | 18,000   | 1,000 | 4 | 4,010    |
| 5,000        | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,200 | 4 | 5,002    |
| 5,000        | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,500 | 4 | 5,005    |
| 5,000        | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 1,000 | 4 | 5,010    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,200 | 4 | 6,002    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,500 | 4 | 6,005    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 1,000 | 4 | 6,010    |
| 6,000        | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 1,500 | 4 | 6,015    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,300 | 4 | 8,003    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,500 | 4 | 8,005    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 1,000 | 4 | 8,010    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 1,500 | 4 | 8,015    |
| 8,000        | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 2,000 | 4 | 8,020    |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,300 | 4 | 10,003   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,500 | 4 | 10,005   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 1,000 | 4 | 10,010   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 1,500 | 4 | 10,015   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 2,000 | 4 | 10,020   |
| 10,000       | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 2,500 | 4 | 10,025   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,300 | 4 | 12,003   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,500 | 4 | 12,005   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 1,000 | 4 | 12,010   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 1,500 | 4 | 12,015   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 2,000 | 4 | 12,020   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 2,500 | 4 | 12,025   |
| 12,000       | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 3,000 | 4 | 12,030   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,500 | 4 | 16,005   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 1,000 | 4 | 16,010   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 1,500 | 4 | 16,015   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 2,000 | 4 | 16,020   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 2,500 | 4 | 16,025   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 3,000 | 4 | 16,030   |
| 16,000       | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 4,000 | 4 | 16,040   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 0,500 | 4 | 20,005   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 1,000 | 4 | 20,010   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 1,500 | 4 | 20,015   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 2,000 | 4 | 20,020   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 2,500 | 4 | 20,025   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 3,000 | 4 | 20,030   |
| 20,000       | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 4,000 | 4 | 20,040   |



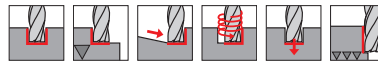
| ISO      | Härte                     | $v_c$      | $f_z$ (mm/z)/ $\emptyset$ |       |       |       |      |      |      | $v_c$      | $f_z$ (mm/z)/ $\emptyset$ |       |       |                            |      |      |      |
|----------|---------------------------|------------|---------------------------|-------|-------|-------|------|------|------|------------|---------------------------|-------|-------|----------------------------|------|------|------|
|          |                           |            | 3                         | 6     | 8     | 10    | 12   | 16   | 20   |            | 3                         | 6     | 8     | 10                         | 12   | 16   | 20   |
|          |                           |            | $a_p = 1,0xD$             |       |       |       |      |      |      |            | $a_p = 1,0xD$             |       |       | $a_e \text{ max} = 0,75xD$ |      |      |      |
| <b>P</b> | $\leq 850 \text{ N/mm}^2$ | <b>180</b> | 0,016                     | 0,031 | 0,042 | 0,060 | 0,07 | 0,10 | 0,12 | <b>210</b> | 0,018                     | 0,036 | 0,048 | 0,069                      | 0,08 | 0,11 | 0,14 |
|          | $\geq 850 \text{ N/mm}^2$ | <b>135</b> | 0,014                     | 0,027 | 0,036 | 0,050 | 0,06 | 0,08 | 0,10 | <b>160</b> | 0,016                     | 0,031 | 0,041 | 0,058                      | 0,07 | 0,09 | 0,12 |
| <b>M</b> | $\leq 750 \text{ N/mm}^2$ | <b>120</b> | 0,014                     | 0,027 | 0,036 | 0,050 | 0,06 | 0,08 | 0,10 | <b>140</b> | 0,016                     | 0,031 | 0,041 | 0,058                      | 0,07 | 0,09 | 0,12 |
|          | $\geq 750 \text{ N/mm}^2$ | <b>60</b>  | 0,011                     | 0,021 | 0,028 | 0,040 | 0,05 | 0,06 | 0,08 | <b>80</b>  | 0,013                     | 0,025 | 0,034 | 0,048                      | 0,06 | 0,08 | 0,10 |
| <b>S</b> | Ni-Basis                  | <b>30</b>  | 0,008                     | 0,017 | 0,022 | 0,032 | 0,04 | 0,05 | 0,06 | <b>40</b>  | 0,010                     | 0,020 | 0,027 | 0,038                      | 0,05 | 0,06 | 0,08 |
|          | Ti-Basis                  | <b>60</b>  | 0,012                     | 0,024 | 0,032 | 0,045 | 0,05 | 0,07 | 0,09 | <b>80</b>  | 0,014                     | 0,029 | 0,038 | 0,054                      | 0,06 | 0,09 | 0,11 |
| <b>N</b> | $\leq 5\% \text{ Si}$     | <b>500</b> | 0,020                     | 0,039 | 0,052 | 0,080 | 0,10 | 0,13 | 0,16 | <b>600</b> | 0,022                     | 0,045 | 0,060 | 0,092                      | 0,11 | 0,15 | 0,18 |
|          | $\geq 5\% \text{ Si}$     | <b>230</b> | 0,017                     | 0,033 | 0,044 | 0,060 | 0,07 | 0,10 | 0,12 | <b>300</b> | 0,019                     | 0,038 | 0,051 | 0,069                      | 0,08 | 0,11 | 0,14 |

## SuperF-UT-Fräser

### SuperF-UT-Fräser Al

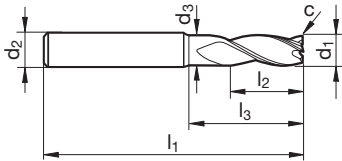


Katalog-Nr. 74557



Arbeitsrichtwerte  
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- nanopolierte Schneidkanten
- besonders stabil durch Kernsprung
- Halsfreischliff
- Zentrumschnitt
- 3-Schneider mit vergrößerten Spanräumen
- Al und Al-Legierungen sowie weitere langspanende NE-Metalle
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung
- Schneidlänge 3xD
- Spiegelschliff für optimale Spanabfuhr
- optimierte Mikrogeometrie



| d1 e8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|-------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 5,000       | 6,000       | 4,800    | 57,000   | 15,000   | 19,400   | 0,050         | 3 | <b>5,000</b>  |
| 6,000       | 6,000       | 5,700    | 65,000   | 18,000   | 28,000   | 0,060         | 3 | <b>6,000</b>  |
| 8,000       | 8,000       | 7,700    | 75,000   | 24,000   | 38,000   | 0,080         | 3 | <b>8,000</b>  |
| 10,000      | 10,000      | 9,500    | 80,000   | 30,000   | 38,000   | 0,100         | 3 | <b>10,000</b> |
| 12,000      | 12,000      | 11,500   | 93,000   | 36,000   | 46,000   | 0,120         | 3 | <b>12,000</b> |
| 16,000      | 16,000      | 15,500   | 108,000  | 48,000   | 58,000   | 0,160         | 3 | <b>16,000</b> |
| 20,000      | 20,000      | 19,500   | 126,000  | 60,000   | 74,000   | 0,200         | 3 | <b>20,000</b> |

Fräserwerkzeuge

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12    | 16    | 20    |                | 3                       | 6     | 8     | 10    | 12    | 16    | 20    |
| N   | ≤ 5 % Si                | 900            | 0,045                   | 0,090 | 0,120 | 0,184 | 0,221 | 0,294 | 0,368 | 1000           | 0,021                   | 0,043 | 0,057 | 0,088 | 0,106 | 0,141 | 0,176 |
|     | ≥ 5 % Si                | 400            | 0,038                   | 0,076 | 0,101 | 0,138 | 0,166 | 0,221 | 0,276 |                | 460                     | 0,018 | 0,036 | 0,048 | 0,066 | 0,079 | 0,106 |
| NE  | ≤ 850 N/mm <sup>2</sup> | 470            | 0,038                   | 0,076 | 0,101 | 0,138 | 0,166 | 0,221 | 0,276 | 500            | 0,018                   | 0,030 | 0,036 | 0,048 | 0,066 | 0,079 | 0,106 |

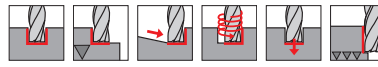
Optional bieten wir unsere Carbo-Beschichtung zur Verbesserung von Spanfluss und Standzeit an.

## SuperF-UT-Fräser

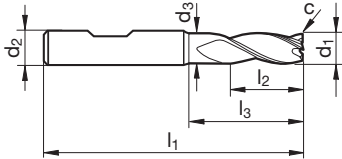
### SuperF-UT-Fräser Al-L



Katalog-Nr. 74556



Arbeitsrichtwerte  
Seite 280-293



- nanopolierte Schneidkanten
- besonders stabil durch Kernsprung
- Halsfreischliff
- Zentrumschnitt
- 3-Schneider mit vergrößerten Spanräumen
- Al und Al-Legierungen sowie weitere langspanende NE-Metalle
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung
- Schneidlänge 3xD
- Spiegelschliff für optimale Spanabfuhr
- optimierte Mikrogeometrie

| d1 e8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|-------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 5,000       | 6,000       | 4,800    | 57,000   | 15,000   | 19,400   | 0,050         | 3 | <b>5,000</b>  |
| 6,000       | 6,000       | 5,700    | 65,000   | 18,000   | 28,000   | 0,060         | 3 | <b>6,000</b>  |
| 8,000       | 8,000       | 7,700    | 75,000   | 24,000   | 38,000   | 0,080         | 3 | <b>8,000</b>  |
| 10,000      | 10,000      | 9,500    | 80,000   | 30,000   | 38,000   | 0,100         | 3 | <b>10,000</b> |
| 12,000      | 12,000      | 11,500   | 93,000   | 36,000   | 46,000   | 0,120         | 3 | <b>12,000</b> |
| 16,000      | 16,000      | 15,500   | 108,000  | 48,000   | 58,000   | 0,160         | 3 | <b>16,000</b> |
| 20,000      | 20,000      | 19,500   | 126,000  | 60,000   | 74,000   | 0,200         | 3 | <b>20,000</b> |

Fräswerkzeuge

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12    | 16    | 20    |                | 3                       | 6     | 8     | 10    | 12    | 16    | 20    |
| N   | ≤ 5 % Si                | 900            | 0,045                   | 0,090 | 0,120 | 0,184 | 0,221 | 0,294 | 0,368 | 1000           | 0,021                   | 0,043 | 0,057 | 0,088 | 0,106 | 0,141 | 0,176 |
|     | ≥ 5 % Si                | 400            | 0,038                   | 0,076 | 0,101 | 0,138 | 0,166 | 0,221 | 0,276 | 460            | 0,018                   | 0,036 | 0,048 | 0,066 | 0,079 | 0,106 | 0,132 |
| NE  | ≤ 850 N/mm <sup>2</sup> | 470            | 0,038                   | 0,076 | 0,101 | 0,138 | 0,166 | 0,221 | 0,276 | 500            | 0,018                   | 0,030 | 0,036 | 0,048 | 0,066 | 0,079 | 0,106 |

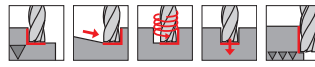
Optional bieten wir unsere Carbo-Beschichtung zur Verbesserung von Spanfluss und Standzeit an.

# SuperF-UT-Fräser

## SuperF-UT-Fräser Al



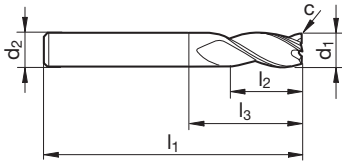
Katalog-Nr. 74559



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
|   |   |   | • |   |   |

Arbeitsrichtwerte  
Seite 280-293

- nanopolierte Schneidkanten
- besonders stabil durch Kernsprung
- Zentrumschnitt
- 3-Schneider mit vergrößerten Spanräumen
- Al und Al-Legierungen sowie weitere langspanende NE-Metalle
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung
- Schneidenlänge 5xD
- Spiegelschliff für optimale Spanabfuhr
- optimierte Mikrogeometrie
- ohne Halsfreischliff



| d1 e8<br>mm | d2 h6<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|-------------|-------------|----------|----------|----------|---------------|---|---------------|
| 6,000       | 6,000       | 75,000   | 30,000   | 38,000   | 0,060         | 3 | <b>6,000</b>  |
| 8,000       | 8,000       | 86,000   | 40,000   | 49,000   | 0,080         | 3 | <b>8,000</b>  |
| 10,000      | 10,000      | 100,000  | 50,000   | 58,000   | 0,100         | 3 | <b>10,000</b> |
| 12,000      | 12,000      | 120,000  | 60,000   | 73,000   | 0,120         | 3 | <b>12,000</b> |
| 16,000      | 16,000      | 150,000  | 80,000   | 100,000  | 0,160         | 3 | <b>16,000</b> |
| 20,000      | 20,000      | 175,000  | 100,000  | 123,000  | 0,200         | 3 | <b>20,000</b> |

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z) / Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z) / Ø |       |       |       |       |       |       |
|-----|-------------------------|----------------|---------------------------|-------|-------|-------|------|------|------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|
|     |                         |                | 3                         | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                         | 6     | 8     | 10    | 12    | 16    | 20    |
| N   | ≤ 5 % Si                | 400            | 0,016                     | 0,031 | 0,042 | 0,064 | 0,08 | 0,10 | 0,13 | 450            | 0,010                     | 0,020 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080 |
|     | ≥ 5 % Si                | 200            | 0,013                     | 0,027 | 0,035 | 0,048 | 0,06 | 0,08 | 0,10 | 210            | 0,008                     | 0,017 | 0,022 | 0,030 | 0,036 | 0,048 | 0,060 |
| NE  | ≤ 850 N/mm <sup>2</sup> | 190            | 0,013                     | 0,027 | 0,035 | 0,048 | 0,06 | 0,08 | 0,10 | 220            | 0,008                     | 0,017 | 0,022 | 0,030 | 0,036 | 0,048 | 0,060 |

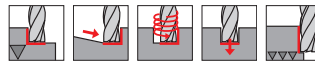
Optional bieten wir unsere Carbo-Beschichtung zur Verbesserung von Spanfluss und Standzeit an.

## SuperF-UT-Fräser

### SuperF-UT-Fräser Al-XL



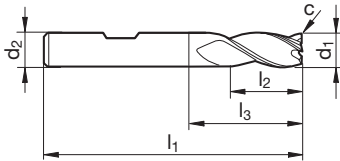
Katalog-Nr. 74558



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
|   |   |   | • |   |   |

Arbeitsrichtwerte  
Seite 280-293

- nanopolierte Schneidkanten
- besonders stabil durch Kernsprung
- Zentrumschnitt
- 3-Schneider mit vergrößerten Spanräumen
- Al und Al-Legierungen sowie weitere langspanende NE-Metalle
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung
- Schneidlänge 5xD
- Spiegelschliff für optimale Spanabfuhr
- optimierte Mikrogeometrie
- ohne Halsfreischliff



| d1 e8<br>mm | d2 h6<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|-------------|-------------|----------|----------|----------|---------------|---|---------------|
| 6,000       | 6,000       | 75,000   | 30,000   | 39,000   | 0,060         | 3 | <b>6,000</b>  |
| 8,000       | 8,000       | 86,000   | 40,000   | 50,000   | 0,080         | 3 | <b>8,000</b>  |
| 10,000      | 10,000      | 100,000  | 50,000   | 60,000   | 0,100         | 3 | <b>10,000</b> |
| 12,000      | 12,000      | 120,000  | 60,000   | 75,000   | 0,120         | 3 | <b>12,000</b> |
| 16,000      | 16,000      | 150,000  | 80,000   | 102,000  | 0,160         | 3 | <b>16,000</b> |
| 20,000      | 20,000      | 175,000  | 100,000  | 125,000  | 0,200         | 3 | <b>20,000</b> |

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z) / Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z) / Ø |       |       |       |       |       |       |
|-----|-------------------------|----------------|---------------------------|-------|-------|-------|------|------|------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|
|     |                         |                | 3                         | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                         | 6     | 8     | 10    | 12    | 16    | 20    |
| N   | ≤ 5 % Si                | 400            | 0,016                     | 0,031 | 0,042 | 0,064 | 0,08 | 0,10 | 0,13 | 450            | 0,010                     | 0,020 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080 |
|     | ≥ 5 % Si                | 200            | 0,013                     | 0,027 | 0,035 | 0,048 | 0,06 | 0,08 | 0,10 | 210            | 0,008                     | 0,017 | 0,022 | 0,030 | 0,036 | 0,048 | 0,060 |
| NE  | ≤ 850 N/mm <sup>2</sup> | 190            | 0,013                     | 0,027 | 0,035 | 0,048 | 0,06 | 0,08 | 0,10 | 220            | 0,008                     | 0,017 | 0,022 | 0,030 | 0,036 | 0,048 | 0,060 |

Optional bieten wir unsere Carbo-Beschichtung zur Verbesserung von Spanfluss und Standzeit an.

# SuperF-UT-Fräser

## SuperF-UT-Fräser N

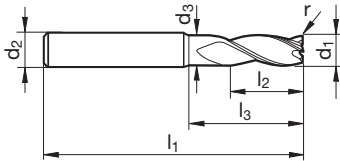


Katalog-Nr. 74563

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
|   |   |   | • |   |   |

Arbeitsrichtwerte  
Seite 280-293

- nanopolierte Schneidkanten
- Halsfreischliff
- Zentrumschnitt
- 3-Schneider mit vergrößerten Spanräumen
- Al und Al-Legierungen sowie weitere langspanende NE-Metalle
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung
- mit definierten Eckradien
- Spiegelschliff für optimale Spanabfuhr
- optimierte Mikrogeometrie



Fräswerkzeuge

| d1 e8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | r     | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|-------|---|----------|
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,500 | 3 | 6,005    |
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 1,000 | 3 | 6,010    |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,500 | 3 | 8,005    |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 1,000 | 3 | 8,010    |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,500 | 3 | 10,005   |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 1,000 | 3 | 10,010   |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 1,500 | 3 | 10,015   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,500 | 3 | 12,005   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 1,000 | 3 | 12,010   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 1,500 | 3 | 12,015   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 2,000 | 3 | 12,020   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 2,500 | 3 | 12,025   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 3,000 | 3 | 12,030   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 4,000 | 3 | 12,040   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 1,000 | 3 | 16,010   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 2,000 | 3 | 16,020   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 2,500 | 3 | 16,025   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 3,000 | 3 | 16,030   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 4,000 | 3 | 16,040   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 1,000 | 3 | 20,010   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 2,000 | 3 | 20,020   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 2,500 | 3 | 20,025   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 3,000 | 3 | 20,030   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 4,000 | 3 | 20,040   |
| 25,000      | 25,000      | 24,000   | 121,000  | 45,000   | 63,000   | 2,000 | 3 | 25,020   |
| 25,000      | 25,000      | 24,000   | 121,000  | 45,000   | 63,000   | 3,000 | 3 | 25,030   |
| 25,000      | 25,000      | 24,000   | 121,000  | 45,000   | 63,000   | 4,000 | 3 | 25,040   |

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|-------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12    | 16   | 20   |
| N   | ≤ 5 % Si                | 500            | 0,020                   | 0,039 | 0,052 | 0,080 | 0,10 | 0,13 | 0,16 | 750            | 0,025                   | 0,051 | 0,068 | 0,104 | 0,12  | 0,17 | 0,21 |
|     | ≥ 5 % Si                | 230            | 0,017                   | 0,033 | 0,044 | 0,060 | 0,07 | 0,10 | 0,12 |                | 345                     | 0,021 | 0,043 | 0,057 | 0,078 | 0,09 | 0,12 |
| NE  | ≤ 850 N/mm <sup>2</sup> | 250            | 0,017                   | 0,033 | 0,044 | 0,060 | 0,07 | 0,10 | 0,12 | 375            | 0,021                   | 0,043 | 0,057 | 0,078 | 0,09  | 0,12 | 0,16 |

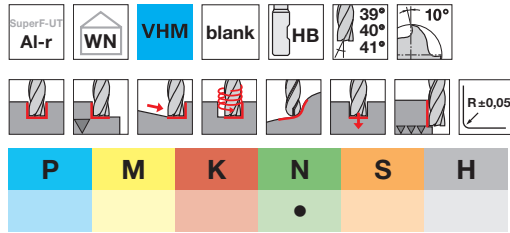
Optional bieten wir unsere Carbo-Beschichtung zur Verbesserung von Spanfluss und Standzeit an.

## SuperF-UT-Fräser

### SuperF-UT-Fräser Al-r

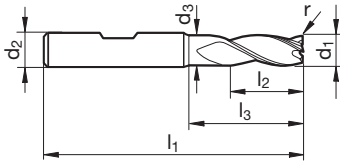


Katalog-Nr. 74562



Arbeitsrichtwerte  
Seite 280-293

- nanopolierte Schneidkanten
- Halsfreischliff
- Zentrumschnitt
- 3-Schneider mit vergrößerten Spanräumen
- Al und Al-Legierungen sowie weitere langspanende NE-Metalle
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung
- mit definierten Eckradien
- Spiegelschliff für optimale Spanabfuhr
- optimierte Mikrogeometrie



| d1 e8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | r     | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|-------|---|----------|
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,500 | 3 | 6,005    |
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 1,000 | 3 | 6,010    |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,500 | 3 | 8,005    |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 1,000 | 3 | 8,010    |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,500 | 3 | 10,005   |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 1,000 | 3 | 10,010   |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 1,500 | 3 | 10,015   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,500 | 3 | 12,005   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 1,000 | 3 | 12,010   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 1,500 | 3 | 12,015   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 2,000 | 3 | 12,020   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 2,500 | 3 | 12,025   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 3,000 | 3 | 12,030   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 4,000 | 3 | 12,040   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 1,000 | 3 | 16,010   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 2,000 | 3 | 16,020   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 2,500 | 3 | 16,025   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 3,000 | 3 | 16,030   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 4,000 | 3 | 16,040   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 1,000 | 3 | 20,010   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 2,000 | 3 | 20,020   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 2,500 | 3 | 20,025   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 3,000 | 3 | 20,030   |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 4,000 | 3 | 20,040   |
| 25,000      | 25,000      | 24,000   | 121,000  | 45,000   | 63,000   | 2,000 | 3 | 25,020   |
| 25,000      | 25,000      | 24,000   | 121,000  | 45,000   | 63,000   | 3,000 | 3 | 25,030   |
| 25,000      | 25,000      | 24,000   | 121,000  | 45,000   | 63,000   | 4,000 | 3 | 25,040   |

Fräswerkzeuge

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|-------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12    | 16   | 20   |
| N   | ≤ 5 % Si                | 500            | 0,020                   | 0,039 | 0,052 | 0,080 | 0,10 | 0,13 | 0,16 | 750            | 0,025                   | 0,051 | 0,068 | 0,104 | 0,12  | 0,17 | 0,21 |
|     | ≥ 5 % Si                | 230            | 0,017                   | 0,033 | 0,044 | 0,060 | 0,07 | 0,10 | 0,12 |                | 345                     | 0,021 | 0,043 | 0,057 | 0,078 | 0,09 | 0,12 |
| NE  | ≤ 850 N/mm <sup>2</sup> | 250            | 0,017                   | 0,033 | 0,044 | 0,060 | 0,07 | 0,10 | 0,12 | 375            | 0,021                   | 0,043 | 0,057 | 0,078 | 0,09  | 0,12 | 0,16 |

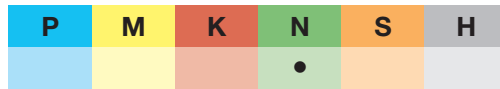
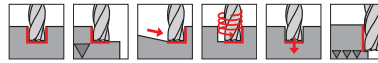
Optional bieten wir unsere Carbo-Beschichtung zur Verbesserung von Spanfluss und Standzeit an.

## SuperF-UT-Fräser

### SuperF-UT-Fräser N

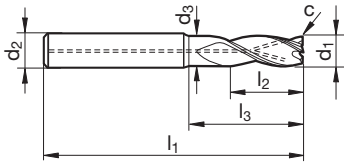


Katalog-Nr. 54593



Arbeitsrichtwerte  
Seite 280-293

- mit Innenkühlung: radiale und axiale Austritte
- nanopolierte Schneidkanten
- Halsfreischliff
- Zentrumschnitt
- 3-Schneider mit vergrößerten Spanräumen
- Al und Al-Legierungen sowie weitere langspanende NE-Metalle
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung
- extrem hohe Standzeiten durch hochharte DLC-Beschichtung



| d1 e8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|-------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 5,000       | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,050         | 3 | <b>5,000</b>  |
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,060         | 3 | <b>6,000</b>  |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,080         | 3 | <b>8,000</b>  |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,100         | 3 | <b>10,000</b> |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,120         | 3 | <b>12,000</b> |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,160         | 3 | <b>16,000</b> |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 0,200         | 3 | <b>20,000</b> |

Fräswerkzeuge

| ISO       | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |
|-----------|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|-------|------|------|
|           |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12    | 16   | 20   |
| <b>N</b>  | ≤ 5 % Si                | <b>500</b>     | 0,020                   | 0,039 | 0,052 | 0,080 | 0,10 | 0,13 | 0,16 | <b>750</b>     | 0,025                   | 0,051 | 0,068 | 0,104 | 0,12  | 0,17 | 0,21 |
|           | ≥ 5 % Si                | <b>230</b>     | 0,017                   | 0,033 | 0,044 | 0,060 | 0,07 | 0,10 | 0,12 |                | <b>345</b>              | 0,021 | 0,043 | 0,057 | 0,078 | 0,09 | 0,12 |
| <b>NE</b> | ≤ 850 N/mm <sup>2</sup> | <b>250</b>     | 0,017                   | 0,033 | 0,044 | 0,060 | 0,07 | 0,10 | 0,12 | <b>375</b>     | 0,021                   | 0,043 | 0,057 | 0,078 | 0,09  | 0,12 | 0,16 |

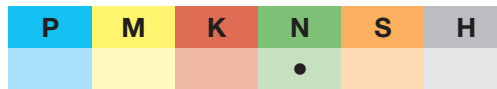
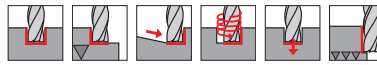


## SuperF-UT-Fräser

### SuperF-UT-Fräser Al-X

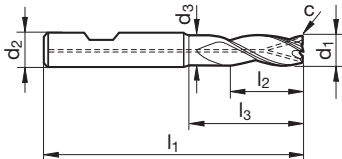


Katalog-Nr. 54592



Arbeitsrichtwerte  
Seite 280-293

- mit Innenkühlung: radiale und axiale Austritte
- nanopolierte Schneidkanten
- Halsfreischliff
- Zentrumschnitt
- 3-Schneider mit vergrößerten Spanräumen
- Al und Al-Legierungen sowie weitere langspanende NE-Metalle
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung
- extrem hohe Standzeiten durch hochharte DLC-Beschichtung



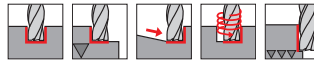
| d1 e8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|-------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 5,000       | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,050         | 3 | <b>5,000</b>  |
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,060         | 3 | <b>6,000</b>  |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,080         | 3 | <b>8,000</b>  |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 30,000   | 0,100         | 3 | <b>10,000</b> |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 36,000   | 0,120         | 3 | <b>12,000</b> |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 42,000   | 0,160         | 3 | <b>16,000</b> |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 52,000   | 0,200         | 3 | <b>20,000</b> |

Fräswerkzeuge

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|------|------|----------------|-------------------------|-------|-------|-------|-------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12    | 16   | 20   |
| N   | ≤ 5 % Si                | <b>500</b>     | 0,020                   | 0,039 | 0,052 | 0,080 | 0,10 | 0,13 | 0,16 | <b>750</b>     | 0,025                   | 0,051 | 0,068 | 0,104 | 0,12  | 0,17 | 0,21 |
|     | ≥ 5 % Si                | <b>230</b>     | 0,017                   | 0,033 | 0,044 | 0,060 | 0,07 | 0,10 | 0,12 |                | <b>345</b>              | 0,021 | 0,043 | 0,057 | 0,078 | 0,09 | 0,12 |
| NE  | ≤ 850 N/mm <sup>2</sup> | <b>250</b>     | 0,017                   | 0,033 | 0,044 | 0,060 | 0,07 | 0,10 | 0,12 | <b>375</b>     | 0,021                   | 0,043 | 0,057 | 0,078 | 0,09  | 0,12 | 0,16 |

## SuperF-UT-Fräser

### SuperF-UT-Fräser Z, Sätze



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • |   |   | • |   |

Arbeitsrichtwerte  
Seite 280-293

Katalog-Nr. 78882

- besonders stabil durch Kernsprung
- universell einsetzbar
- Werkstoffe bis 1400 N/mm<sup>2</sup>
- Mikroeckenschutz
- Zentrumschnitt
- ungleiche Teilung
- HPC-Bearbeitung in zähen, niedrig- und hochlegierten Stählen und in schwer bearbeitbaren Sonderwerkstoffen
- bestehend aus Katalog-Nr. 54577

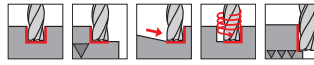
| Code-Nr. | d1<br>mm | Stück/Satz |
|----------|----------|------------|
| 1,000    | 6,0-16,0 | 5          |
| 2,000    | 6,0-12,0 | 4          |

Fräszeuge

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |                             |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |                             |      |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|-------|------|-----------------------------|------|----------------|-------------------------|-------|-------|-----------------------------|------|------|------|
|     |                         |                | a <sub>p</sub> = l2     |       | HPC   | HSC   |      | a <sub>e</sub> max = 0,10xD |      |                | a <sub>p</sub> = l2     |       |       | a <sub>e</sub> max = 0,02xD |      |      |      |
|     |                         |                | 3                       | 6     | 8     | 10    | 12   | 16                          | 20   |                | 3                       | 6     | 8     | 10                          | 12   | 16   | 20   |
| P   | ≤ 850 N/mm <sup>2</sup> | 340            | 0,036                   | 0,072 | 0,096 | 0,138 | 0,17 | 0,22                        | 0,28 | 360            | 0,017                   | 0,034 | 0,046 | 0,066                       | 0,08 | 0,11 | 0,13 |
|     | ≥ 850 N/mm <sup>2</sup> | 250            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18                        | 0,23 | 270            | 0,015                   | 0,030 | 0,040 | 0,055                       | 0,07 | 0,09 | 0,11 |
| M   | ≤ 750 N/mm <sup>2</sup> | 220            | 0,031                   | 0,062 | 0,083 | 0,115 | 0,14 | 0,18                        | 0,23 | 240            | 0,015                   | 0,030 | 0,040 | 0,055                       | 0,07 | 0,09 | 0,11 |
|     | ≥ 750 N/mm <sup>2</sup> | 110            | 0,024                   | 0,048 | 0,064 | 0,092 | 0,11 | 0,15                        | 0,18 | 120            | 0,011                   | 0,021 | 0,028 | 0,040                       | 0,05 | 0,06 | 0,08 |
| S   | Ni-Basis                | 60             | 0,019                   | 0,039 | 0,052 | 0,074 | 0,09 | 0,12                        | 0,15 | 60             | 0,008                   | 0,017 | 0,022 | 0,032                       | 0,04 | 0,05 | 0,06 |
|     | Ti-Basis                | 110            | 0,028                   | 0,055 | 0,074 | 0,104 | 0,12 | 0,17                        | 0,21 | 120            | 0,013                   | 0,026 | 0,035 | 0,050                       | 0,06 | 0,08 | 0,10 |

## SuperF-UT-Fräser

### SuperF-UT-Fräser N<sup>2</sup>, Sätze







|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ●        | ○        | ●        | ●        | ○        | ○        |

Arbeitsrichtwerte  
Seite 280-293

Katalog-Nr. 78883

- sehr großes Materialspektrum = universeller Einsatzbereich
- extrem hohe Standzeiten durch hochharte TiAlZrN-Beschichtung
- bis 1600 N/mm<sup>2</sup>
- Mikroeckenschutz
- Halsfreischliff
- Zentrumschnitt
- ruhiger, vibrationsfreier Lauf durch ungleiche Drallsteigung
- bestehend aus Katalog-Nr. 64552

| Code-Nr. | d1<br>mm | Stück/Satz |
|----------|----------|------------|
| 1,000    | 6,0-16,0 | 5          |

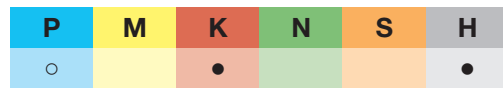
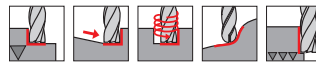
| ISO      | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |   |                        |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |   |   |   |                            |
|----------|-------------------------|----------------|-------------------------|-------|-------|---|------------------------|------|------|----------------|-------------------------|-------|-------|---|---|---|----------------------------|
|          |                         |                | a <sub>p</sub> = 1,0xD  |       |       |  | a <sub>s</sub> = 1,0xD |      |      |                | a <sub>p</sub> = l2     |       |       |  |  |  | a <sub>s</sub> max = 0,2xD |
| <b>P</b> | ≤ 850 N/mm <sup>2</sup> | <b>180</b>     | 0,016                   | 0,031 | 0,042 | 0,060   | 0,07                   | 0,10 | 0,12 | <b>305</b>     | 0,025                   | 0,050 | 0,067 | 0,096   | 0,12  | 0,15  | 0,19                       |
|          | ≥ 850 N/mm <sup>2</sup> | <b>135</b>     | 0,014                   | 0,027 | 0,036 | 0,050   | 0,06                   | 0,08 | 0,10 |                | <b>230</b>              | 0,022 | 0,043 | 0,058   | 0,080   | 0,10  | 0,13                       |
| <b>K</b> | ≤ 240 HB                | <b>160</b>     | 0,017                   | 0,033 | 0,044 | 0,065   | 0,08                   | 0,10 | 0,13 | <b>270</b>     | 0,026                   | 0,053 | 0,070 | 0,104   | 0,12  | 0,17  | 0,21                       |
|          | ≥ 240 HB                | <b>140</b>     | 0,015                   | 0,030 | 0,040 | 0,055   | 0,07                   | 0,09 | 0,11 |                | <b>240</b>              | 0,024 | 0,048 | 0,064   | 0,088   | 0,11  | 0,14                       |

## VHM Fräser

### Kopierfräser mit Vollradius H B2

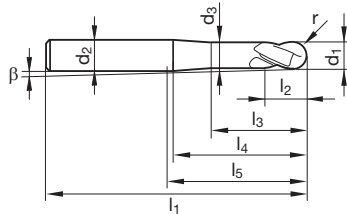


Katalog-Nr. 54325



Arbeitsrichtwerte  
Seite 280-293

- Zentrumschnitt
- R +/- 0,01
- ab Ø 4,0 mm mit TiAlSiN-Beschichtung
- lange Ausführung



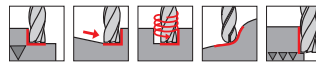
| d1 <sup>-0,01</sup> / <sub>-0,03</sub><br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|--|-------------|----------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 0,500  | 4,000       | 0,450    | 45,000   | 0,500    | 2,500    | 9,100    | 17,000   | 0,250   | 11,100 | 2 | 0,500    |
| 0,800  | 4,000       | 0,750    | 45,000   | 0,800    | 3,200    | 9,300    | 17,000   | 0,400   | 10,200 | 2 | 0,800    |
| 1,000  | 4,000       | 0,920    | 45,000   | 1,000    | 4,000    | 9,700    | 17,000   | 0,500   | 9,200  | 2 | 1,000    |
| 1,500  | 4,000       | 1,400    | 45,000   | 1,500    | 6,000    | 10,900   | 17,000   | 0,750   | 7,000  | 2 | 1,500    |
| 2,000  | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 1,000   | 8,900  | 2 | 2,000    |
| 3,000  | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 1,500   | 5,700  | 2 | 3,000    |
| 4,000  | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 2,000   | 3,800  | 2 | 4,000    |
| 5,000  | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 2,500   | 1,700  | 2 | 5,000    |
| 6,000  | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 3,000   |        | 2 | 6,000    |
| 8,000  | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 4,000   |        | 2 | 8,000    |
| 10,000                                       | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 5,000   |        | 2 | 10,000   |
| 12,000                                       | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 6,000   |        | 2 | 12,000   |

## VHM Fräser

### Kopierfräser mit Vollradius H B2

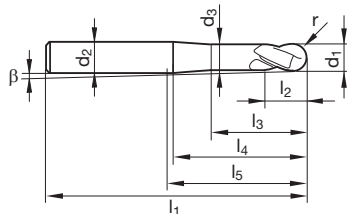


Katalog-Nr. 54326



Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- $R \pm 0,01$
- ab  $\varnothing 4,0$  mm mit TiAlSiN-Beschichtung
- mittellange Ausführung



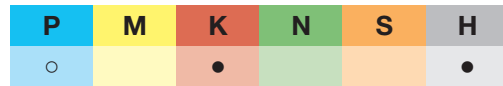
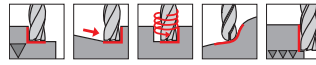
| d1 $^{+0,01}_{-0,03}$<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | $\beta$<br>° | Z | Code-Nr. |
|-----------------------------|-------------|----------|----------|----------|----------|----------|----------|---------|--------------|---|----------|
| 0,500                       | 4,000       | 0,450    | 50,000   | 0,500    | 3,600    | 10,200   | 22,000   | 0,250   | 9,900        | 2 | 0,500    |
| 0,800                       | 4,000       | 0,750    | 50,000   | 0,800    | 5,000    | 11,100   | 22,000   | 0,400   | 8,500        | 2 | 0,800    |
| 1,000                       | 4,000       | 0,920    | 50,000   | 1,000    | 6,500    | 12,200   | 22,000   | 0,500   | 7,300        | 2 | 1,000    |
| 1,500                       | 4,000       | 1,400    | 50,000   | 1,500    | 10,000   | 14,900   | 22,000   | 0,750   | 5,000        | 2 | 1,500    |
| 2,000                       | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 21,000   | 1,000   | 6,400        | 2 | 2,000    |
| 3,000                       | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 29,000   | 1,500   | 3,700        | 2 | 3,000    |
| 4,000                       | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 39,000   | 2,000   | 2,200        | 2 | 4,000    |
| 5,000                       | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 39,000   | 2,500   | 0,900        | 2 | 5,000    |
| 6,000                       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 3,000   |              | 2 | 6,000    |
| 8,000                       | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 4,000   |              | 2 | 8,000    |
| 10,000                      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 5,000   |              | 2 | 10,000   |
| 12,000                      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 6,000   |              | 2 | 12,000   |

## VHM Fräser

### Kopierfräser mit Vollradius H B4

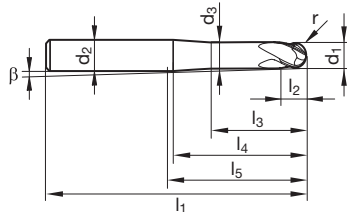


Katalog-Nr. 54345



Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- $R \pm 0,02$
- ab  $\varnothing 4,0$  mm mit TiAlSiN-Beschichtung
- lange Ausführung



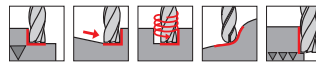
| d1<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | $\beta$<br>° | Z | Code-Nr. |
|----------|-------------|----------|----------|----------|----------|----------|----------|---------|--------------|---|----------|
| 1,000    | 4,000       | 0,920    | 45,000   | 1,000    | 4,000    | 9,700    | 17,000   | 0,500   | 9,200        | 4 | 1,000    |
| 1,500    | 4,000       | 1,400    | 45,000   | 1,500    | 6,000    | 10,900   | 17,000   | 0,750   | 7,000        | 4 | 1,500    |
| 2,000    | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 1,000   | 8,900        | 4 | 2,000    |
| 3,000    | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 1,500   | 5,700        | 4 | 3,000    |
| 4,000    | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 2,000   | 3,800        | 4 | 4,000    |
| 5,000    | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 2,500   | 1,700        | 4 | 5,000    |
| 6,000    | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 3,000   |              | 4 | 6,000    |
| 8,000    | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 4,000   |              | 4 | 8,000    |
| 10,000   | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 5,000   |              | 4 | 10,000   |
| 12,000   | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 6,000   |              | 4 | 12,000   |

## VHM Fräser

### Kopierfräser mit Vollradius H B4



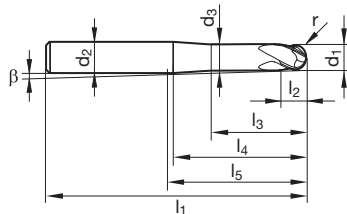
Katalog-Nr. 54346



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ |   | ● |   |   | ● |

Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- R +/- 0,02
- ab Ø 4,0 mm mit TiAlSiN-Beschichtung
- mittellange Ausführung



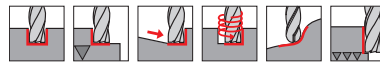
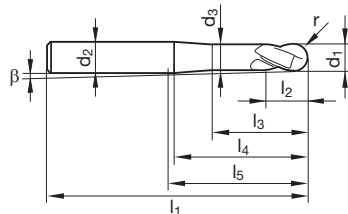
| d1 <sup>-0,01</sup> / <sub>-0,03</sub><br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|--|-------------|----------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 1,000  | 4,000       | 0,920    | 50,000   | 1,000    | 6,500    | 12,200   | 25,025   | 0,500   | 7,300  | 4 | 1,000    |
| 1,500  | 4,000       | 1,400    | 50,000   | 1,500    | 10,000   | 14,900   | 25,538   | 0,750   | 5,000  | 4 | 1,500    |
| 2,000  | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 29,550   | 1,000   | 6,400  | 4 | 2,000    |
| 3,000  | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 34,575   | 1,500   | 3,700  | 4 | 3,000    |
| 4,000  | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 40,600   | 2,000   | 2,200  | 4 | 4,000    |
| 5,000  | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 41,625   | 2,500   | 0,900  | 4 | 5,000    |
| 6,000  | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 3,000   |        | 4 | 6,000    |
| 8,000  | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 4,000   |        | 4 | 8,000    |
| 10,000                                       | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 5,000   |        | 4 | 10,000   |
| 12,000                                       | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 6,000   |        | 4 | 12,000   |

## VHM Fräser

### Kopierfräser mit Vollradius S B2



Katalog-Nr. 54425



| P | M | K | N | S | H |
|---|---|---|---|---|---|
| ● | ● | ● | ○ | ● | ● |

Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- $R \pm 0,01$
- ab  $\varnothing 4,0$  mm mit TiAlSiN-Beschichtung
- lange Ausführung

| d1 $\begin{smallmatrix} -0,01 \\ -0,03 \end{smallmatrix}$<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | $\beta$<br>° | Z | Code-Nr. |
|---|-------------|----------|----------|----------|----------|----------|----------|---------|--------------|---|----------|
| 0,500   | 4,000       | 0,450    | 45,000   | 0,500    | 2,500    | 9,100    | 17,000   | 0,250   | 11,100       | 2 | 0,500    |
| 0,800   | 4,000       | 0,750    | 45,000   | 0,800    | 3,200    | 9,300    | 17,000   | 0,400   | 10,200       | 2 | 0,800    |
| 1,000   | 4,000       | 0,920    | 45,000   | 1,000    | 4,000    | 9,700    | 17,000   | 0,500   | 9,200        | 2 | 1,000    |
| 1,500   | 4,000       | 1,400    | 45,000   | 1,500    | 6,000    | 10,900   | 17,000   | 0,750   | 7,000        | 2 | 1,500    |
| 2,000   | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 1,000   | 8,900        | 2 | 2,000    |
| 3,000   | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 1,500   | 5,700        | 2 | 3,000    |
| 4,000   | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 2,000   | 3,800        | 2 | 4,000    |
| 5,000   | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 2,500   | 1,700        | 2 | 5,000    |
| 6,000   | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 3,000   |              | 2 | 6,000    |
| 8,000   | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 4,000   |              | 2 | 8,000    |
| 10,000  | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 5,000   |              | 2 | 10,000   |
| 12,000  | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 6,000   |              | 2 | 12,000   |

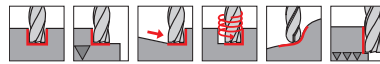
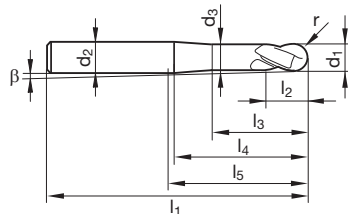


## VHM Fräser

### Kopierfräser mit Vollradius S B2



Katalog-Nr. 54426



| P | M | K | N | S | H |
|---|---|---|---|---|---|
| ● | ● | ● | ○ | ● | ● |

Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- R +/- 0,01
- ab Ø 4,0 mm mit TiAlSiN-Beschichtung
- mittellange Ausführung

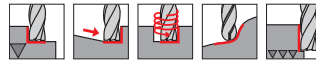
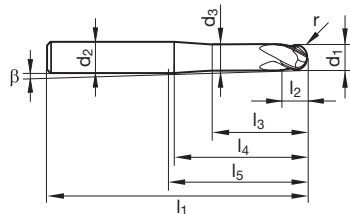
| d1 <sup>-0,01</sup> / <sub>-0,03</sub><br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|--|-------------|----------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 0,500  | 4,000       | 0,450    | 50,000   | 0,500    | 3,600    | 10,200   | 22,000   | 0,250   | 9,900  | 2 | 0,500    |
| 0,800  | 4,000       | 0,750    | 50,000   | 0,800    | 5,000    | 11,100   | 22,000   | 0,400   | 8,500  | 2 | 0,800    |
| 1,000  | 4,000       | 0,920    | 50,000   | 1,000    | 6,500    | 12,200   | 22,000   | 0,500   | 7,300  | 2 | 1,000    |
| 1,500  | 4,000       | 1,400    | 50,000   | 1,500    | 10,000   | 14,900   | 22,000   | 0,750   | 5,000  | 2 | 1,500    |
| 2,000  | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 21,000   | 1,000   | 6,400  | 2 | 2,000    |
| 3,000  | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 29,000   | 1,500   | 3,700  | 2 | 3,000    |
| 4,000  | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 39,000   | 2,000   | 2,200  | 2 | 4,000    |
| 5,000  | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 39,000   | 2,500   | 0,900  | 2 | 5,000    |
| 6,000  | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 3,000   |        | 2 | 6,000    |
| 8,000  | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 4,000   |        | 2 | 8,000    |
| 10,000                                       | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 5,000   |        | 2 | 10,000   |
| 12,000                                       | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 6,000   |        | 2 | 12,000   |

## VHM Fräser

### Kopierfräser mit Vollradius S B4



Katalog-Nr. 54445



| P | M | K | N | S | H |
|---|---|---|---|---|---|
| ● | ● | ● | ○ | ● | ● |

Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- R +/- 0,02
- ab Ø 4,0 mm mit TiAlSiN-Beschichtung
- lange Ausführung

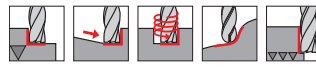
| d1<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|----------|-------------|----------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 1,000    | 4,000       | 0,920    | 45,000   | 1,000    | 4,000    | 9,700    | 17,000   | 0,500   | 9,200  | 4 | 1,000    |
| 1,500    | 4,000       | 1,400    | 45,000   | 1,500    | 6,000    | 10,900   | 17,000   | 0,750   | 7,000  | 4 | 1,500    |
| 2,000    | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 1,000   | 8,900  | 4 | 2,000    |
| 3,000    | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 1,500   | 5,700  | 4 | 3,000    |
| 4,000    | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 2,000   | 3,800  | 4 | 4,000    |
| 5,000    | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 2,500   | 1,700  | 4 | 5,000    |
| 6,000    | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 3,000   |        | 4 | 6,000    |
| 8,000    | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 4,000   |        | 4 | 8,000    |
| 10,000   | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 5,000   |        | 4 | 10,000   |
| 12,000   | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 6,000   |        | 4 | 12,000   |

## VHM Fräser

### Kopierfräser mit Vollradius S B4



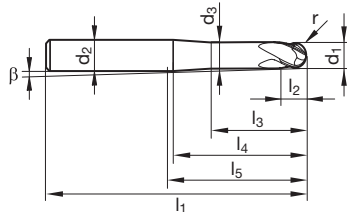
Katalog-Nr. 54446



| P | M | K | N | S | H |
|---|---|---|---|---|---|
| ● | ● | ● | ○ | ● | ● |

Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- $R \pm 0,02$
- ab  $\varnothing 4,0$  mm mit TiAlSiN-Beschichtung
- mittellange Ausführung



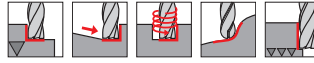
| d1 $\begin{smallmatrix} -0,01 \\ -0,03 \end{smallmatrix}$<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | $\beta$<br>° | Z | Code-Nr. |
|---|-------------|----------|----------|----------|----------|----------|----------|---------|--------------|---|----------|
| 1,000   | 4,000       | 0,920    | 50,000   | 1,000    | 6,500    | 12,200   | 25,000   | 0,500   | 7,300        | 4 | 1,000    |
| 1,500   | 4,000       | 1,400    | 50,000   | 1,500    | 10,000   | 14,900   | 25,500   | 0,750   | 5,000        | 4 | 1,500    |
| 2,000   | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 29,500   | 1,000   | 6,400        | 4 | 2,000    |
| 3,000   | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 34,500   | 1,500   | 3,700        | 4 | 3,000    |
| 4,000   | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 40,500   | 2,000   | 2,200        | 4 | 4,000    |
| 5,000   | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 41,500   | 2,500   | 0,900        | 4 | 5,000    |
| 6,000   | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 3,000   |              | 4 | 6,000    |
| 8,000   | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 4,000   |              | 4 | 8,000    |
| 10,000  | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 5,000   |              | 4 | 10,000   |
| 12,000  | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 6,000   |              | 4 | 12,000   |

## VHM Fräser

### Kopierfräser mit Torusanschliff H T4

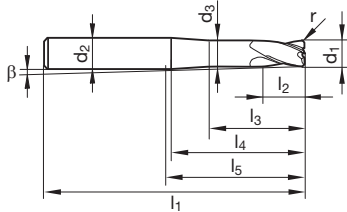


Katalog-Nr. 54347



Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- R +/- 0,01
- lange Ausführung



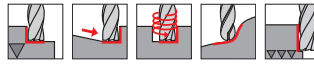
| d1 f8<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 1,000       | 4,000       | 0,920    | 45,000   | 1,000    | 4,000    | 9,700    | 17,000   | 0,100   | 8,800  | 4 | 1,001    |
| 1,000       | 4,000       | 0,920    | 45,000   | 1,000    | 4,000    | 9,700    | 17,000   | 0,200   | 8,900  | 4 | 1,002    |
| 1,500       | 4,000       | 1,400    | 45,000   | 1,500    | 6,000    | 10,900   | 17,000   | 0,200   | 6,600  | 4 | 1,502    |
| 2,000       | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 0,100   | 8,300  | 4 | 2,001    |
| 2,000       | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 0,200   | 8,400  | 4 | 2,002    |
| 2,000       | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 0,500   | 8,600  | 4 | 2,005    |
| 3,000       | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 0,100   | 5,300  | 4 | 3,001    |
| 3,000       | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 0,300   | 5,300  | 4 | 3,003    |
| 3,000       | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 0,500   | 5,400  | 4 | 3,005    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 0,200   | 3,400  | 4 | 4,002    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 0,300   | 3,400  | 4 | 4,003    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 0,500   | 3,400  | 4 | 4,005    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 0,200   | 1,500  | 4 | 5,002    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 0,500   | 1,500  | 4 | 5,005    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 1,000   | 1,600  | 4 | 5,010    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 0,200   |        | 4 | 6,002    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 0,300   |        | 4 | 6,003    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 0,500   |        | 4 | 6,005    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 1,000   |        | 4 | 6,010    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 1,500   |        | 4 | 6,015    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 2,000   |        | 4 | 6,020    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 0,300   |        | 4 | 8,003    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 0,500   |        | 4 | 8,005    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 1,000   |        | 4 | 8,010    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 1,500   |        | 4 | 8,015    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 2,000   |        | 4 | 8,020    |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 0,300   |        | 4 | 10,003   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 0,500   |        | 4 | 10,005   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 1,000   |        | 4 | 10,010   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 1,500   |        | 4 | 10,015   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 2,000   |        | 4 | 10,020   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 3,000   |        | 4 | 10,030   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 0,500   |        | 4 | 12,005   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 1,000   |        | 4 | 12,010   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 2,000   |        | 4 | 12,020   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 3,000   |        | 4 | 12,030   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 4,000   |        | 4 | 12,040   |

## VHM Fräser

### Kopierfräser mit Torusanschliff H T4



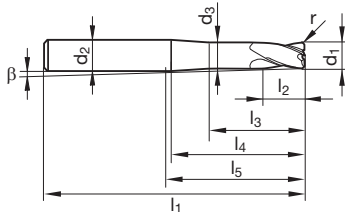
Katalog-Nr. 54348



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ |   | ● |   |   | ● |

Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- R +/- 0,01
- mittellange Ausführung



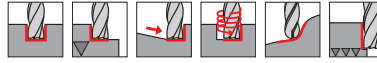
| d1 f8<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 1,000       | 4,000       | 0,920    | 50,000   | 1,000    | 6,500    | 12,200   | 22,000   | 0,100   | 7,000  | 4 | 1,001    |
| 1,000       | 4,000       | 0,920    | 50,000   | 1,000    | 6,500    | 12,200   | 22,000   | 0,200   | 7,100  | 4 | 1,002    |
| 1,500       | 4,000       | 1,400    | 50,000   | 1,500    | 10,000   | 14,900   | 22,000   | 0,200   | 4,800  | 4 | 1,502    |
| 2,000       | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 21,000   | 0,100   | 6,100  | 4 | 2,001    |
| 2,000       | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 21,000   | 0,200   | 6,100  | 4 | 2,002    |
| 2,000       | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 21,000   | 0,500   | 6,200  | 4 | 2,005    |
| 3,000       | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 29,000   | 0,100   | 3,500  | 4 | 3,001    |
| 3,000       | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 29,000   | 0,300   | 3,500  | 4 | 3,003    |
| 3,000       | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 29,000   | 0,500   | 3,600  | 4 | 3,005    |
| 4,000       | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 39,000   | 0,200   | 2,000  | 4 | 4,002    |
| 4,000       | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 39,000   | 0,300   | 2,000  | 4 | 4,003    |
| 4,000       | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 39,000   | 0,500   | 2,000  | 4 | 4,005    |
| 5,000       | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 39,000   | 0,200   | 0,800  | 4 | 5,002    |
| 5,000       | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 39,000   | 0,500   | 0,900  | 4 | 5,005    |
| 5,000       | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 39,000   | 1,000   | 0,900  | 4 | 5,010    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 0,200   |        | 4 | 6,002    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 0,300   |        | 4 | 6,003    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 0,500   |        | 4 | 6,005    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 1,000   |        | 4 | 6,010    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 1,500   |        | 4 | 6,015    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 2,000   |        | 4 | 6,020    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 0,300   |        | 4 | 8,003    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 0,500   |        | 4 | 8,005    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 1,000   |        | 4 | 8,010    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 1,500   |        | 4 | 8,015    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 2,000   |        | 4 | 8,020    |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 0,300   |        | 4 | 10,003   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 0,500   |        | 4 | 10,005   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 1,000   |        | 4 | 10,010   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 1,500   |        | 4 | 10,015   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 2,000   |        | 4 | 10,020   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 3,000   |        | 4 | 10,030   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 0,500   |        | 4 | 12,005   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 1,000   |        | 4 | 12,010   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 2,000   |        | 4 | 12,020   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 3,000   |        | 4 | 12,030   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 4,000   |        | 4 | 12,040   |

## VHM Fräser

### Kopierfräser mit Torusanschliiff S T2



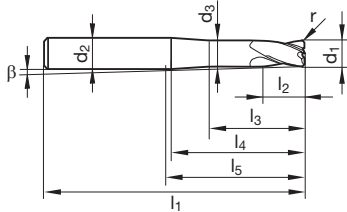
Katalog-Nr. 54427



| P | M | K | N | S | H |
|---|---|---|---|---|---|
| ● | ● | ● | ○ | ● | ● |

Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- R +/- 0,01
- ab Ø 4,0 mm mit TiAlSiN-Beschichtung
- lange Ausführung



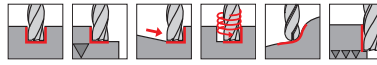
| d1 f8<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 0,500       | 4,000       | 0,450    | 45,000   | 0,500    | 3,000    | 9,600    | 17,000   | 0,100   | 10,400 | 2 | 0,501    |
| 1,000       | 4,000       | 0,920    | 45,000   | 1,000    | 4,000    | 9,700    | 17,000   | 0,100   | 8,800  | 2 | 1,001    |
| 1,000       | 4,000       | 0,920    | 45,000   | 1,000    | 4,000    | 9,700    | 17,000   | 0,200   | 8,900  | 2 | 1,002    |
| 1,500       | 4,000       | 1,400    | 45,000   | 1,500    | 6,000    | 10,900   | 17,000   | 0,200   | 6,600  | 2 | 1,502    |
| 2,000       | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 0,100   | 8,300  | 2 | 2,001    |
| 2,000       | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 0,200   | 8,400  | 2 | 2,002    |
| 2,000       | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 0,500   | 8,600  | 2 | 2,005    |
| 3,000       | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 0,100   | 5,300  | 2 | 3,001    |
| 3,000       | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 0,300   | 5,300  | 2 | 3,003    |
| 3,000       | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 0,500   | 5,400  | 2 | 3,005    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 0,200   | 3,400  | 2 | 4,002    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 0,300   | 3,400  | 2 | 4,003    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 0,500   | 3,400  | 2 | 4,005    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 0,200   | 1,500  | 2 | 5,002    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 0,500   | 1,500  | 2 | 5,005    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 1,000   | 1,600  | 2 | 5,010    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 0,200   |        | 2 | 6,002    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 0,300   |        | 2 | 6,003    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 0,500   |        | 2 | 6,005    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 1,000   |        | 2 | 6,010    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 1,500   |        | 2 | 6,015    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 2,000   |        | 2 | 6,020    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 0,300   |        | 2 | 8,003    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 0,500   |        | 2 | 8,005    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 1,000   |        | 2 | 8,010    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 1,500   |        | 2 | 8,015    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 2,000   |        | 2 | 8,020    |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 0,300   |        | 2 | 10,003   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 0,500   |        | 2 | 10,005   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 1,000   |        | 2 | 10,010   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 1,500   |        | 2 | 10,015   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 2,000   |        | 2 | 10,020   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 3,000   |        | 2 | 10,030   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 0,500   |        | 2 | 12,005   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 1,000   |        | 2 | 12,010   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 2,000   |        | 2 | 12,020   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 3,000   |        | 2 | 12,030   |

## VHM Fräser

### Kopierfräser mit Torusanschliff S T2



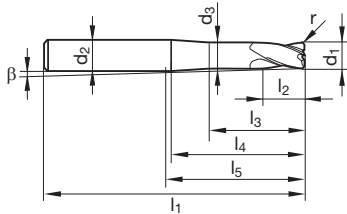
Katalog-Nr. 54428



| P | M | K | N | S | H |
|---|---|---|---|---|---|
| ● | ● | ● | ○ | ● | ● |

Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- R +/- 0,01
- ab Ø 4,0 mm mit TiAlSiN-Beschichtung
- mittellange Ausführung



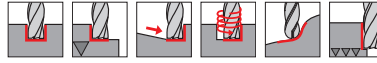
| d1 f8<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 0,500       | 4,000       | 0,450    | 50,000   | 0,500    | 3,600    | 10,200   | 22,000   | 0,100   | 9,800  | 2 | 0,501    |
| 1,000       | 4,000       | 0,920    | 50,000   | 1,000    | 6,500    | 12,200   | 22,000   | 0,100   | 7,000  | 2 | 1,001    |
| 1,000       | 4,000       | 0,920    | 50,000   | 1,000    | 6,500    | 12,200   | 22,000   | 0,200   | 7,100  | 2 | 1,002    |
| 1,500       | 4,000       | 1,400    | 50,000   | 1,500    | 10,000   | 14,900   | 22,000   | 0,200   | 4,800  | 2 | 1,502    |
| 2,000       | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 21,000   | 0,100   | 6,100  | 2 | 2,001    |
| 2,000       | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 21,000   | 0,200   | 6,100  | 2 | 2,002    |
| 2,000       | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 21,000   | 0,500   | 6,200  | 2 | 2,005    |
| 3,000       | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 29,000   | 0,100   | 3,500  | 2 | 3,001    |
| 3,000       | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 29,000   | 0,300   | 3,500  | 2 | 3,003    |
| 3,000       | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 29,000   | 0,500   | 3,600  | 2 | 3,005    |
| 4,000       | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 39,000   | 0,200   | 2,000  | 2 | 4,002    |
| 4,000       | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 39,000   | 0,300   | 2,000  | 2 | 4,003    |
| 4,000       | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 39,000   | 0,500   | 2,000  | 2 | 4,005    |
| 5,000       | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 39,000   | 0,200   | 0,800  | 2 | 5,002    |
| 5,000       | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 39,000   | 0,500   | 0,900  | 2 | 5,005    |
| 5,000       | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 39,000   | 1,000   | 0,900  | 2 | 5,010    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 0,200   |        | 2 | 6,002    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 0,300   |        | 2 | 6,003    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 0,500   |        | 2 | 6,005    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 1,000   |        | 2 | 6,010    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 1,500   |        | 2 | 6,015    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 38,000   | 38,600   | 39,000   | 2,000   |        | 2 | 6,020    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 0,300   |        | 2 | 8,003    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 0,500   |        | 2 | 8,005    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 1,000   |        | 2 | 8,010    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 1,500   |        | 2 | 8,015    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 53,000   | 53,600   | 54,000   | 2,000   |        | 2 | 8,020    |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 0,300   |        | 2 | 10,003   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 0,500   |        | 2 | 10,005   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 1,000   |        | 2 | 10,010   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 1,500   |        | 2 | 10,015   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 2,000   |        | 2 | 10,020   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 59,000   | 59,900   | 60,000   | 3,000   |        | 2 | 10,030   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 0,500   |        | 2 | 12,005   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 1,000   |        | 2 | 12,010   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 2,000   |        | 2 | 12,020   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 3,000   |        | 2 | 12,030   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 4,000   |        | 2 | 12,040   |

## VHM Fräser

### Kopierfräser mit Torusanschliff S T4



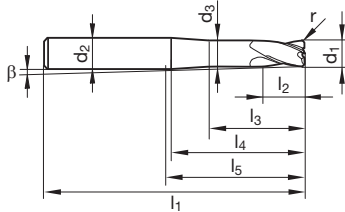
Katalog-Nr. 54447



| P | M | K | N | S | H |
|---|---|---|---|---|---|
| ● | ● | ● | ○ | ● | ● |

Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- R +/- 0,01
- ab Ø 4,0 mm mit TiAlSiN-Beschichtung
- lange Ausführung



| d1 f8<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 1,000       | 4,000       | 0,920    | 45,000   | 1,000    | 4,000    | 9,700    | 17,000   | 0,100   | 8,800  | 4 | 1,001    |
| 1,000       | 4,000       | 0,920    | 45,000   | 1,000    | 4,000    | 9,700    | 17,000   | 0,200   | 8,900  | 4 | 1,002    |
| 1,500       | 4,000       | 1,400    | 45,000   | 1,500    | 6,000    | 10,900   | 17,000   | 0,200   | 6,600  | 4 | 1,502    |
| 2,000       | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 0,100   | 8,300  | 4 | 2,001    |
| 2,000       | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 0,200   | 8,400  | 4 | 2,002    |
| 2,000       | 6,000       | 1,850    | 54,000   | 2,000    | 8,000    | 13,700   | 18,000   | 0,500   | 8,600  | 4 | 2,005    |
| 3,000       | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 0,100   | 5,300  | 4 | 3,001    |
| 3,000       | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 0,300   | 5,300  | 4 | 3,003    |
| 3,000       | 6,000       | 2,850    | 54,000   | 3,000    | 12,000   | 16,300   | 18,000   | 0,500   | 5,400  | 4 | 3,005    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 0,200   | 3,400  | 4 | 4,002    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 0,300   | 3,400  | 4 | 4,003    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 14,000   | 17,000   | 21,000   | 0,500   | 3,400  | 4 | 4,005    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 0,200   | 1,500  | 4 | 5,002    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 0,500   | 1,500  | 4 | 5,005    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 17,000   | 18,600   | 21,000   | 1,000   | 1,600  | 4 | 5,010    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 0,200   |        | 4 | 6,002    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 0,300   |        | 4 | 6,003    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 0,500   |        | 4 | 6,005    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 1,000   |        | 4 | 6,010    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 1,500   |        | 4 | 6,015    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 20,600   | 21,000   | 2,000   |        | 4 | 6,020    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 0,300   |        | 4 | 8,003    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 0,500   |        | 4 | 8,005    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 1,000   |        | 4 | 8,010    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 1,500   |        | 4 | 8,015    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 26,600   | 27,000   | 2,000   |        | 4 | 8,020    |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 0,300   |        | 4 | 10,003   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 0,500   |        | 4 | 10,005   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 1,000   |        | 4 | 10,010   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 1,500   |        | 4 | 10,015   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 2,000   |        | 4 | 10,020   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 31,000   | 31,900   | 32,000   | 3,000   |        | 4 | 10,030   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 0,500   |        | 4 | 12,005   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 1,000   |        | 4 | 12,010   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 2,000   |        | 4 | 12,020   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 3,000   |        | 4 | 12,030   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 37,000   | 37,900   | 38,000   | 4,000   |        | 4 | 12,040   |

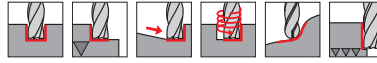


## VHM Fräser

### Kopierfräser mit Torusanschliff S T4



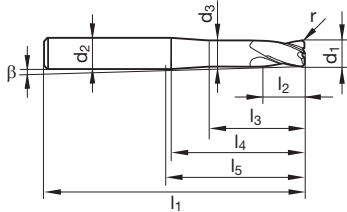
Katalog-Nr. 54448



| P | M | K | N | S | H |
|---|---|---|---|---|---|
| ● | ● | ● | ○ | ● | ● |

Arbeitsrichtwerte  
Seite 280-293

- Halsfreischliff
- Zentrumschnitt
- R +/- 0,01
- ab Ø 4,0 mm mit TiAlSiN-Beschichtung
- mittellange Ausführung



| d1 f8<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | l5<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 1,000       | 4,000       | 0,920    | 50,000   | 1,000    | 6,500    | 12,200   | 20,000   | 0,100   | 7,000  | 4 | 1,001    |
| 1,000       | 4,000       | 0,920    | 50,000   | 1,000    | 6,500    | 12,200   | 20,000   | 0,200   | 7,100  | 4 | 1,002    |
| 1,500       | 4,000       | 1,400    | 50,000   | 1,500    | 10,000   | 14,900   | 20,000   | 0,200   | 4,800  | 4 | 1,502    |
| 2,000       | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 17,000   | 0,100   | 6,100  | 4 | 2,001    |
| 2,000       | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 17,000   | 0,200   | 6,100  | 4 | 2,002    |
| 2,000       | 6,000       | 1,850    | 57,000   | 2,000    | 13,000   | 18,700   | 17,000   | 0,500   | 6,200  | 4 | 2,005    |
| 3,000       | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 25,000   | 0,100   | 3,500  | 4 | 3,001    |
| 3,000       | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 25,000   | 0,300   | 3,500  | 4 | 3,003    |
| 3,000       | 6,000       | 2,850    | 65,000   | 3,000    | 20,000   | 24,300   | 25,000   | 0,500   | 3,600  | 4 | 3,005    |
| 4,000       | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 35,000   | 0,200   | 2,000  | 4 | 4,002    |
| 4,000       | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 35,000   | 0,300   | 2,000  | 4 | 4,003    |
| 4,000       | 6,000       | 3,800    | 75,000   | 4,000    | 25,000   | 28,000   | 35,000   | 0,500   | 2,000  | 4 | 4,005    |
| 5,000       | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 35,000   | 0,200   | 0,800  | 4 | 5,002    |
| 5,000       | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 35,000   | 0,500   | 0,900  | 4 | 5,005    |
| 5,000       | 6,000       | 4,800    | 75,000   | 5,000    | 31,000   | 32,600   | 35,000   | 1,000   | 0,900  | 4 | 5,010    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 34,000   | 34,600   | 35,000   | 0,200   |        | 4 | 6,002    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 34,000   | 34,600   | 35,000   | 0,300   |        | 4 | 6,003    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 34,000   | 34,600   | 35,000   | 0,500   |        | 4 | 6,005    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 34,000   | 34,600   | 35,000   | 1,000   |        | 4 | 6,010    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 34,000   | 34,600   | 35,000   | 1,500   |        | 4 | 6,015    |
| 6,000       | 6,000       | 5,700    | 75,000   | 6,000    | 34,000   | 34,600   | 35,000   | 2,000   |        | 4 | 6,020    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 49,000   | 49,600   | 50,000   | 0,300   |        | 4 | 8,003    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 49,000   | 49,600   | 50,000   | 0,500   |        | 4 | 8,005    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 49,000   | 49,600   | 50,000   | 1,000   |        | 4 | 8,010    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 49,000   | 49,600   | 50,000   | 1,500   |        | 4 | 8,015    |
| 8,000       | 8,000       | 7,700    | 90,000   | 8,000    | 49,000   | 49,600   | 50,000   | 2,000   |        | 4 | 8,020    |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 54,000   | 54,900   | 55,000   | 0,300   |        | 4 | 10,003   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 54,000   | 54,900   | 55,000   | 0,500   |        | 4 | 10,005   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 54,000   | 54,900   | 55,000   | 1,000   |        | 4 | 10,010   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 54,000   | 54,900   | 55,000   | 1,500   |        | 4 | 10,015   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 54,000   | 54,900   | 55,000   | 2,000   |        | 4 | 10,020   |
| 10,000      | 10,000      | 9,500    | 100,000  | 10,000   | 54,000   | 54,900   | 55,000   | 3,000   |        | 4 | 10,030   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 0,500   |        | 4 | 12,005   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 1,000   |        | 4 | 12,010   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 2,000   |        | 4 | 12,020   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 3,000   |        | 4 | 12,030   |
| 12,000      | 12,000      | 11,500   | 120,000  | 12,000   | 74,000   | 74,900   | 75,000   | 4,000   |        | 4 | 12,040   |

## VHM Fräser

### Hartfräser, mehrschneidig H FS6



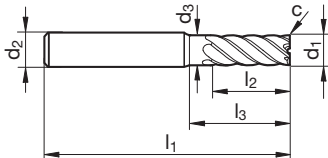
Katalog-Nr. 54360



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ |   | ● |   |   | ● |

Arbeitsrichtwerte  
Seite 280-293

- ohne Zentrumschnitt
- Halsfreischliff
- lange Ausführung



| d1 f8<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|-------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 3,000       | 6,000       | 2,850    | 57,000   | 8,000    | 12,000   | 0,030         | 6 | <b>3,000</b>  |
| 4,000       | 6,000       | 3,800    | 57,000   | 11,000   | 15,000   | 0,040         | 6 | <b>4,000</b>  |
| 5,000       | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,050         | 6 | <b>5,000</b>  |
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,060         | 6 | <b>6,000</b>  |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,080         | 6 | <b>8,000</b>  |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 31,000   | 0,100         | 6 | <b>10,000</b> |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 37,000   | 0,120         | 6 | <b>12,000</b> |
| 14,000      | 14,000      | 13,500   | 83,000   | 26,000   | 37,000   | 0,140         | 6 | <b>14,000</b> |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 43,000   | 0,160         | 6 | <b>16,000</b> |
| 20,000      | 20,000      | 19,500   | 104,000  | 38,000   | 53,000   | 0,200         | 6 | <b>20,000</b> |

## VHM Fräser

### Hartfräser, mehrschneidig H FS6



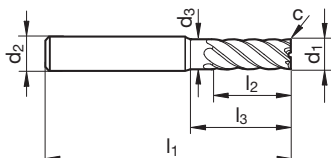
Katalog-Nr. 54361



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ |   | ● |   |   | ● |

Arbeitsrichtwerte  
Seite 280-293

- ohne Zentrumschnitt
- Halsfreischliff
- extra lange Ausführung



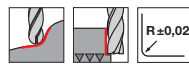
| d1 f8<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | c<br>mm x 45° | Z | Code-Nr.      |
|-------------|-------------|----------|----------|----------|----------|---------------|---|---------------|
| 3,000       | 6,000       | 2,850    | 65,000   | 11,000   | 21,000   | 0,030         | 6 | <b>3,000</b>  |
| 4,000       | 6,000       | 3,800    | 65,000   | 14,000   | 26,000   | 0,040         | 6 | <b>4,000</b>  |
| 5,000       | 6,000       | 4,800    | 75,000   | 17,000   | 32,000   | 0,050         | 6 | <b>5,000</b>  |
| 6,000       | 6,000       | 5,700    | 75,000   | 20,000   | 38,000   | 0,060         | 6 | <b>6,000</b>  |
| 8,000       | 8,000       | 7,700    | 90,000   | 28,000   | 53,000   | 0,080         | 6 | <b>8,000</b>  |
| 10,000      | 10,000      | 9,500    | 100,000  | 31,000   | 59,000   | 0,100         | 6 | <b>10,000</b> |
| 12,000      | 12,000      | 11,500   | 114,000  | 36,000   | 68,000   | 0,120         | 6 | <b>12,000</b> |
| 14,000      | 14,000      | 13,500   | 100,000  | 42,000   | 54,000   | 0,140         | 6 | <b>14,000</b> |
| 16,000      | 16,000      | 15,500   | 125,000  | 52,000   | 76,000   | 0,160         | 6 | <b>16,000</b> |
| 20,000      | 20,000      | 19,500   | 150,000  | 62,000   | 99,000   | 0,200         | 6 | <b>20,000</b> |

## VHM Fräser

### Hartfräser, mehrschneidig H FS6



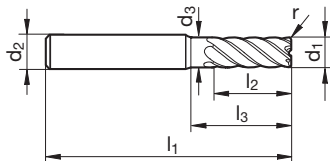
Katalog-Nr. 54362



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ○ |   | ● |   |   | ● |

Arbeitsrichtwerte  
Seite 280-293

- ohne Zentrumschnitt
- Halsfreischliff
- lange Ausführung



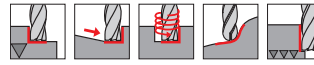
| d1 f8<br>mm | d2 h5<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | r     | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|-------|---|----------|
| 3,000       | 6,000       | 2,850    | 57,000   | 8,000    | 12,000   | 0,100 | 6 | 3,001    |
| 3,000       | 6,000       | 2,850    | 57,000   | 8,000    | 12,000   | 0,300 | 6 | 3,003    |
| 3,000       | 6,000       | 2,850    | 57,000   | 8,000    | 12,000   | 0,500 | 6 | 3,005    |
| 4,000       | 6,000       | 3,800    | 57,000   | 11,000   | 15,000   | 0,200 | 6 | 4,002    |
| 4,000       | 6,000       | 3,800    | 57,000   | 11,000   | 15,000   | 0,500 | 6 | 4,005    |
| 5,000       | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,200 | 6 | 5,002    |
| 5,000       | 6,000       | 4,800    | 57,000   | 13,000   | 18,000   | 0,500 | 6 | 5,005    |
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,200 | 6 | 6,002    |
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 0,500 | 6 | 6,005    |
| 6,000       | 6,000       | 5,700    | 57,000   | 13,000   | 20,000   | 1,000 | 6 | 6,010    |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,300 | 6 | 8,003    |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 0,500 | 6 | 8,005    |
| 8,000       | 8,000       | 7,700    | 63,000   | 19,000   | 26,000   | 1,000 | 6 | 8,010    |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 31,000   | 0,300 | 6 | 10,003   |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 31,000   | 0,500 | 6 | 10,005   |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 31,000   | 1,000 | 6 | 10,010   |
| 10,000      | 10,000      | 9,500    | 72,000   | 22,000   | 31,000   | 1,500 | 6 | 10,015   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 37,000   | 0,500 | 6 | 12,005   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 37,000   | 1,500 | 6 | 12,015   |
| 12,000      | 12,000      | 11,500   | 83,000   | 26,000   | 37,000   | 1,000 | 6 | 12,100   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 43,000   | 0,500 | 6 | 16,005   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 43,000   | 1,000 | 6 | 16,010   |
| 16,000      | 16,000      | 15,500   | 92,000   | 32,000   | 43,000   | 2,000 | 6 | 16,020   |

## VHM Fräser

### Kopierfräser mit Torusanschliff



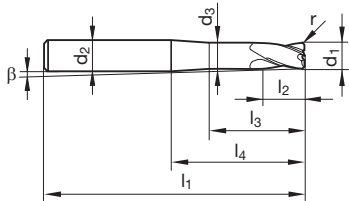
Katalog-Nr. 54304



|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ○        |          | ●        |          |          | ●        |

Arbeitsrichtwerte  
Seite 280-293

- kurz
- Zentrumschnitt
- für den Formenbau
- hohe Standzeiten durch hochharte Beschichtung
- bis 63 HRC



| d1 h8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 1,000       | 4,000       | 0,950    | 50,000   | 2,000    | 6,000    | 20,000   | 0,200   | 4,000  | 2 | 1,002    |
| 2,000       | 6,000       | 1,900    | 57,000   | 3,000    | 8,000    | 21,000   | 0,200   | 5,500  | 2 | 2,002    |
| 2,000       | 6,000       | 1,900    | 57,000   | 3,000    | 8,000    | 21,000   | 0,500   | 5,600  | 2 | 2,005    |
| 3,000       | 6,000       | 2,800    | 57,000   | 3,500    | 14,000   | 21,000   | 0,500   | 4,200  | 4 | 3,000    |
| 3,000       | 6,000       | 2,800    | 57,000   | 3,500    | 14,000   | 21,000   | 0,300   | 4,200  | 4 | 3,003    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 16,000   | 21,000   | 0,500   | 2,800  | 4 | 4,000    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 16,000   | 21,000   | 0,300   | 2,800  | 4 | 4,003    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 18,000   | 21,000   | 0,500   | 1,400  | 4 | 5,000    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 18,000   | 21,000   | 0,300   | 1,400  | 4 | 5,003    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 21,000   | 1,000   |        | 4 | 6,000    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 21,000   | 0,300   |        | 4 | 6,003    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 21,000   | 0,500   |        | 4 | 6,005    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 21,000   | 1,500   |        | 4 | 6,015    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 27,000   | 1,000   |        | 4 | 8,000    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 27,000   | 0,500   |        | 4 | 8,005    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 27,000   | 2,000   |        | 4 | 8,020    |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 30,000   | 32,000   | 1,500   |        | 4 | 10,000   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 30,000   | 32,000   | 0,500   |        | 4 | 10,005   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 30,000   | 32,000   | 1,000   |        | 4 | 10,010   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 36,000   | 38,000   | 1,500   |        | 4 | 12,000   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 36,000   | 38,000   | 0,500   |        | 4 | 12,005   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 36,000   | 38,000   | 1,000   |        | 4 | 12,010   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 36,000   | 38,000   | 2,000   |        | 4 | 12,020   |
| 16,000      | 16,000      | 15,500   | 92,000   | 16,000   | 42,000   | 44,000   | 2,000   |        | 4 | 16,000   |
| 16,000      | 16,000      | 15,500   | 92,000   | 16,000   | 42,000   | 44,000   | 3,000   |        | 4 | 16,030   |

Fräswerkzeuge

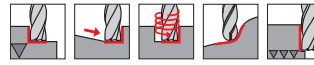
| ISO      | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       |            |            |       |       |       |       |       |       |
|----------|-------------------------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|------------|------------|-------|-------|-------|-------|-------|-------|
|          |                         |                | 2                       | 3     | 4     | 6     | 8     | 10    | 12    |            |            |       |       |       |       |       |       |
| <b>P</b> | ≤ 850 N/mm <sup>2</sup> | <b>200</b>     | 0,024                   | 0,036 | 0,048 | 0,072 | 0,096 | 0,120 | 0,144 | <b>300</b> | 0,017      | 0,025 | 0,034 | 0,050 | 0,067 | 0,084 | 0,101 |
|          | ≥ 850 N/mm <sup>2</sup> | <b>120</b>     | 0,024                   | 0,036 | 0,048 | 0,072 | 0,096 | 0,120 | 0,144 |            | <b>200</b> | 0,017 | 0,025 | 0,034 | 0,050 | 0,067 | 0,084 |
| <b>H</b> | ≤ 55 HRC                | <b>180</b>     | 0,026                   | 0,039 | 0,052 | 0,078 | 0,104 | 0,130 | 0,156 | <b>270</b> | 0,018      | 0,027 | 0,036 | 0,055 | 0,073 | 0,091 | 0,109 |
|          | 55-63 HRC               | <b>90</b>      | 0,020                   | 0,030 | 0,040 | 0,060 | 0,080 | 0,100 | 0,120 |            | <b>160</b> | 0,013 | 0,020 | 0,026 | 0,039 | 0,052 | 0,065 |
| <b>K</b> | ≥ 240 HB                | <b>220</b>     | 0,030                   | 0,045 | 0,060 | 0,090 | 0,120 | 0,150 | 0,180 | <b>360</b> | 0,018      | 0,027 | 0,036 | 0,054 | 0,072 | 0,090 | 0,108 |

## VHM Fräser

### Kopierfräser mit Torusanschliff



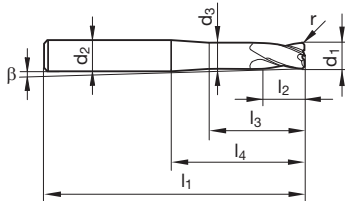
Katalog-Nr. 54305



|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ○        |          | ●        |          |          | ●        |

Arbeitsrichtwerte  
Seite 280-293

- lang
- Zentrumschnitt
- mit extra langer Reichweite für den Formenbau
- hohe Standzeiten durch hochharte Beschichtung
- bis 63 HRC



Fräserzeuge

| d1 h8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 1,000       | 4,000       | 0,950    | 50,000   | 2,000    | 12,000   | 20,000   | 0,200   | 4,400  | 2 | 1,002    |
| 2,000       | 6,000       | 1,900    | 75,000   | 3,000    | 18,000   | 35,000   | 0,500   | 3,400  | 2 | 2,005    |
| 3,000       | 6,000       | 2,800    | 75,000   | 5,000    | 25,000   | 39,000   | 0,300   | 2,300  | 4 | 3,003    |
| 3,000       | 6,000       | 2,800    | 75,000   | 5,000    | 25,000   | 39,000   | 0,500   | 2,300  | 4 | 3,005    |
| 4,000       | 6,000       | 3,800    | 75,000   | 6,000    | 32,000   | 39,000   | 0,300   | 1,500  | 4 | 4,003    |
| 4,000       | 6,000       | 3,800    | 75,000   | 6,000    | 32,000   | 39,000   | 0,500   | 1,500  | 4 | 4,005    |
| 5,000       | 6,000       | 4,800    | 75,000   | 8,000    | 38,000   | 39,000   | 0,500   | 0,800  | 4 | 5,005    |
| 6,000       | 6,000       | 5,700    | 75,000   | 9,000    | 38,000   | 39,000   | 1,000   |        | 4 | 6,000    |
| 6,000       | 6,000       | 5,700    | 75,000   | 9,000    | 38,000   | 39,000   | 0,500   |        | 4 | 6,005    |
| 8,000       | 8,000       | 7,700    | 100,000  | 12,000   | 59,000   | 64,000   | 1,000   |        | 4 | 8,000    |
| 8,000       | 8,000       | 7,700    | 100,000  | 12,000   | 59,000   | 64,000   | 0,500   |        | 4 | 8,005    |
| 10,000      | 10,000      | 9,500    | 100,000  | 15,000   | 58,000   | 60,000   | 1,500   |        | 4 | 10,000   |
| 10,000      | 10,000      | 9,500    | 100,000  | 15,000   | 58,000   | 60,000   | 0,500   |        | 4 | 10,005   |
| 10,000      | 10,000      | 9,500    | 100,000  | 15,000   | 58,000   | 60,000   | 1,000   |        | 4 | 10,010   |
| 10,000      | 10,000      | 9,500    | 100,000  | 15,000   | 58,000   | 60,000   | 2,000   |        | 4 | 10,020   |
| 12,000      | 12,000      | 11,500   | 150,000  | 18,000   | 98,000   | 105,000  | 1,500   |        | 4 | 12,000   |
| 12,000      | 12,000      | 11,500   | 150,000  | 18,000   | 98,000   | 105,000  | 0,500   |        | 4 | 12,005   |
| 12,000      | 12,000      | 11,500   | 150,000  | 18,000   | 98,000   | 105,000  | 1,000   |        | 4 | 12,010   |
| 12,000      | 12,000      | 11,500   | 150,000  | 18,000   | 98,000   | 105,000  | 2,000   |        | 4 | 12,020   |
| 16,000      | 16,000      | 15,500   | 150,000  | 24,000   | 98,000   | 102,000  | 2,000   |        | 4 | 16,000   |

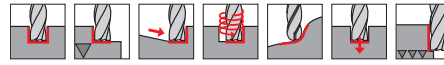
| ISO      | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |       |       |       | f <sub>z</sub> (mm/z)/Ø |                         |                             |            |       |       |       |       |            |       |       |       |       |       |       |       |
|----------|-------------------------|----------------|-------------------------|-------|-------|-------|-------|-------|-------|-------------------------|-------------------------|-----------------------------|------------|-------|-------|-------|-------|------------|-------|-------|-------|-------|-------|-------|-------|
|          |                         |                | 2                       | 3     | 4     | 6     | 8     | 10    | 12    | 2                       | 3                       | 4                           | 6          | 8     | 10    | 12    |       |            |       |       |       |       |       |       |       |
| <b>P</b> | ≤ 850 N/mm <sup>2</sup> | <b>100</b>     | 0,012                   | 0,018 | 0,024 | 0,036 | 0,048 | 0,060 | 0,072 |                         | a <sub>p</sub> = 0,1xD  | a <sub>e</sub> = 0,1xD      | <b>150</b> | 0,008 | 0,013 | 0,017 | 0,025 | 0,034      | 0,042 | 0,050 |       |       |       |       |       |
|          | ≥ 850 N/mm <sup>2</sup> | <b>60</b>      | 0,012                   | 0,018 | 0,024 | 0,036 | 0,048 | 0,060 | 0,072 |                         |                         |                             | <b>100</b> | 0,008 | 0,013 | 0,017 | 0,025 | 0,034      | 0,042 | 0,050 |       |       |       |       |       |
| <b>H</b> | ≤ 55 HRC                | <b>90</b>      | 0,013                   | 0,020 | 0,026 | 0,039 | 0,052 | 0,065 | 0,078 |                         | a <sub>p</sub> = 0,01xD | a <sub>e</sub> max = 0,01xD | <b>135</b> | 0,009 | 0,014 | 0,018 | 0,027 | 0,036      | 0,046 | 0,055 |       |       |       |       |       |
|          | 55-63 HRC               | <b>50</b>      | 0,010                   | 0,015 | 0,020 | 0,030 | 0,040 | 0,050 | 0,060 |                         |                         |                             | <b>80</b>  | 0,007 | 0,010 | 0,013 | 0,020 | 0,026      | 0,033 | 0,039 |       |       |       |       |       |
| <b>K</b> | ≥ 240 HB                | <b>220</b>     | 0,030                   | 0,045 | 0,060 | 0,090 | 0,120 | 0,150 | 0,180 |                         |                         |                             |            |       |       |       |       | <b>360</b> | 0,018 | 0,027 | 0,036 | 0,054 | 0,072 | 0,090 | 0,108 |

# VHM Fräser

## Kopierfräser mit Torusanschliff



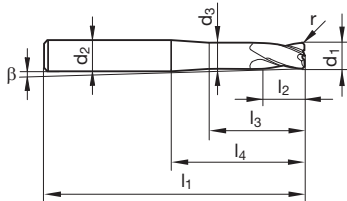
Katalog-Nr. 54302



|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| <b>P</b> | <b>M</b> | <b>K</b> | <b>N</b> | <b>S</b> | <b>H</b> |
| ●        | ●        | ●        | ○        | ●        | ○        |

Arbeitsrichtwerte  
Seite 280-293

- zum Schruppen, Schlichten und Feinschlichten unter HSC-Bedingungen im Gesenk- und Formenbau
- Zentrumschnitt
- geeignet für Werkstoffe von 40 bis 54 HRC
- hohe Standzeiten durch hochharte Beschichtung



| d1 h8<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | r<br>mm | β<br>° | Z | Code-Nr. |
|-------------|-------------|----------|----------|----------|----------|----------|---------|--------|---|----------|
| 0,500       | 4,000       | 0,480    | 50,000   | 1,000    | 3,000    | 22,000   | 0,100   | 4,600  | 2 | 0,501    |
| 1,000       | 4,000       | 0,950    | 50,000   | 2,000    | 6,000    | 22,000   | 0,200   | 4,000  | 2 | 1,002    |
| 2,000       | 6,000       | 1,900    | 57,000   | 3,000    | 8,000    | 21,000   | 0,500   | 5,600  | 2 | 2,000    |
| 2,000       | 6,000       | 1,900    | 57,000   | 3,000    | 8,000    | 21,000   | 0,200   | 5,500  | 2 | 2,002    |
| 3,000       | 6,000       | 2,800    | 57,000   | 3,500    | 14,000   | 21,000   | 0,500   | 4,200  | 2 | 3,000    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 16,000   | 21,000   | 1,000   | 2,900  | 2 | 4,000    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 16,000   | 21,000   | 0,300   | 2,800  | 2 | 4,003    |
| 4,000       | 6,000       | 3,800    | 57,000   | 4,000    | 16,000   | 21,000   | 0,500   | 2,800  | 2 | 4,005    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 18,000   | 21,000   | 0,500   | 1,400  | 2 | 5,005    |
| 5,000       | 6,000       | 4,800    | 57,000   | 5,000    | 18,000   | 21,000   | 1,000   | 1,500  | 2 | 5,010    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 21,000   | 2,000   |        | 2 | 6,000    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 21,000   | 0,500   |        | 2 | 6,005    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 21,000   | 1,000   |        | 2 | 6,010    |
| 6,000       | 6,000       | 5,700    | 57,000   | 6,000    | 20,000   | 21,000   | 1,500   |        | 2 | 6,015    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 27,000   | 2,000   |        | 2 | 8,000    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 27,000   | 0,500   |        | 2 | 8,005    |
| 8,000       | 8,000       | 7,700    | 63,000   | 8,000    | 26,000   | 27,000   | 1,000   |        | 2 | 8,010    |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 30,000   | 32,000   | 3,000   |        | 2 | 10,000   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 30,000   | 32,000   | 0,500   |        | 2 | 10,005   |
| 10,000      | 10,000      | 9,500    | 72,000   | 10,000   | 30,000   | 32,000   | 1,500   |        | 2 | 10,015   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 36,000   | 38,000   | 4,000   |        | 2 | 12,000   |
| 12,000      | 12,000      | 11,500   | 83,000   | 12,000   | 36,000   | 38,000   | 2,000   |        | 2 | 12,020   |

| ISO      | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |                        |       |       |            | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |                             |       |  |  |
|----------|-------------------------|----------------|-------------------------|-------|-------|-------|------------------------|-------|-------|------------|----------------|-------------------------|-------|-------|-------|-----------------------------|-------|--|--|
|          |                         |                | a <sub>p</sub> = 0,1xD  |       |       |       | a <sub>e</sub> = 0,1xD |       |       |            |                | a <sub>p</sub> = 0,01xD |       |       |       | a <sub>e</sub> max = 0,01xD |       |  |  |
|          |                         |                | 2                       | 3     | 4     | 6     | 8                      | 10    | 12    |            | 2              | 3                       | 4     | 6     | 8     | 10                          | 12    |  |  |
| <b>P</b> | ≤ 850 N/mm <sup>2</sup> | <b>240</b>     | 0,030                   | 0,045 | 0,060 | 0,090 | 0,120                  | 0,150 | 0,180 | <b>360</b> | 0,021          | 0,032                   | 0,042 | 0,063 | 0,084 | 0,105                       | 0,126 |  |  |
|          | ≥ 850 N/mm <sup>2</sup> | <b>200</b>     | 0,024                   | 0,036 | 0,048 | 0,072 | 0,096                  | 0,120 | 0,144 | <b>300</b> | 0,017          | 0,025                   | 0,034 | 0,050 | 0,067 | 0,084                       | 0,101 |  |  |
| <b>H</b> | ≤ 55 HRC                | <b>120</b>     | 0,024                   | 0,036 | 0,048 | 0,072 | 0,096                  | 0,120 | 0,144 | <b>200</b> | 0,017          | 0,025                   | 0,034 | 0,050 | 0,067 | 0,084                       | 0,101 |  |  |
|          |                         |                |                         |       |       |       |                        |       |       |            |                |                         |       |       |       |                             |       |  |  |
| <b>M</b> | ≤ 750 N/mm <sup>2</sup> | <b>160</b>     | 0,026                   | 0,039 | 0,052 | 0,078 | 0,104                  | 0,130 | 0,156 | <b>240</b> | 0,018          | 0,027                   | 0,036 | 0,055 | 0,073 | 0,091                       | 0,109 |  |  |
|          | ≥ 750 N/mm <sup>2</sup> | <b>80</b>      | 0,020                   | 0,030 | 0,040 | 0,060 | 0,080                  | 0,100 | 0,120 | <b>130</b> | 0,013          | 0,020                   | 0,026 | 0,039 | 0,052 | 0,065                       | 0,078 |  |  |
| <b>S</b> | Ni-Basis                | <b>45</b>      | 0,020                   | 0,030 | 0,040 | 0,060 | 0,080                  | 0,100 | 0,120 | <b>80</b>  | 0,013          | 0,020                   | 0,026 | 0,039 | 0,052 | 0,065                       | 0,078 |  |  |
|          | Ti-Basis                | <b>100</b>     | 0,024                   | 0,036 | 0,048 | 0,072 | 0,096                  | 0,120 | 0,144 | <b>150</b> | 0,017          | 0,025                   | 0,034 | 0,050 | 0,067 | 0,084                       | 0,101 |  |  |
| <b>K</b> | ≤ 240 HB                | <b>220</b>     | 0,030                   | 0,045 | 0,060 | 0,090 | 0,120                  | 0,150 | 0,180 | <b>330</b> | 0,021          | 0,032                   | 0,042 | 0,063 | 0,084 | 0,105                       | 0,126 |  |  |
|          | ≥ 240 HB                | <b>180</b>     | 0,026                   | 0,039 | 0,052 | 0,078 | 0,104                  | 0,130 | 0,156 | <b>270</b> | 0,018          | 0,027                   | 0,036 | 0,055 | 0,073 | 0,091                       | 0,109 |  |  |
| <b>N</b> | ≥ 7 % Si                | <b>300</b>     | 0,030                   | 0,045 | 0,060 | 0,090 | 0,120                  | 0,150 | 0,180 | <b>500</b> | 0,021          | 0,032                   | 0,042 | 0,063 | 0,084 | 0,105                       | 0,126 |  |  |

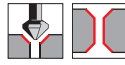
Fräswerkzeuge

## Entgrat- und Faswerkzeuge

### Entgratfräser 90°

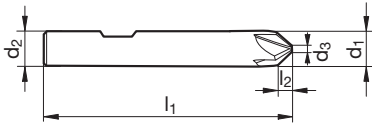


Katalog-Nr. 53399



|   |   |   |   |   |   |                                    |
|---|---|---|---|---|---|------------------------------------|
| P | M | K | N | S | H | Arbeitsrichtwerte<br>Seite 280-293 |
| ● | ● | ● | ● | ● | ○ |                                    |

- Entgrat- und Anfasfräser, z.B. zur Bearbeitung von Werkstückkanten mit Faswinkel 90°
- höchste Vorschübe und bessere Oberfläche durch z = 6
- auch als Satz 322 044 176 erhältlich
- HA-Schaft auf Anfrage



| d1 js9<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | Z | Code-Nr. |
|--------------|-------------|----------|----------|----------|---|----------|
| 6,000        | 6,000       | 1,500    | 57,000   | 2,250    | 6 | 6,000    |
| 8,000        | 8,000       | 2,000    | 63,000   | 3,000    | 6 | 8,000    |
| 10,000       | 10,000      | 3,000    | 72,000   | 3,500    | 6 | 10,000   |
| 12,000       | 12,000      | 3,000    | 83,000   | 4,500    | 6 | 12,000   |
| 16,000       | 16,000      | 4,000    | 92,000   | 6,000    | 6 | 16,000   |
| 20,000       | 20,000      | 6,000    | 92,000   | 7,000    | 6 | 20,000   |

Fräserwerkzeuge

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |      |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |       |      |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|------|------|------|------|----------------|-------------------------|-------|-------|-------|------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10   | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10    | 12   | 16   | 20   |
| P   | ≤ 850 N/mm <sup>2</sup> | 192            | 0,018                   | 0,036 | 0,048 | 0,06 | 0,08 | 0,10 | 0,13 | 250            | 0,030                   | 0,060 | 0,080 | 0,11  | 0,13 | 0,17 | 0,21 |
|     | ≥ 850 N/mm <sup>2</sup> | 140            | 0,016                   | 0,032 | 0,042 | 0,06 | 0,07 | 0,09 | 0,12 |                | 180                     | 0,026 | 0,053 | 0,070 | 0,10 | 0,12 | 0,16 |
| M   | ≤ 750 N/mm <sup>2</sup> | 120            | 0,013                   | 0,025 | 0,034 | 0,05 | 0,05 | 0,07 | 0,09 | 160            | 0,021                   | 0,042 | 0,056 | 0,08  | 0,09 | 0,12 | 0,15 |
|     | ≥ 750 N/mm <sup>2</sup> | 80             | 0,009                   | 0,019 | 0,025 | 0,04 | 0,04 | 0,06 | 0,07 |                | 100                     | 0,016 | 0,032 | 0,042 | 0,06 | 0,07 | 0,10 |
| K   | ≤ 240 HB                | 170            | 0,017                   | 0,033 | 0,044 | 0,06 | 0,07 | 0,09 | 0,12 | 230            | 0,028                   | 0,056 | 0,074 | 0,10  | 0,12 | 0,16 | 0,20 |
| N   | ≥ 7 % Si                | 250            | 0,023                   | 0,047 | 0,062 | 0,08 | 0,10 | 0,13 | 0,17 | 330            | 0,039                   | 0,078 | 0,104 | 0,14  | 0,17 | 0,22 | 0,28 |

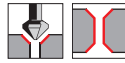


## Entgrat- und Faswerkzeuge

### Entgratfräser 90°, spiralisiert

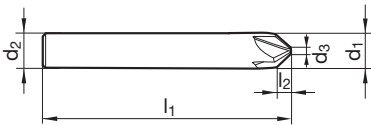


Katalog-Nr. 63399



|   |   |   |   |   |   |                                    |
|---|---|---|---|---|---|------------------------------------|
| P | M | K | N | S | H | Arbeitsrichtwerte<br>Seite 280-293 |
| ● | ● | ○ | ● | ● |   |                                    |

- Nutzung der vollen Schneidenlänge durch Stirnschnitt, Bearbeitung bis an den Bauteilboden
- weicher Schnitt und bessere Oberflächen bei großen Fasen durch positiven Spanwinkel und 5 unterschiedliche Spiralwinkel
- HB Spannfläche auf Anfrage möglich



| d1 js9<br>mm | d2 h6<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | Z | Code-Nr. |
|--------------|-------------|----------|----------|----------|---|----------|
| 6,000        | 6,000       | 1,500    | 57,000   | 2,250    | 5 | 6,000    |
| 8,000        | 8,000       | 2,000    | 63,000   | 3,000    | 5 | 8,000    |
| 10,000       | 10,000      | 2,500    | 72,000   | 3,750    | 5 | 10,000   |
| 12,000       | 12,000      | 3,000    | 83,000   | 4,500    | 5 | 12,000   |
| 16,000       | 16,000      | 4,000    | 92,000   | 6,000    | 5 | 16,000   |
| 20,000       | 20,000      | 5,000    | 104,000  | 7,500    | 5 | 20,000   |

| ISO | Härte                   | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |      |      |      |      | v <sub>c</sub> | f <sub>z</sub> (mm/z)/Ø |       |       |      |      |      |      |
|-----|-------------------------|----------------|-------------------------|-------|-------|------|------|------|------|----------------|-------------------------|-------|-------|------|------|------|------|
|     |                         |                | 3                       | 6     | 8     | 10   | 12   | 16   | 20   |                | 3                       | 6     | 8     | 10   | 12   | 16   | 20   |
| P   | ≤ 850 N/mm <sup>2</sup> | 192            | 0,018                   | 0,036 | 0,048 | 0,06 | 0,08 | 0,10 | 0,13 | 250            | 0,030                   | 0,060 | 0,080 | 0,11 | 0,13 | 0,17 | 0,21 |
|     | ≥ 850 N/mm <sup>2</sup> | 140            | 0,016                   | 0,032 | 0,042 | 0,06 | 0,07 | 0,09 | 0,12 | 180            | 0,026                   | 0,053 | 0,070 | 0,10 | 0,12 | 0,16 | 0,20 |
| M   | ≤ 750 N/mm <sup>2</sup> | 120            | 0,013                   | 0,025 | 0,034 | 0,05 | 0,05 | 0,07 | 0,09 | 160            | 0,021                   | 0,042 | 0,056 | 0,08 | 0,09 | 0,12 | 0,15 |
|     | ≥ 750 N/mm <sup>2</sup> | 80             | 0,009                   | 0,019 | 0,025 | 0,04 | 0,04 | 0,06 | 0,07 | 100            | 0,016                   | 0,032 | 0,042 | 0,06 | 0,07 | 0,10 | 0,12 |
| K   | ≤ 240 HB                | 170            | 0,017                   | 0,033 | 0,044 | 0,06 | 0,07 | 0,09 | 0,12 | 230            | 0,028                   | 0,056 | 0,074 | 0,10 | 0,12 | 0,16 | 0,20 |
| N   | ≥ 7 % Si                | 250            | 0,023                   | 0,047 | 0,062 | 0,08 | 0,10 | 0,13 | 0,17 | 330            | 0,039                   | 0,078 | 0,104 | 0,14 | 0,17 | 0,22 | 0,28 |

## Hartmetall-Reibwerkzeuge

### VHM-Hochleistungs-Kopfreibahnen



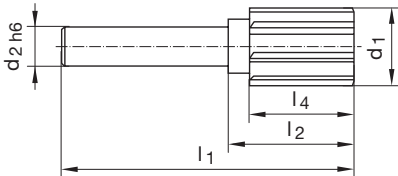
Katalog-Nr. 72874



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | ○ |   | • | • |

Arbeitsrichtwerte  
Seite 294

- für höchste Schnittwerte und hochwertige Bohrungsqualitäten
- mit axialem Kühlkanal, zur Bearbeitung von Grundbohrungen
- hohe Reibtiefevarianz durch Einsatz der Schrumpferlängerung (Kat.-Nr. 78719)
- Spannen in Hydrodehn- oder Schrumpffutter möglich



| d1<br>mm | d2 h6<br>mm | l1<br>mm | l2<br>mm | l4<br>mm | Z | Code-Nr. |
|----------|-------------|----------|----------|----------|---|----------|
| 14,000   | 6,000       | 66,000   | 30,000   | 25,000   | 8 | 14,000   |
| 15,000   | 6,000       | 66,000   | 30,000   | 25,000   | 8 | 15,000   |
| 16,000   | 8,000       | 66,000   | 30,000   | 25,000   | 8 | 16,000   |
| 18,000   | 8,000       | 66,000   | 30,000   | 25,000   | 8 | 18,000   |
| 20,000   | 10,000      | 70,000   | 30,000   | 25,000   | 8 | 20,000   |
| 22,000   | 10,000      | 70,000   | 30,000   | 25,000   | 8 | 22,000   |
| 24,000   | 12,000      | 75,000   | 30,000   | 25,000   | 8 | 24,000   |
| 25,000   | 12,000      | 75,000   | 30,000   | 25,000   | 8 | 25,000   |
| 26,000   | 12,000      | 75,000   | 30,000   | 25,000   | 8 | 26,000   |
| 28,000   | 12,000      | 75,000   | 30,000   | 25,000   | 8 | 28,000   |
| 30,000   | 16,000      | 78,000   | 30,000   | 25,000   | 8 | 30,000   |
| 32,000   | 16,000      | 78,000   | 30,000   | 25,000   | 8 | 32,000   |
| 34,000   | 20,000      | 80,000   | 30,000   | 25,000   | 8 | 34,000   |
| 36,000   | 20,000      | 80,000   | 30,000   | 25,000   | 8 | 36,000   |
| 38,000   | 20,000      | 80,000   | 30,000   | 25,000   | 8 | 38,000   |
| 40,000   | 20,000      | 80,000   | 30,000   | 25,000   | 8 | 40,000   |
| 42,000   | 20,000      | 80,000   | 30,000   | 25,000   | 8 | 42,000   |

## Hartmetall-Reibwerkzeuge

### VHM-Hochleistungs-Kopfreibahnen



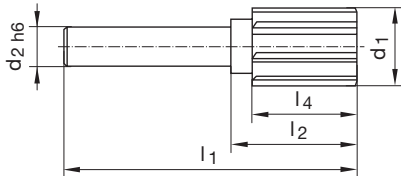
Katalog-Nr. 72875



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ○ |   | ● | ● |

Arbeitsrichtwerte  
Seite 294

- für höchste Schnittwerte und hochwertige Bohrungsqualitäten
- mit radialer Kühlmittelzufuhr und Schälanschnitt zum gesicherten Spänetransport in die Vorschubrichtung bei der Bearbeitung von Durchgangsbohrungen
- hohe Reibtiefenvarianz durch Einsatz der Schrumpferlängerung (Kat.-Nr. 78719)
- Spannen in Hydrodehn- oder Schrumpffutter möglich



| d1<br>mm | d2 h6<br>mm | l1<br>mm | l2<br>mm | l4<br>mm | Z | Code-Nr. |
|----------|-------------|----------|----------|----------|---|----------|
| 14,000   | 6,000       | 66,000   | 30,000   | 25,000   | 8 | 14,000   |
| 15,000   | 6,000       | 66,000   | 30,000   | 25,000   | 8 | 15,000   |
| 16,000   | 8,000       | 66,000   | 30,000   | 25,000   | 8 | 16,000   |
| 18,000   | 8,000       | 66,000   | 30,000   | 25,000   | 8 | 18,000   |
| 20,000   | 10,000      | 70,000   | 30,000   | 25,000   | 8 | 20,000   |
| 22,000   | 10,000      | 70,000   | 30,000   | 25,000   | 8 | 22,000   |
| 24,000   | 12,000      | 75,000   | 30,000   | 25,000   | 8 | 24,000   |
| 25,000   | 12,000      | 75,000   | 30,000   | 25,000   | 8 | 25,000   |
| 26,000   | 12,000      | 75,000   | 30,000   | 25,000   | 8 | 26,000   |
| 28,000   | 12,000      | 75,000   | 30,000   | 25,000   | 8 | 28,000   |
| 30,000   | 16,000      | 78,000   | 30,000   | 25,000   | 8 | 30,000   |
| 32,000   | 16,000      | 78,000   | 30,000   | 25,000   | 8 | 32,000   |
| 34,000   | 20,000      | 80,000   | 30,000   | 25,000   | 8 | 34,000   |
| 36,000   | 20,000      | 80,000   | 30,000   | 25,000   | 8 | 36,000   |
| 38,000   | 20,000      | 80,000   | 30,000   | 25,000   | 8 | 38,000   |
| 40,000   | 20,000      | 80,000   | 30,000   | 25,000   | 8 | 40,000   |
| 42,000   | 20,000      | 80,000   | 30,000   | 25,000   | 8 | 42,000   |

## Hartmetall-Reibwerkzeuge

### VHM-Hochleistungs-Reibahlen

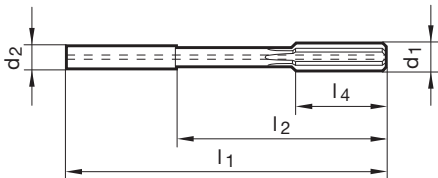


Katalog-Nr. 72876



Arbeitsrichtwerte  
Seite 294

- mit axialem Kühlkanal, zur Bearbeitung von Grundbohrungen
- für höchste Schnittwerte und hochwertige Bohrungsqualitäten
- gerade genutet, mit extrem ungleicher Teilung
- Zylinderschaft Tol. h6 zur Aufnahme in Hydraulik-Dehnspann- oder Schrumpffutter
- erhebliche Einsparpotenziale bei den Prozesskosten möglich
- die DLC-Beschichtung verhindert die Bildung von Aufbauschneiden  
Durchmesserschwankungen bei bester Oberflächenqualität der geriebenen  
Bohrung werden so vermieden



| d1<br>mm | d2 h6<br>mm | l1<br>mm | l2<br>mm | l4<br>mm | Z | Code-Nr. |
|----------|-------------|----------|----------|----------|---|----------|
| 4,000    | 4,000       | 68,000   | 40,000   | 12,000   | 4 | 4,000    |
| 5,000    | 6,000       | 76,000   | 40,000   | 12,000   | 4 | 5,000    |
| 6,000    | 6,000       | 76,000   | 40,000   | 12,000   | 4 | 6,000    |
| 7,000    | 8,000       | 101,000  | 65,000   | 16,000   | 6 | 7,000    |
| 8,000    | 8,000       | 101,000  | 65,000   | 16,000   | 6 | 8,000    |
| 10,000   | 10,000      | 101,000  | 61,000   | 19,000   | 6 | 10,000   |
| 12,000   | 12,000      | 130,000  | 85,000   | 19,000   | 6 | 12,000   |
| 14,000   | 14,000      | 130,000  | 85,000   | 22,000   | 6 | 14,000   |
| 16,000   | 16,000      | 150,000  | 102,000  | 22,000   | 6 | 16,000   |
| 18,000   | 18,000      | 150,000  | 102,000  | 25,000   | 6 | 18,000   |
| 20,000   | 20,000      | 150,000  | 100,000  | 25,000   | 6 | 20,000   |

## Hartmetall-Reibwerkzeuge

### VHM-Hochleistungs-Reibahlen

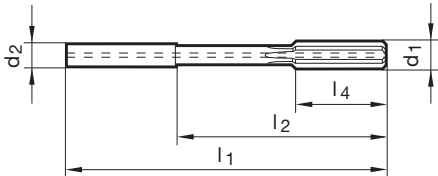


Katalog-Nr. 72877



Arbeitsrichtwerte  
Seite 294

- für höchste Schnittwerte und hochwertige Bohrungsqualitäten
- gerade genutet, mit extrem ungleicher Teilung
- Zylinderschaft Tol. h6 zur Aufnahme in Hydraulik-Dehnspann- oder Schrumpffutter
- erhebliche Einsparpotenziale bei den Prozesskosten möglich
- die DLC-Beschichtung verhindert die Bildung von Aufbauschneiden  
Durchmesserschwankungen bei bester Oberflächenqualität der geriebenen Bohrung werden so vermieden



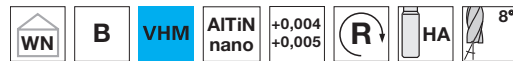
| d1<br>mm | d2 h6<br>mm | l1<br>mm | l2<br>mm | l4<br>mm | Z | Code-Nr. |
|----------|-------------|----------|----------|----------|---|----------|
| 4,000    | 4,000       | 68,000   | 40,000   | 12,000   | 4 | 4,000    |
| 5,000    | 6,000       | 76,000   | 40,000   | 12,000   | 4 | 5,000    |
| 6,000    | 6,000       | 76,000   | 40,000   | 12,000   | 4 | 6,000    |
| 7,000    | 8,000       | 101,000  | 65,000   | 16,000   | 6 | 7,000    |
| 8,000    | 8,000       | 101,000  | 65,000   | 16,000   | 6 | 8,000    |
| 10,000   | 10,000      | 101,000  | 61,000   | 19,000   | 6 | 10,000   |
| 12,000   | 12,000      | 130,000  | 85,000   | 19,000   | 6 | 12,000   |
| 14,000   | 14,000      | 130,000  | 85,000   | 22,000   | 6 | 14,000   |
| 16,000   | 16,000      | 150,000  | 102,000  | 22,000   | 6 | 16,000   |
| 18,000   | 18,000      | 150,000  | 102,000  | 25,000   | 6 | 18,000   |
| 20,000   | 20,000      | 150,000  | 100,000  | 25,000   | 6 | 20,000   |

## Hartmetall-Reibwerkzeuge

### VHM NC-Maschinen-Reibbahlen



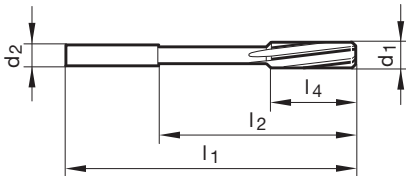
Katalog-Nr. 52920



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | • |   | • | ○ |

Arbeitsrichtwerte  
Seite 294

- > Ø 3,75 mm mit extrem ungleicher Teilung
- ≤ Ø 5,50 mm: 0,000/+0,004
- > Ø 5,50 mm: 0,000/+0,005
- Zylinderschaft Tol. h6 zur Aufnahme in Hydraulik-Dehnspann- oder Schrumpffutter
- AlTiNnano-Beschichtung für höchste Standzeiten und Oberflächenqualität der Bohrungen
- für Serienfertigung



| d1<br>mm | d2 h6<br>mm | l1<br>mm | l2<br>mm | l4<br>mm | Z | Code-Nr. |
|----------|-------------|----------|----------|----------|---|----------|
| 0,980    | 4,000       | 50,000   | 22,000   | 6,000    | 3 | 0,980    |
| 0,990    | 4,000       | 50,000   | 22,000   | 6,000    | 3 | 0,990    |
| 1,000    | 4,000       | 50,000   | 22,000   | 6,000    | 3 | 1,000    |
| 1,010    | 4,000       | 50,000   | 22,000   | 6,000    | 3 | 1,010    |
| 1,020    | 4,000       | 50,000   | 22,000   | 6,000    | 3 | 1,020    |
| 1,030    | 4,000       | 50,000   | 22,000   | 9,000    | 3 | 1,030    |
| 1,480    | 4,000       | 50,000   | 22,000   | 9,000    | 3 | 1,480    |
| 1,490    | 4,000       | 50,000   | 22,000   | 9,000    | 3 | 1,490    |
| 1,500    | 4,000       | 50,000   | 22,000   | 9,000    | 3 | 1,500    |
| 1,510    | 4,000       | 50,000   | 22,000   | 9,000    | 3 | 1,510    |
| 1,520    | 4,000       | 50,000   | 22,000   | 9,000    | 3 | 1,520    |
| 1,530    | 4,000       | 50,000   | 22,000   | 9,000    | 3 | 1,530    |
| 1,980    | 4,000       | 50,000   | 22,000   | 12,000   | 4 | 1,980    |
| 1,990    | 4,000       | 50,000   | 22,000   | 12,000   | 4 | 1,990    |
| 2,000    | 4,000       | 50,000   | 22,000   | 12,000   | 4 | 2,000    |
| 2,010    | 4,000       | 50,000   | 22,000   | 12,000   | 4 | 2,010    |
| 2,020    | 4,000       | 50,000   | 22,000   | 12,000   | 4 | 2,020    |
| 2,030    | 4,000       | 50,000   | 22,000   | 12,000   | 4 | 2,030    |
| 2,480    | 4,000       | 60,000   | 32,000   | 16,000   | 4 | 2,480    |
| 2,490    | 4,000       | 60,000   | 32,000   | 16,000   | 4 | 2,490    |
| 2,500    | 4,000       | 60,000   | 32,000   | 16,000   | 4 | 2,500    |
| 2,510    | 4,000       | 60,000   | 32,000   | 16,000   | 4 | 2,510    |
| 2,520    | 4,000       | 60,000   | 32,000   | 16,000   | 4 | 2,520    |
| 2,530    | 4,000       | 60,000   | 32,000   | 16,000   | 4 | 2,530    |
| 2,970    | 4,000       | 64,000   | 36,000   | 17,000   | 6 | 2,970    |
| 2,980    | 4,000       | 64,000   | 36,000   | 17,000   | 6 | 2,980    |
| 2,990    | 4,000       | 64,000   | 36,000   | 17,000   | 6 | 2,990    |
| 3,000    | 4,000       | 64,000   | 36,000   | 17,000   | 6 | 3,000    |
| 3,010    | 4,000       | 64,000   | 36,000   | 17,000   | 6 | 3,010    |
| 3,020    | 4,000       | 64,000   | 36,000   | 17,000   | 6 | 3,020    |
| 3,030    | 4,000       | 64,000   | 36,000   | 17,000   | 6 | 3,030    |
| 3,970    | 4,000       | 77,000   | 45,000   | 21,000   | 6 | 3,970    |
| 3,980    | 4,000       | 77,000   | 45,000   | 21,000   | 6 | 3,980    |
| 3,990    | 4,000       | 77,000   | 45,000   | 21,000   | 6 | 3,990    |
| 4,000    | 4,000       | 77,000   | 45,000   | 21,000   | 6 | 4,000    |
| 4,010    | 4,000       | 77,000   | 45,000   | 21,000   | 6 | 4,010    |
| 4,020    | 4,000       | 77,000   | 45,000   | 21,000   | 6 | 4,020    |
| 4,030    | 4,000       | 77,000   | 45,000   | 21,000   | 6 | 4,030    |
| 4,970    | 6,000       | 93,000   | 59,000   | 26,000   | 6 | 4,970    |
| 4,980    | 6,000       | 93,000   | 59,000   | 26,000   | 6 | 4,980    |
| 4,990    | 6,000       | 93,000   | 59,000   | 26,000   | 6 | 4,990    |
| 5,000    | 6,000       | 93,000   | 59,000   | 26,000   | 6 | 5,000    |
| 5,010    | 6,000       | 93,000   | 59,000   | 26,000   | 6 | 5,010    |
| 5,020    | 6,000       | 93,000   | 59,000   | 26,000   | 6 | 5,020    |
| 5,030    | 6,000       | 93,000   | 59,000   | 26,000   | 6 | 5,030    |
| 5,970    | 6,000       | 93,000   | 57,000   | 26,000   | 6 | 5,970    |
| 5,980    | 6,000       | 93,000   | 57,000   | 26,000   | 6 | 5,980    |
| 5,990    | 6,000       | 93,000   | 57,000   | 26,000   | 6 | 5,990    |

| d1<br>mm | d2 h6<br>mm | l1<br>mm | l2<br>mm | l4<br>mm | Z | Code-Nr. |
|----------|-------------|----------|----------|----------|---|----------|
| 6,000    | 6,000       | 93,000   | 57,000   | 26,000   | 6 | 6,000    |
| 6,010    | 6,000       | 93,000   | 57,000   | 26,000   | 6 | 6,010    |
| 6,020    | 6,000       | 93,000   | 57,000   | 26,000   | 6 | 6,020    |
| 6,030    | 6,000       | 93,000   | 57,000   | 26,000   | 6 | 6,030    |
| 7,000    | 8,000       | 109,000  | 69,000   | 31,000   | 6 | 7,000    |
| 7,970    | 8,000       | 117,000  | 75,000   | 33,000   | 6 | 7,970    |
| 7,980    | 8,000       | 117,000  | 75,000   | 33,000   | 6 | 7,980    |
| 7,990    | 8,000       | 117,000  | 75,000   | 33,000   | 6 | 7,990    |
| 8,000    | 8,000       | 117,000  | 75,000   | 33,000   | 6 | 8,000    |
| 8,010    | 8,000       | 117,000  | 75,000   | 33,000   | 6 | 8,010    |
| 8,020    | 8,000       | 117,000  | 75,000   | 33,000   | 6 | 8,020    |
| 8,030    | 8,000       | 117,000  | 75,000   | 33,000   | 6 | 8,030    |
| 8,040    | 8,000       | 117,000  | 75,000   | 33,000   | 6 | 8,040    |
| 9,000    | 10,000      | 125,000  | 81,000   | 36,000   | 6 | 9,000    |
| 9,970    | 10,000      | 133,000  | 87,000   | 38,000   | 6 | 9,970    |
| 9,980    | 10,000      | 133,000  | 87,000   | 38,000   | 6 | 9,980    |
| 9,990    | 10,000      | 133,000  | 87,000   | 38,000   | 6 | 9,990    |
| 10,000   | 10,000      | 133,000  | 87,000   | 38,000   | 6 | 10,000   |
| 10,010   | 10,000      | 133,000  | 87,000   | 38,000   | 6 | 10,010   |
| 10,020   | 10,000      | 133,000  | 87,000   | 38,000   | 6 | 10,020   |
| 10,030   | 10,000      | 133,000  | 87,000   | 38,000   | 6 | 10,030   |
| 10,040   | 10,000      | 133,000  | 87,000   | 38,000   | 6 | 10,040   |
| 10,050   | 10,000      | 133,000  | 87,000   | 38,000   | 6 | 10,050   |
| 11,970   | 12,000      | 151,000  | 105,000  | 44,000   | 6 | 11,970   |
| 11,980   | 12,000      | 151,000  | 105,000  | 44,000   | 6 | 11,980   |
| 11,990   | 12,000      | 151,000  | 105,000  | 44,000   | 6 | 11,990   |
| 12,000   | 12,000      | 151,000  | 105,000  | 44,000   | 6 | 12,000   |
| 12,010   | 12,000      | 151,000  | 105,000  | 44,000   | 6 | 12,010   |
| 12,020   | 12,000      | 151,000  | 105,000  | 44,000   | 6 | 12,020   |
| 12,030   | 12,000      | 151,000  | 105,000  | 44,000   | 6 | 12,030   |
| 12,040   | 12,000      | 151,000  | 105,000  | 44,000   | 6 | 12,040   |
| 12,050   | 12,000      | 151,000  | 105,000  | 44,000   | 6 | 12,050   |

## Hartmetall-Reibwerkzeuge

### VHM NC-Maschinen-Reibbahlen



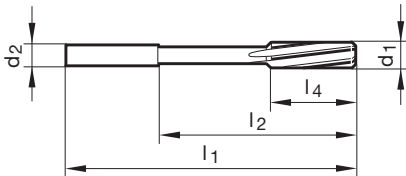
Katalog-Nr. 52930



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| • | • | • |   | • | ○ |

Arbeitsrichtwerte  
Seite 294

- > Ø 3,75 mm mit extrem ungleicher Teilung
- Zylinderschaft Tol. h6 zur Aufnahme in Hydraulik-Dehnspann- oder Schrumpffutter
- AlTiNnano-Beschichtung für höchste Standzeiten und Oberflächenqualität der Bohrungen



| d1<br>mm | d2 h6<br>mm | l1<br>mm | l2<br>mm | l4<br>mm | Z | Code-Nr. |
|----------|-------------|----------|----------|----------|---|----------|
| 3,000    | 4,000       | 64,000   | 36,000   | 17,000   | 6 | 3,000    |
| 3,500    | 4,000       | 74,000   | 46,000   | 20,000   | 6 | 3,500    |
| 4,000    | 4,000       | 77,000   | 45,000   | 21,000   | 6 | 4,000    |
| 4,500    | 6,000       | 82,000   | 50,000   | 23,000   | 6 | 4,500    |
| 5,000    | 6,000       | 93,000   | 59,000   | 26,000   | 6 | 5,000    |
| 5,500    | 6,000       | 93,000   | 57,000   | 26,000   | 6 | 5,500    |
| 6,000    | 6,000       | 93,000   | 57,000   | 26,000   | 6 | 6,000    |
| 6,500    | 8,000       | 101,000  | 63,000   | 28,000   | 6 | 6,500    |
| 7,000    | 8,000       | 109,000  | 69,000   | 31,000   | 6 | 7,000    |
| 7,500    | 8,000       | 109,000  | 69,000   | 31,000   | 6 | 7,500    |
| 8,000    | 8,000       | 117,000  | 75,000   | 33,000   | 6 | 8,000    |
| 8,500    | 10,000      | 117,000  | 75,000   | 33,000   | 6 | 8,500    |
| 9,000    | 10,000      | 125,000  | 81,000   | 36,000   | 6 | 9,000    |
| 9,500    | 10,000      | 125,000  | 81,000   | 36,000   | 6 | 9,500    |
| 10,000   | 10,000      | 133,000  | 87,000   | 38,000   | 6 | 10,000   |
| 10,500   | 10,000      | 133,000  | 87,000   | 38,000   | 6 | 10,500   |
| 11,000   | 10,000      | 142,000  | 96,000   | 41,000   | 6 | 11,000   |
| 11,500   | 10,000      | 142,000  | 96,000   | 41,000   | 6 | 11,500   |
| 12,000   | 12,000      | 151,000  | 105,000  | 44,000   | 6 | 12,000   |
| 13,000   | 14,000      | 160,000  | 114,000  | 44,000   | 6 | 13,000   |
| 14,000   | 14,000      | 160,000  | 110,000  | 47,000   | 6 | 14,000   |
| 15,000   | 16,000      | 170,000  | 120,000  | 50,000   | 6 | 15,000   |
| 16,000   | 16,000      | 170,000  | 120,000  | 52,000   | 6 | 16,000   |
| 17,000   | 18,000      | 182,000  | 130,000  | 52,000   | 6 | 17,000   |
| 18,000   | 18,000      | 182,000  | 130,000  | 52,000   | 6 | 18,000   |
| 19,000   | 20,000      | 195,000  | 137,000  | 52,000   | 6 | 19,000   |
| 20,000   | 20,000      | 195,000  | 137,000  | 52,000   | 6 | 20,000   |



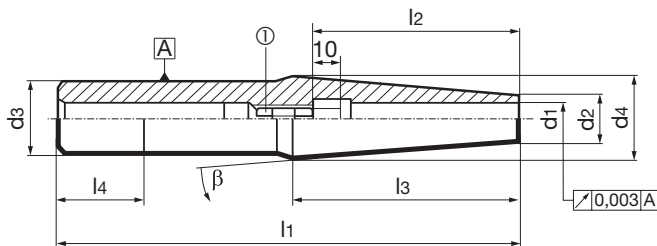
## Schrumpffutter

### Schrumpfverlängerungen



Katalog-Nr. 78719

- zur Aufnahme im Hydraulik-Dehnspannfutter oder Schrumpffutter
- geeignet für Innenkühlung
- für d1 h6 Hartmetall-Werkzeugschäfte (ab d1 14 mm auch HSS möglich)
- Sonderausführungen auf Anfrage
- auch geeignet zum Einsatz mit Kat.-Nr. 72874 und 72875



| d1<br>mm | d2<br>mm | d3<br>mm | d4<br>mm | l1<br>mm | l2<br>mm | l3<br>mm | l4<br>mm | $\beta$<br>° | Code-Nr. |
|----------|----------|----------|----------|----------|----------|----------|----------|--------------|----------|
| 3        | 10       | 20       | 20       | 160      | 30       | 71,5     | 88       | 4            | 3,120    |
| 4        | 10       | 20       | 20       | 160      | 35       | 71,5     | 88       | 4            | 4,120    |
| 5        | 10       | 20       | 20       | 160      | 40       | 71,5     | 88       | 4            | 5,120    |
| 6        | 14       | 20       | 20       | 160      | 36       | 42,9     | 117      | 4            | 6,120    |
| 8        | 14       | 20       | 20       | 160      | 36       | 42,9     | 117      | 4            | 8,120    |
| 10       | 20       | 25       | 25       | 160      | 41       | 35,8     | 124      | 4            | 10,125   |
| 12       | 20       | 25       | 25       | 160      | 46       | 35,8     | 124      | 4            | 12,125   |
| 14       | 20       | 25       | 29       | 160      | 46       | 74,9     | 85       | 4            | 14,125   |
| 16       | 22       | 25       | 33       | 160      | 49       | 82,7     | 77       | 4            | 16,125   |
| 18       | 27       | 32       | 32       | 160      | 49       | 35,8     | 124      | 4            | 18,132   |
| 20       | 27       | 32       | 32       | 160      | 51       | 35,8     | 124      | 4            | 20,132   |
| 3        | 10       | 20       | 20       | 200      | 30       | 71,5     | 128      | 4            | 3,220    |
| 4        | 10       | 20       | 20       | 200      | 35       | 71,5     | 128      | 4            | 4,220    |
| 5        | 10       | 20       | 20       | 200      | 40       | 71,5     | 128      | 4            | 5,220    |
| 6        | 14       | 20       | 20       | 200      | 36       | 42,9     | 157      | 4            | 6,220    |
| 8        | 14       | 20       | 20       | 200      | 36       | 42,9     | 157      | 4            | 8,220    |
| 10       | 20       | 25       | 25       | 200      | 41       | 35,8     | 164      | 4            | 10,225   |
| 12       | 20       | 25       | 25       | 200      | 46       | 35,8     | 164      | 4            | 12,225   |
| 14       | 20       | 32       | 32       | 200      | 46       | 85,8     | 114      | 4            | 14,232   |
| 16       | 24       | 32       | 32       | 200      | 49       | 57,2     | 142      | 4            | 16,232   |
| 18       | 27       | 32       | 32       | 200      | 49       | 35,8     | 164      | 4            | 18,232   |
| 20       | 27       | 32       | 32       | 200      | 51       | 35,8     | 164      | 4            | 20,232   |
| 6        | 10       | 12       | 12       | 125      | 38       | 19,1     | 105      | 3            | 6,012    |
| 8        | 12       | 14       | 14       | 125      | 38       | 19,1     | 105      | 3            | 8,014    |
| 10       | 14       | 16       | 16       | 160      | 42       | 19,1     | 140      | 3            | 10,116   |
| 12       | 16       | 20       | 20       | 160      | 47       | 38,2     | 121      | 3            | 12,120   |
| 16       | 22       | 25       | 25       | 160      | 50       | 28,6     | 131      | 3            | 16,225   |
| 20       | 27       | 32       | 32       | 160      | 52       | 47,7     | 112      | 3            | 20,332   |
| 6        | 10       | 12       | 12       | 200      | 38       | 153,0    | 47       | 3            | 6,312    |
| 8        | 12       | 14       | 14       | 200      | 38       | 153,0    | 47       | 3            | 8,314    |
| 10       | 14       | 16       | 16       | 250      | 42       | 200,0    | 50       | 3            | 10,316   |
| 12       | 16       | 20       | 20       | 250      | 47       | 198,0    | 52       | 3            | 12,320   |
| 16       | 22       | 25       | 25       | 250      | 50       | 192,0    | 58       | 3            | 16,325   |
| 20       | 27       | 32       | 32       | 250      | 52       | 188,0    | 62       | 3            | 20,432   |

## HSS-Co Senkwerkzeuge

### Kegelsenker 90° V-NX



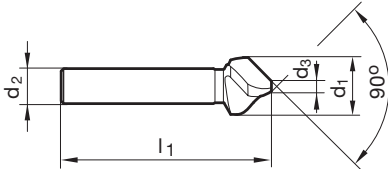
Katalog-Nr. 52348



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 296

- 3 ungleiche, konvexe Schneiden
- vibrationsarmes Schneiden
- für runde und ratterfreie Senkungen
- deutlich reduzierte Vorschubkraft
- universell einsetzbar



| d1<br>mm | d2<br>mm | d3<br>mm | l1<br>mm | Z | Code-Nr. |
|----------|----------|----------|----------|---|----------|
| 6,300    | 5,000    | 1,500    | 45,000   | 3 | 6,300    |
| 8,000    | 6,000    | 2,000    | 50,000   | 3 | 8,000    |
| 8,300    | 6,000    | 2,000    | 50,000   | 3 | 8,300    |
| 10,000   | 6,000    | 2,500    | 50,000   | 3 | 10,000   |
| 10,400   | 6,000    | 2,500    | 50,000   | 3 | 10,400   |
| 11,500   | 8,000    | 2,800    | 56,000   | 3 | 11,500   |
| 12,400   | 8,000    | 2,800    | 56,000   | 3 | 12,400   |
| 15,000   | 10,000   | 3,200    | 60,000   | 3 | 15,000   |
| 16,500   | 10,000   | 3,200    | 60,000   | 3 | 16,500   |
| 19,000   | 10,000   | 3,500    | 63,000   | 3 | 19,000   |
| 20,500   | 10,000   | 3,500    | 63,000   | 3 | 20,500   |
| 23,000   | 10,000   | 3,800    | 67,000   | 3 | 23,000   |
| 25,000   | 10,000   | 3,800    | 67,000   | 3 | 25,000   |
| 31,000   | 12,000   | 4,200    | 71,000   | 3 | 31,000   |
| 40,000   | 12,000   | 10,000   | 75,000   | 3 | 40,000   |

## HSS-Co Senkwerkzeuge

### Kegelsenker 90° V-NX



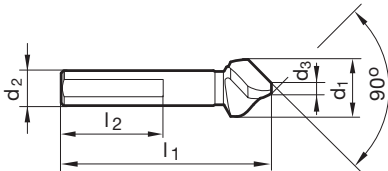
Katalog-Nr. 52350



|   |   |   |   |   |   |
|---|---|---|---|---|---|
| P | M | K | N | S | H |
| ● | ● | ● | ○ | ○ |   |

Arbeitsrichtwerte  
Seite 296

- 3-Flächen-Schaft verhindert Durchrutschen im Bohrfutter
- 3 ungleiche, konvexe Schneiden
- optimal für Handbohrmaschinen
- vibrationsarmes Schneiden
- für runde und ratterfreie Senkungen
- deutlich reduzierte Vorschubkraft
- universell einsetzbar



| d1<br>mm | d2<br>mm | d3<br>mm | l1<br>mm | l2<br>mm | Z | Code-Nr. |
|----------|----------|----------|----------|----------|---|----------|
| 6,300    | 5,000    | 1,500    | 45,000   | 30,000   | 3 | 6,300    |
| 8,000    | 6,000    | 2,000    | 50,000   | 30,000   | 3 | 8,000    |
| 8,300    | 6,000    | 2,000    | 50,000   | 30,000   | 3 | 8,300    |
| 10,000   | 6,000    | 2,500    | 50,000   | 30,000   | 3 | 10,000   |
| 10,400   | 6,000    | 2,500    | 50,000   | 30,000   | 3 | 10,400   |
| 11,500   | 8,000    | 2,800    | 56,000   | 30,000   | 3 | 11,500   |
| 12,400   | 8,000    | 2,800    | 56,000   | 30,000   | 3 | 12,400   |
| 15,000   | 10,000   | 3,200    | 60,000   | 30,000   | 3 | 15,000   |
| 16,500   | 10,000   | 3,200    | 60,000   | 30,000   | 3 | 16,500   |
| 19,000   | 10,000   | 3,500    | 63,000   | 30,000   | 3 | 19,000   |
| 20,500   | 10,000   | 3,500    | 63,000   | 30,000   | 3 | 20,500   |
| 23,000   | 10,000   | 3,800    | 67,000   | 30,000   | 3 | 23,000   |
| 25,000   | 10,000   | 3,800    | 67,000   | 30,000   | 3 | 25,000   |
| 31,000   | 12,000   | 4,200    | 71,000   | 30,000   | 3 | 31,000   |
| 40,000   | 12,000   | 10,000   | 75,000   | 30,000   | 3 | 40,000   |

## HSS-Co Senkwerkzeuge

### Kegelsenkersätze 90° V-NX



|      |         |   |      |        |     |   |     |
|------|---------|---|------|--------|-----|---|-----|
| V-NX | DIN 335 | C | HSCO | Al-TiN | 90° | R | Cyl |
| P    | M       | K | N    | S      | H   |   |     |
| •    | •       | • | ○    | ○      |     |   |     |

Arbeitsrichtwerte  
Seite 296

- bestehend aus Katalog-Nr. 52348
- 3 ungleiche, konvexe Schneiden
- vibrationsarmes Schneiden
- für runde und ratterfreie Senkungen
- deutlich reduzierte Vorschubkraft
- universell einsetzbar

Katalog-Nr. 52398

| Code-Nr. | Ø-Bereich<br>mm             | Stück/Satz |
|----------|-----------------------------|------------|
| 1,000    | 6,3/8,3/10,4/12,4/16,5/20,5 | 6          |

## HSS-Co Senkwerkzeuge

### Kegelsenkersätze 90° V-NX



|      |         |   |      |        |     |   |   |
|------|---------|---|------|--------|-----|---|---|
| V-NX | DIN 335 | C | HSCO | Al-TiN | 90° | R | 3 |
| P    | M       | K | N    | S      | H   |   |   |
| ●    | ●       | ● | ○    | ○      |     |   |   |

Arbeitsrichtwerte  
Seite 296

- bestehend aus Katalog-Nr. 52350
- 3-Flächen-Schaft verhindert Durchrutschen im Bohrfutter
- 3 ungleiche, konvexe Schneiden
- optimal für Handbohrmaschinen
- vibrationsarmes Schneiden
- für runde und ratterfreie Senkungen
- deutlich reduzierte Vorschubkraft
- universell einsetzbar

**Katalog-Nr. 52399**

| Code-Nr. | Ø-Bereich<br>mm             | Stück/Satz |
|----------|-----------------------------|------------|
| 1,000    | 6,3/8,3/10,4/12,4/16,5/20,5 | 6          |

# ARBEITS- RICHTWERTE





# SuperV-Bohrer

## Arbeitsrichtwerte

| Vorschubreihen |       |       |       |       |       |       |       |       |       |       |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Code-Buchstabe | A     | B     | C     | D     | E     | F     | G     | H     | I     |       |
| Werkzeug-Ø mm  | 0,50  | 0,004 | 0,006 | 0,007 | 0,008 | 0,010 | 0,012 | 0,014 | 0,016 | 0,019 |
|                | 1,00  | 0,006 | 0,008 | 0,012 | 0,014 | 0,016 | 0,018 | 0,020 | 0,023 | 0,025 |
|                | 2,00  | 0,020 | 0,025 | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 |
|                | 2,50  | 0,025 | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 |
|                | 3,15  | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,160 |
|                | 4,00  | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,200 |
|                | 5,00  | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 |
|                | 6,30  | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 |
|                | 8,00  | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,315 |
|                | 10,00 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,400 |
|                | 12,50 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 |
|                | 16,00 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 |
|                | 20,00 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,630 |
|                | 25,00 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 0,800 |
|                | 31,50 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 1,000 |
|                | 40,00 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 1,000 | 1,250 |

Werkzeuge mit fett gedruckten Vorschubreihen-Codebuchstaben sind für die entsprechende Werkstoffgruppe vorrangig einzusetzen.

Bedeutung der Kennbuchstaben bei den Typbezeichnungen:

- S** für hochfeste Werkstoffe
- U** für Universalbearbeitung, Kohlenstoffstähle
- VA** für rostfreie Werkstoffe
- X** für Aluminium
- AL** für Stahlbearbeitung
- T** für Tieflochbohrer

### Kühlmitteleinsatz:

- Schneidöl, hochaktiviert
- Bohrölemulsion
- ohne Schmiermittel
- nur Luftkühlung

| Werkstoffgruppe                   | Werkstoffbeispiele, <b>neue Bezeichnung</b> (in Klammern alte Bezeichnung)<br>Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN  | Zugfestigkeit<br>MPa (N/mm <sup>2</sup> ) | Härte                    | Kühl-<br>mittel   |
|-----------------------------------|---|---|--------------------------|---|
| Allgemeine Baustähle              | <b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2)<br><b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500) | ≤500<br>>500-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Automatenstähle                   | <b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36)<br><b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)   | ≤850<br>850-1000                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Vergütungsstähle       | <b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30)<br><b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45)<br><b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)  | ≤ 700<br>700-850<br>850-1000              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Legierte Vergütungsstähle         | <b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4<br><b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Einsatzstähle          | <b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)  | ≤750                                      |                          | <input checked="" type="checkbox"/>   |
| Legierte Einsatzstähle            | <b>1.7043</b> 38Cr4<br><b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Nitrierstähle                     | <b>1.8504</b> 34CrAl6<br><b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7  | >850-≤1000<br>≥1000-1200                  |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Werkzeugstähle                    | <b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9<br><b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4                                    | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Schnellarbeitsstähle              | <b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3   | ≥650-1000                                 |                          | <input checked="" type="checkbox"/>   |
| Federstähle                       | <b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)   |   | ≤330 HB                  | <input checked="" type="checkbox"/>   |
| Gehärtete Stähle                  | -   |   | ≤40-48 HRC<br>>48-60 HRC | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Rostfreie Stähle, geschwefelt     | <b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9  | ≤850                                      |                          | <input checked="" type="checkbox"/>   |
| austenitisch                      | <b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A)  | ≤850                                      |                          | <input checked="" type="checkbox"/>   |
| martensitisch                     | <b>1.4057</b> X20CrNi 17 2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2   | ≤850                                      |                          | <input checked="" type="checkbox"/>   |
| Gusseisen                         | <b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20)<br><b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kugelgraphit- und Temperguss      | <b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMw-350-4(GTW35)<br><b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)  |   | ≤240 HB<br><300 HB       | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Hartguss                          | -   |   | ≤350 HB                  | <input checked="" type="checkbox"/>   |
| Neue Gusswerkstoffe GGV           | <b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35)<br><b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6   |   |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Neue Gusswerkstoffe ADI           | <b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000)<br><b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)  | 800-1000<br>1200-1400                     |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Sonderlegierungen                 | Nimonic, Inconel, Monel, Hastelloy  | ≤1200                                     |                          | <input checked="" type="checkbox"/>   |
| Titan und Titan-Legierungen       | <b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2<br><b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1                                       | ≤850<br>>850-1200                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Aluminium und Al-Legierungen      | <b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1  | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Knetlegierungen                | <b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5   | ≤450                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Gusslegierungen ≤ 10 % Si      | <b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| > 10 % Si                         | <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg  | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| Magnesium-Legierungen             | <b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1   | ≤450                                      |                          | <input type="checkbox"/>  |
| Kupfer, niedriglegiert            | <b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb   | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Messing, kurzspanend              | <b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| langspanend                       | <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| Bronzen, kurzspanend              | <b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn<br><b>2.0790</b> CuNi18Zn19Pb   | ≤600<br>>600-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Bronzen, langspanend              | <b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10<br><b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2   | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kunststoffe, duroplastisch        | Epoxidharz, Resopal, Pertinax, Moltopren  |   | -                        | <input type="checkbox"/>  |
| thermoplastisch                   | Plexiglas, Hostalen, Novodur, Makralon  |   | -                        | <input checked="" type="checkbox"/>   |
| Kunststoffe, aramidfaserverstärkt | Kevlar  |   | -                        | <input type="checkbox"/>  |
| glas-/kohlefaserverstärkt         | GFK/CFK   |   | -                        | <input type="checkbox"/>  |



## ≤3×D Bohrtiefe

## ≤5×D Bohrtiefe

| Katalog-Nr.    | 51673        | 51676        | 51670        | 51687        | 51681        | 51674        | 71791        |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Schneidstoff   | <b>VHM</b>   | <b>VHM</b>   | <b>VHM</b>   | <b>VHM</b>   | <b>VHM</b>   | <b>VHM</b>   | <b>VHM</b>   |
| HM-Anwendgsgr. | K/P          | K/P          | K/P          | K/P          | K/P          | K/P          | K/P          |
| Oberfläche     | TiAlN nano   | TiAlN nano   | TiAlN nano   | TiAlN nano   | TiAlN nano   | TiAlN nano   | blank        |
| DIN/Form       | <b>6537K</b> | <b>6537K</b> | <b>6537K</b> | <b>6537L</b> | <b>6537L</b> | <b>6537L</b> | <b>6537L</b> |
| Typ            | U            | U            | VA           | U            | U            | VA           | AI           |
| Innenkühlung   | <b>ohne</b>  | <b>mit</b>   | <b>mit</b>   | <b>ohne</b>  | <b>mit</b>   | <b>mit</b>   | <b>mit</b>   |
| Katalogseite   | 23           | 29           | 31           | 27           | 43           | 45           | 41           |



| V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code |
|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|
| 130                     | G       | 145                     | G       |                         |         | 130                     | G       | 145                     | G       |                         |         |                         |         |
| 110                     | F       | 120                     | F       |                         |         | 110                     | F       | 120                     | F       |                         |         |                         |         |
| 145                     | H       | 170                     | H       |                         |         | 145                     | H       | 170                     | H       |                         |         |                         |         |
| 110                     | G       | 145                     | H       |                         |         | 110                     | G       | 145                     | H       |                         |         |                         |         |
| 120                     | G       | 130                     | H       |                         |         | 120                     | G       | 130                     | H       |                         |         |                         |         |
| 110                     | G       | 125                     | G       |                         |         | 110                     | G       | 125                     | G       |                         |         |                         |         |
| 105                     | G       | 120                     | G       |                         |         | 105                     | G       | 120                     | G       |                         |         |                         |         |
| 105                     | G       | 120                     | G       |                         |         | 105                     | G       | 120                     | G       |                         |         |                         |         |
| 100                     | F       | 105                     | G       |                         |         | 100                     | F       | 105                     | G       |                         |         |                         |         |
| 130                     | H       | 145                     | H       |                         |         | 130                     | H       | 145                     | H       |                         |         |                         |         |
| 120                     | G       | 120                     | G       |                         |         | 120                     | G       | 120                     | G       |                         |         |                         |         |
| 85                      | E       | 85                      | E       |                         |         | 85                      | E       | 85                      | E       |                         |         |                         |         |
| 100                     | F       | 110                     | G       |                         |         | 100                     | F       | 105                     | G       |                         |         |                         |         |
| 90                      | E       | 105                     | E       |                         |         | 90                      | E       | 100                     | E       |                         |         |                         |         |
| 65                      | F       | 80                      | F       |                         |         | 65                      | F       | 70                      | F       |                         |         |                         |         |
| 55                      | E       | 65                      | E       |                         |         | 55                      | E       | 55                      | E       |                         |         |                         |         |
| 55                      |         | 60                      | D       |                         |         | 55                      |         | 60                      | E       |                         |         |                         |         |
| 45                      | C       | 60                      | C       |                         |         | 45                      | C       | 60                      | C       |                         |         |                         |         |
| 40                      | A       | 55                      | C       |                         |         | 35                      | A       | 55                      | C       |                         |         |                         |         |
| 20                      | A       | 35                      | B       |                         |         | 20                      | A       | 35                      | B       |                         |         |                         |         |
| 40                      | B       | 60                      | E       | 80                      | E       | 45                      | B       | 60                      | E       | 80                      | E       |                         |         |
| 15                      | A       | 55                      | B       | 60                      | B-C     | 15                      | A       | 55                      | B       | 60                      | B-C     |                         |         |
| 35                      | B       | 45                      | E       | 80                      | E       | 35                      | B       | 50                      | E       | 80                      | E       |                         |         |
| 210                     | H       | 210                     | I       |                         |         | 210                     | H       | 195                     | I       |                         |         |                         |         |
| 155                     | H       | 160                     | I       |                         |         | 155                     | H       | 160                     | I       |                         |         |                         |         |
| 155                     | G       | 140                     | I       |                         |         | 145                     | G       | 140                     | I       |                         |         |                         |         |
| 125                     | G       | 130                     | H       |                         |         | 125                     | G       | 130                     | H       |                         |         |                         |         |
| 35                      | C       | 40                      | C       |                         |         | 35                      | C       | 40                      | C       |                         |         |                         |         |
|                         |         |                         |         |                         |         |                         |         |                         |         |                         |         |                         |         |
|                         |         |                         |         |                         |         |                         |         |                         |         |                         |         |                         |         |
|                         |         |                         |         |                         |         |                         |         |                         |         |                         |         |                         |         |
|                         |         |                         |         |                         |         |                         |         |                         |         |                         |         |                         |         |
| 25                      | D       | 35                      | D       | 30                      | D       | 25                      | D       | 35                      | D       | 30                      | D       |                         |         |
| 15                      | A       | 45                      | D       | 45                      | D       | 15                      | A       | 45                      | D       | 45                      | D       |                         |         |
| 15                      | A       | 40                      | C       | 40                      | C       | 15                      | A       | 40                      | C       | 40                      | C       |                         |         |
| 260                     | I       | 310                     | I       |                         |         | 260                     | I       | 310                     | I       |                         |         | 350                     | I       |
| 260                     | I       | 310                     | I       |                         |         | 260                     | I       | 310                     | I       |                         |         | 350                     | I       |
| 220                     | H       | 260                     | I       |                         |         | 235                     | I       | 260                     | I       |                         |         | 320                     | H       |
| 180                     | H       | 220                     | I       |                         |         | 170                     | H       | 220                     | I       |                         |         | 280                     | G       |
| 260                     | H       | 280                     | H       |                         |         | 260                     | H       | 280                     | H       |                         |         | 320                     | G       |
| 105                     | G       | 125                     | G       |                         |         | 105                     | G       | 125                     | G       |                         |         | 190                     | G       |
| 270                     | H       | 325                     | H       |                         |         | 270                     | H       | 325                     | H       |                         |         | 160                     | F       |
| 180                     | G       | 220                     | G       |                         |         | 180                     | G       | 220                     | G       |                         |         | 160                     | F       |
| 105                     | F       | 125                     | G       |                         |         | 105                     | F       | 125                     | G       |                         |         | 160                     | F       |
| 85                      | F       | 105                     | F       |                         |         | 85                      | F       | 105                     | F       |                         |         | 160                     | F       |
| 80                      | E       | 90                      | F       |                         |         | 80                      | E       | 90                      | F       |                         |         | 150                     | F       |
| 60                      | E       | 80                      | F       |                         |         | 60                      | E       | 80                      | F       |                         |         | 150                     | F       |
|                         |         |                         |         |                         |         |                         |         |                         |         |                         |         | 100                     | C       |
|                         |         |                         |         |                         |         |                         |         |                         |         |                         |         | 100                     | C       |
|                         |         |                         |         |                         |         |                         |         |                         |         |                         |         | 100                     | B       |

Arbeitsrichtwerte

# SuperV-Bohrer

## Arbeitsrichtwerte

| Vorschubreihen |       |       |       |       |       |       |       |       |       |       |                       |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------|
| Code-Buchstabe | A     | B     | C     | D     | E     | F     | G     | H     | I     |       |                       |
| Werkzeug-Ø mm  | 0,50  | 0,004 | 0,006 | 0,007 | 0,008 | 0,010 | 0,012 | 0,014 | 0,016 | 0,019 | Vorschübe<br>f (mm/U) |
|                | 1,00  | 0,006 | 0,008 | 0,012 | 0,014 | 0,016 | 0,018 | 0,020 | 0,023 | 0,025 |                       |
|                | 2,00  | 0,020 | 0,025 | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 |                       |
|                | 2,50  | 0,025 | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 |                       |
|                | 3,15  | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,160 |                       |
|                | 4,00  | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,200 |                       |
|                | 5,00  | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 |                       |
|                | 6,30  | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 |                       |
|                | 8,00  | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,315 |                       |
|                | 10,00 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,400 |                       |
|                | 12,50 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 |                       |
|                | 16,00 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 |                       |
|                | 20,00 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,630 |                       |
|                | 25,00 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 0,800 |                       |
|                | 31,50 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 1,000 |                       |
|                | 40,00 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 1,000 | 1,250 |                       |

Werkzeuge mit fett gedruckten Vorschubreihen-Codebuchstaben sind für die entsprechende Werkstoffgruppe vorrangig einzusetzen.

Bedeutung der Kennbuchstaben bei den Typbezeichnungen:

- S** für hochfeste Werkstoffe
- U** für Universalbearbeitung, Kohlenstoffstähle
- VA** für rostfreie Werkstoffe
- X** für Aluminium
- AL** für Stahlbearbeitung
- T** für Tieflochbohrer

### Kühlmitteleinsatz:

- Schneidöl, hochaktiviert
- Bohrölemulsion
- ohne Schmiermittel
- nur Luftkühlung

| Werkstoffgruppe                   | Werkstoffbeispiele, <b>neue Bezeichnung</b> (in Klammern alte Bezeichnung)<br>Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN  | Zugfestigkeit<br>MPa (N/mm <sup>2</sup> ) | Härte                    | Kühl-<br>mittel   |
|-----------------------------------|---|---|--------------------------|---|
| Allgemeine Baustähle              | <b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2)<br><b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500) | ≤500<br>>500-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Automatenstähle                   | <b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36)<br><b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)   | ≤850<br>850-1000                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Vergütungsstähle       | <b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30)<br><b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45)<br><b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)  | ≤ 700<br>700-850<br>850-1000              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Legierte Vergütungsstähle         | <b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4<br><b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Einsatzstähle          | <b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)  | ≤750                                      |                          | <input checked="" type="checkbox"/>   |
| Legierte Einsatzstähle            | <b>1.7043</b> 38Cr4<br><b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Nitrierstähle                     | <b>1.8504</b> 34CrAl6<br><b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7  | >850-≤1000<br>>1000-1200                  |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Werkzeugstähle                    | <b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9<br><b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4                                    | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Schnellarbeitsstähle              | <b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3   | ≥650-1000                                 |                          | <input checked="" type="checkbox"/>   |
| Federstähle                       | <b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)   |   | ≤330 HB                  | <input checked="" type="checkbox"/>   |
| Gehärtete Stähle                  | -   |   | ≤40-48 HRC<br>>48-60 HRC | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Rostfreie Stähle, geschwefelt     | <b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9  | ≤850                                      |                          | <input checked="" type="checkbox"/>   |
| austenitisch                      | <b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A)  | ≤850                                      |                          | <input checked="" type="checkbox"/>   |
| martensitisch                     | <b>1.4057</b> X20CrNi 17 2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2   | ≤850                                      |                          | <input checked="" type="checkbox"/>   |
| Gusseisen                         | <b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20)<br><b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kugelgraphit- und Temperguss      | <b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMw-350-4(GTW35)<br><b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)  |   | ≤240 HB<br><300 HB       | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Hartguss                          | -   |   | ≤350 HB                  | <input checked="" type="checkbox"/>   |
| Neue Gusswerkstoffe GGV           | <b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35)<br><b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6   |   |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Neue Gusswerkstoffe ADI           | <b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000)<br><b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)  | 800-1000<br>1200-1400                     |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Sonderlegierungen                 | Nimonic, Inconel, Monel, Hastelloy  | ≤1200                                     |                          | <input checked="" type="checkbox"/>   |
| Titan und Titan-Legierungen       | <b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2<br><b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1                                       | ≤850<br>>850-1200                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Aluminium und Al-Legierungen      | <b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1  | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Knetlegierungen                | <b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5   | ≤450                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Gusslegierungen ≤ 10 % Si      | <b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| > 10 % Si                         | <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg  | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| Magnesium-Legierungen             | <b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1   | ≤450                                      |                          | <input type="checkbox"/>  |
| Kupfer, niedriglegiert            | <b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb   | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Messing, kurzspanend              | <b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| langspanend                       | <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| Bronzen, kurzspanend              | <b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn<br><b>2.0790</b> CuNi18Zn19Pb   | ≤600<br>>600-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Bronzen, langspanend              | <b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10<br><b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2   | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kunststoffe, duroplastisch        | Epoxidharz, Resopal, Pertinax, Moltopren  |   | -                        | <input type="checkbox"/>  |
| thermoplastisch                   | Plexiglas, Hostalen, Novodur, Makralon  |   | -                        | <input checked="" type="checkbox"/>   |
| Kunststoffe, aramidfaserverstärkt | Kevlar  |   | -                        | <input type="checkbox"/>  |
| glas-/kohlefaserverstärkt         | GFK/CFK   |   | -                        | <input type="checkbox"/>  |

## ≤3×D Bohrtiefe

## ≤5×D

## ≤7×D

|                |              |
|----------------|--------------|
| Katalog-Nr.    | <b>51750</b> |
| Schneidstoff   | <b>VHM</b>   |
| HM-Anwendgsgr. | K/P          |
| Oberfläche     | TiAlSiN      |
| DIN/Form       | <b>6537K</b> |
| Typ            | S            |
| Innenkühlung   | <b>ohne</b>  |
| Katalogseite   | 25           |

|                |              |              |
|----------------|--------------|--------------|
| Katalog-Nr.    | <b>51752</b> | <b>51753</b> |
| Schneidstoff   | <b>VHM</b>   | <b>VHM</b>   |
| HM-Anwendgsgr. | K/P          | K/P          |
| Oberfläche     | TiAlSiN      | TiAlSiN      |
| DIN/Form       | <b>6537K</b> | <b>6537K</b> |
| Typ            | S            | S            |
| Innenkühlung   | <b>mit</b>   | <b>mit</b>   |
| Katalogseite   | 35           | 37           |

|                |              |              |
|----------------|--------------|--------------|
| Katalog-Nr.    | <b>51754</b> | <b>51755</b> |
| Schneidstoff   | <b>VHM</b>   | <b>VHM</b>   |
| HM-Anwendgsgr. | K/P          | K/P          |
| Oberfläche     | TiAlSiN      | TiAlSiN      |
| DIN/Form       | <b>6537L</b> | <b>6537L</b> |
| Typ            | S            | S            |
| Innenkühlung   | <b>mit</b>   | <b>mit</b>   |
| Katalogseite   | 49           | 51           |

|                |              |
|----------------|--------------|
| Katalog-Nr.    | <b>51756</b> |
| Schneidstoff   | <b>VHM</b>   |
| HM-Anwendgsgr. | K/P          |
| Oberfläche     | TiAlSiN      |
| DIN/Form       | <b>WN</b>    |
| Typ            | S            |
| Innenkühlung   | <b>mit</b>   |
| Katalogseite   | 55           |

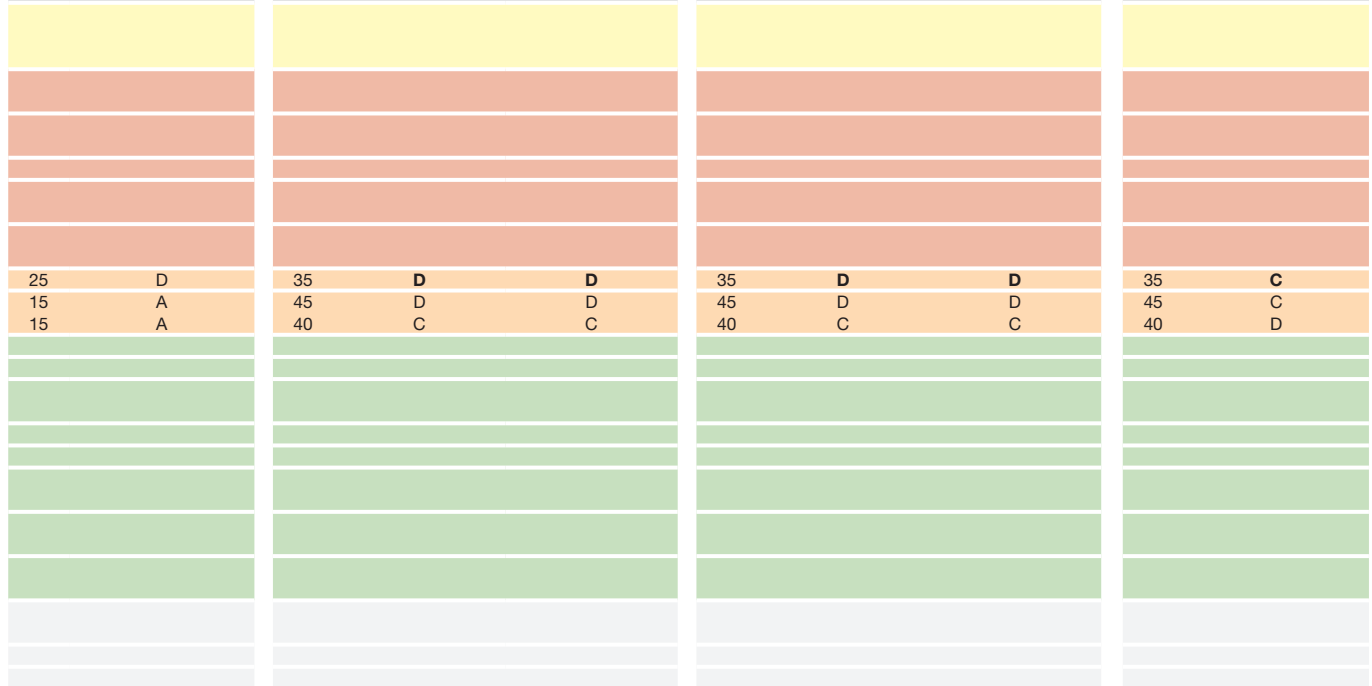


| V <sub>c</sub> m/min | VR-Code |
|----------------------|---------|
| 130                  | G       |
| 110                  | F       |
| 145                  | H       |
| 110                  | G       |
| 120                  | G       |
| 110                  | G       |
| 105                  | G       |
| 105                  | G       |
| 100                  | F       |
| 130                  | H       |
| 120                  | G       |
| 85                   | E       |
| 100                  | F       |
| 90                   | E       |
| 65                   | F       |
| 55                   | E       |
| 55                   | D       |
| 45                   | C       |
| 40                   | A       |
| 20                   | A       |

| V <sub>c</sub> m/min | VR-Code | VR-Code |
|----------------------|---------|---------|
| 145                  | G       | G       |
| 120                  | F       | F       |
| 170                  | H       | H       |
| 145                  | H       | H       |
| 130                  | H       | H       |
| 125                  | G       | G       |
| 120                  | G       | G       |
| 120                  | G       | G       |
| 105                  | G       | G       |
| 145                  | H       | H       |
| 120                  | G       | G       |
| 85                   | E       | E       |
| 110                  | G       | G       |
| 105                  | E       | E       |
| 80                   | F       | F       |
| 65                   | E       | E       |
| 60                   | D       | D       |
| 60                   | C       | C       |
| 55                   | C       | C       |
| 35                   | B       | B       |

| V <sub>c</sub> m/min | VR-Code | VR-Code |
|----------------------|---------|---------|
| 145                  | G       | G       |
| 120                  | F       | F       |
| 170                  | H       | H       |
| 145                  | H       | H       |
| 130                  | H       | H       |
| 125                  | G       | G       |
| 120                  | G       | G       |
| 120                  | G       | G       |
| 105                  | G       | G       |
| 145                  | H       | H       |
| 120                  | G       | G       |
| 85                   | E       | E       |
| 110                  | G       | G       |
| 105                  | E       | E       |
| 80                   | F       | F       |
| 65                   | E       | E       |
| 60                   | D       | D       |
| 60                   | C       | C       |
| 55                   | C       | C       |
| 35                   | B       | B       |

| V <sub>c</sub> m/min | VR-Code |
|----------------------|---------|
| 145                  | F       |
| 120                  | E       |
| 170                  | G       |
| 145                  | G       |
| 130                  | G       |
| 125                  | F       |
| 120                  | F       |
| 120                  | F       |
| 105                  | F       |
| 145                  | G       |
| 120                  | F       |
| 85                   | D       |
| 110                  | F       |
| 105                  | D       |
| 80                   | E       |
| 65                   | D       |
| 60                   | C       |
| 60                   | B       |
| 55                   | B       |
| 35                   | A       |



Arbeitsrichtwerte

# SuperV-Bohrer

## Arbeitsrichtwerte

| Vorschubreihen |       |       |       |       |       |       |       |       |       |       |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Code-Buchstabe | A     | B     | C     | D     | E     | F     | G     | H     | I     |       |
| Werkzeug-Ø mm  | 0,50  | 0,004 | 0,006 | 0,007 | 0,008 | 0,010 | 0,012 | 0,014 | 0,016 | 0,019 |
|                | 1,00  | 0,006 | 0,008 | 0,012 | 0,014 | 0,016 | 0,018 | 0,020 | 0,023 | 0,025 |
|                | 2,00  | 0,020 | 0,025 | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 |
|                | 2,50  | 0,025 | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 |
|                | 3,15  | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,160 |
|                | 4,00  | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,200 |
|                | 5,00  | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 |
|                | 6,30  | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 |
|                | 8,00  | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,315 |
|                | 10,00 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,400 |
|                | 12,50 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 |
|                | 16,00 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 |
|                | 20,00 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,630 |
|                | 25,00 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 0,800 |
|                | 31,50 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 1,000 |
|                | 40,00 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 1,000 | 1,250 |

Werkzeuge mit fett gedruckten Vorschubreihen-Codebuchstaben sind für die entsprechende Werkstoffgruppe vorrangig einzusetzen.

Bedeutung der Kennbuchstaben bei den Typbezeichnungen:

- S** für hochfeste Werkstoffe
- U** für Universalbearbeitung, Kohlenstoffstähle
- VA** für rostfreie Werkstoffe
- X** für Stahlbearbeitung
- AL** für Aluminium
- T** für Tieflochbohrer

### Einsatzhinweise SuperV-T-Bohrer:

Um bei tiefen Bohrungen optimale Bearbeitungsergebnisse zu erzielen, empfehlen wir:

- Herstellen einer zylindrischen Pilotbohrung (Toleranz F9), Bohrtiefe 1 x D mit unseren SuperV-Bohrern Typ U bzw. VA (140° Spitzwinkel, Ø-Toleranz m7). Alternativ kann auch der Pilotbohrfräser Artikel-Nr. 54700 eingesetzt werden.
- Einfahren in Pilotbohrung: Drehzahl ca. 300 U/min, Vorschub ca. 500 mm/min.
- Einstellen des Kühlschmierstoffdruckes und der Drehzahl.
- Kontinuierliches Bohren auf volle Bohrtiefe ohne Entspanzyklus.
- Bei Durchgangsbohrungen mit geradem (90°) Austritt,  $v_f$  ca. 1 mm vor dem Durchbrechen auf 50% reduzieren.
- Bei Durchgangsbohrungen mit schrägem Austritt,  $v_f$  ca. 1 mm vor dem Durchbrechen auf 40% reduzieren.
- Nach Erreichen der Bohrtiefe Drehzahl und Kühlschmierstoff abschalten, Ausfahren im Eilgang.

### Kühlmitteleinsatz:

- Schneidöl, hochaktiviert
- Bohrölemulsion
- ohne Schmiermittel
- nur Luftkühlung

| Werkstoffgruppe  | Werkstoffbeispiele, <b>neue Bezeichnung</b> (in Klammern alte Bezeichnung)<br>Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN  | Zugfestigkeit<br>MPa (N/mm <sup>2</sup> ) | Härte                    | Kühl-<br>mittel   |
|--|---|---|--------------------------|---|
| Allgemeine Baustähle   | <b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2)<br><b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500)   | ≤500<br>>500-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Automatenstähle  | <b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36)<br><b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)   | ≤850<br>850-1000                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Vergütungsstähle                                    | <b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30)<br><b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45)<br><b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)  | ≤ 700<br>700-850<br>850-1000              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Legierte Vergütungsstähle                                      | <b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4<br><b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Einsatzstähle                                       | <b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)  | ≤750                                      |                          | <input checked="" type="checkbox"/>   |
| Legierte Einsatzstähle   | <b>1.7043</b> 38Cr4<br><b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Nitrierstähle  | <b>1.8504</b> 34CrAl6<br><b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7  | >850-≤1000<br>>1000-1200                  |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Werkzeugstähle   | <b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9<br><b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4  | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Schnellarbeitsstähle   | <b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3   | ≥650-1000                                 |                          | <input checked="" type="checkbox"/>   |
| Federstähle  | <b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)   |   | ≤330 HB                  | <input checked="" type="checkbox"/>   |
| Gehärtete Stähle   | -   |   | ≤40-48 HRC<br>>48-60 HRC | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Rostfreie Stähle, geschwefelt<br>austenitisch<br>martensitisch | <b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9<br><b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A)<br><b>1.4057</b> X20CrNi 17 2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2 | ≤850<br>≤850<br>≤850                      |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Gusseisen  | <b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20)<br><b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kugelgraphit- und Tempereguss                                  | <b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMw-350-4(GTW35)<br><b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)  |   | ≤240 HB<br><300 HB       | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Hartguss   | -   |   | ≤350 HB                  | <input checked="" type="checkbox"/>   |
| Neue Gusswerkstoffe GGV  | <b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35)<br><b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6   |   |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Neue Gusswerkstoffe ADI  | <b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000)<br><b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)  | 800-1000<br>1200-1400                     |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Sonderlegierungen  | Nimonic, Inconel, Monel, Hastelloy  | ≤1200                                     |                          | <input checked="" type="checkbox"/>   |
| Titan und Titan-Legierungen                                    | <b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2<br><b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1   | ≤850<br>>850-1200                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Aluminium und Al-Legierungen                                   | <b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1  | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Knetlegierungen   | <b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5   | ≤450                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Gusslegierungen ≤ 10 % Si<br>> 10 % Si                      | <b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9<br><b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg   | ≤600<br>≤600                              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Magnesium-Legierungen  | <b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1   | ≤450                                      |                          | <input type="checkbox"/>  |
| Kupfer, niedriglegiert   | <b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb   | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Messing, kurzspanend<br>langspanend                            | <b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2<br><b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5  | ≤600<br>≤600                              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Bronzen, kurzspanend   | <b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn<br><b>2.0790</b> CuNi18Zn19Pb   | ≤600<br>>600-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Bronzen, langspanend   | <b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10<br><b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2   | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kunststoffe, duroplastisch<br>thermoplastisch                  | Epoxidharz, Resopal, Pertinax, Moltopren<br>Plexiglas, Hostalen, Novodur, Makralon  |   | -                        | <input type="checkbox"/><br><input checked="" type="checkbox"/>   |
| Kunststoffe, aramidfaserverstärkt<br>glas-/kohlefaserverstärkt | Kevlar<br>GFK/CFK   |   | -                        | <input type="checkbox"/><br><input type="checkbox"/>  |

### ≤3×D

### ≤5×D

### ≤7×D

### ≤12×D

### ≤3×D Pilotbohrer

|                |            |
|----------------|------------|
| Katalog-Nr.    | 51784      |
| Schneidstoff   | VHM        |
| HM-Anwendgsgr. | K/P        |
| Oberfläche     | TiAlN nano |
| DIN/Form       | 6537K      |
| Typ            | X          |
| Innenkühlung   | mit        |
| Katalogeseite  | 33         |

|                |            |
|----------------|------------|
| Katalog-Nr.    | 51786      |
| Schneidstoff   | VHM        |
| HM-Anwendgsgr. | K/P        |
| Oberfläche     | TiAlN nano |
| DIN/Form       | 6537L      |
| Typ            | X          |
| Innenkühlung   | mit        |
| Katalogeseite  | 47         |

|                |            |
|----------------|------------|
| Katalog-Nr.    | 51791      |
| Schneidstoff   | VHM        |
| HM-Anwendgsgr. | K/P        |
| Oberfläche     | TiAlN nano |
| DIN/Form       | WN         |
| Typ            | X          |
| Innenkühlung   | mit        |
| Katalogeseite  | 53         |

|                |            |
|----------------|------------|
| Katalog-Nr.    | 51792      |
| Schneidstoff   | VHM        |
| HM-Anwendgsgr. | K/P        |
| Oberfläche     | TiAlN nano |
| DIN/Form       | WN         |
| Typ            | X          |
| Innenkühlung   | mit        |
| Katalogeseite  | 56         |

|                |            |
|----------------|------------|
| Katalog-Nr.    | 51718      |
| Schneidstoff   | VHM        |
| HM-Anwendgsgr. | K/P        |
| Oberfläche     | TiAlN nano |
| DIN/Form       | WN         |
| Typ            | SuperV-180 |
| Innenkühlung   | mit        |
| Katalogeseite  | 39         |



| V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code |
|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|
| 200                     | H       | 200                     | H       | 180                     | H       | 180                     | H       | 100                     | D       |
| 200                     | G       | 200                     | G       | 180                     | G       | 180                     | G       | 85                      | D       |
| 200                     | H       | 200                     | H       | 180                     | H       | 180                     | H       | 110                     | D       |
| 200                     | H       | 200                     | H       | 180                     | H       | 180                     | H       | 85                      | D       |
| 180                     | H       | 180                     | H       | 160                     | H       | 160                     | H       | 90                      | D       |
| 160                     | H       | 160                     | H       | 140                     | H       | 140                     | H       | 85                      | D       |
| 130                     | H       | 130                     | H       | 120                     | H       | 120                     | H       | 80                      | D       |
| 120                     | H       | 120                     | H       | 110                     | H       | 110                     | H       | 80                      | D       |
| 120                     | G       | 120                     | G       | 110                     | G       | 110                     | G       | 75                      | D       |
| 180                     | H       | 180                     | H       | 160                     | H       | 160                     | H       | 100                     | D       |
| 120                     | H       | 120                     | H       | 110                     | H       | 110                     | H       | 90                      | D       |
| 110                     | G       | 110                     | G       | 100                     | G       | 100                     | G       | 65                      | D       |
| 110                     | G       | 110                     | G       | 100                     | G       | 100                     | G       | 75                      | D       |
| 100                     | E       | 100                     | E       | 90                      | E       | 90                      | E       | 70                      | D       |
| 90                      | G       | 90                      | G       | 80                      | G       | 80                      | G       | 50                      | D       |
| 65                      | F       | 65                      | F       | 60                      | F       | 60                      | F       | 40                      | D       |
| 60                      | E       | 60                      | E       | 55                      | E       | 55                      | E       | 40                      | D       |
| 60                      | E       | 60                      | E       | 55                      | E       | 55                      | E       | 35                      | D       |
| 55                      | C       | 55                      | C       | 45                      | C       | 45                      | C       | 35                      | A       |
| 80                      | E       | 80                      | E       | 70                      | E       | 70                      | E       | 40                      | C       |
|                         |         |                         |         |                         |         |                         |         | 15                      | C       |
| 60                      | E       | 60                      | E       | 50                      | E       | 50                      | E       | 35                      | C       |
| 180                     | I       | 180                     | I       | 165                     | I       | 165                     | I       | 160                     | D       |
| 160                     | I       | 160                     | I       | 145                     | I       | 145                     | I       | 120                     | D       |
| 140                     | I       | 140                     | I       | 130                     | I       | 130                     | I       | 120                     | D       |
| 140                     | H       | 140                     | H       | 130                     | H       | 130                     | H       | 95                      | D       |
|                         |         |                         |         |                         |         |                         |         | 25                      | B       |
| 140                     | H       | 140                     | H       | 130                     | H       | 130                     | H       | 100                     | D       |
| 140                     | H       | 140                     | H       | 130                     | H       | 130                     | H       | 90                      | D       |
| 80                      | G       | 80                      | G       | 70                      | G       | 70                      | G       | 80                      | C       |
| 80                      | G       | 80                      | G       | 70                      | G       | 70                      | G       | 70                      | C       |
| 30                      | D       | 30                      | D       | 25                      | D       | 25                      | D       | 20                      | C       |
| 40                      | D       | 40                      | D       | 35                      | D       | 35                      | D       | 15                      | C       |
| 35                      | C       | 35                      | C       | 30                      | C       | 30                      | C       | 15                      | C       |
|                         |         |                         |         |                         |         |                         |         | 200                     | D       |
|                         |         |                         |         |                         |         |                         |         | 200                     | D       |
|                         |         |                         |         |                         |         |                         |         | 170                     | D       |
|                         |         |                         |         |                         |         |                         |         | 140                     | D       |
|                         |         |                         |         |                         |         |                         |         | 200                     | D       |
|                         |         |                         |         |                         |         |                         |         | 80                      | D       |
|                         |         |                         |         |                         |         |                         |         | 210                     | D       |
|                         |         |                         |         |                         |         |                         |         | 140                     | D       |
|                         |         |                         |         |                         |         |                         |         | 80                      | D       |
|                         |         |                         |         |                         |         |                         |         | 65                      | C       |
|                         |         |                         |         |                         |         |                         |         | 60                      | C       |
|                         |         |                         |         |                         |         |                         |         | 45                      | C       |

Arbeitsrichtwerte

# SuperV-Bohrer

## Arbeitsrichtwerte

| Vorschubreihen |       |       |       |       |       |       |       |       |       |       |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Code-Buchstabe | A     | B     | C     | D     | E     | F     | G     | H     | I     |       |
| Werkzeug-Ø mm  | 0,50  | 0,004 | 0,006 | 0,007 | 0,008 | 0,010 | 0,012 | 0,014 | 0,016 | 0,019 |
|                | 1,00  | 0,006 | 0,008 | 0,012 | 0,014 | 0,016 | 0,018 | 0,020 | 0,023 | 0,025 |
|                | 2,00  | 0,020 | 0,025 | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 |
|                | 2,50  | 0,025 | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 |
|                | 3,15  | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,160 |
|                | 4,00  | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,200 |
|                | 5,00  | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 |
|                | 6,30  | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 |
|                | 8,00  | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,315 |
|                | 10,00 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,400 |
|                | 12,50 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 |
|                | 16,00 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 |
|                | 20,00 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,630 |
|                | 25,00 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 0,800 |
|                | 31,50 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 1,000 |
|                | 40,00 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 1,000 | 1,250 |

Werkzeuge mit fett gedruckten Vorschubreihen-Codebuchstaben sind für die entsprechende Werkstoffgruppe vorrangig einzusetzen.

Bedeutung der Kennbuchstaben bei den Typbezeichnungen:

- S** für hochfeste Werkstoffe
- U** für Universalbearbeitung, Kohlenstoffstähle
- VA** für rostfreie Werkstoffe
- X** für Stahlbearbeitung
- AL** für Aluminium
- T** für Tieflochbohrer

### Einsatzhinweise SuperV-T-Bohrer:

Um bei tiefen Bohrungen optimale Bearbeitungsergebnisse zu erzielen, empfehlen wir:

- Herstellen einer zylindrischen Pilotbohrung (Toleranz F9), Bohrtiefe 1 x D mit unseren SuperV-Bohrern Typ U bzw. VA (140° Spitzwinkel, Ø-Toleranz m7). Alternativ kann auch der Pilotbohrfräser Artikel-Nr. 54700 eingesetzt werden.
- Einfahren in Pilotbohrung: Drehzahl ca. 300 U/min, Vorschub ca. 500 mm/min.
- Einstellen des Kühlschmierstoffdruckes und der Drehzahl.
- Kontinuierliches Bohren auf volle Bohrtiefe ohne Entspanzyklus.
- Bei Durchgangsbohrungen mit geradem (90°) Austritt,  $v_f$  ca. 1 mm vor dem Durchbrechen auf 50% reduzieren.
- Bei Durchgangsbohrungen mit schrägem Austritt,  $v_f$  ca. 1 mm vor dem Durchbrechen auf 40% reduzieren.
- Nach Erreichen der Bohrtiefe Drehzahl und Kühlschmierstoff abschalten, Ausfahren im Eilgang.

### Kühlmitteleinsatz:

- Schneidöl, hochaktiviert
- Bohrölemulsion
- ohne Schmiermittel
- nur Luftkühlung

| Werkstoffgruppe  | Werkstoffbeispiele, <b>neue Bezeichnung</b> (in Klammern alte Bezeichnung)<br>Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN  | Zugfestigkeit<br>MPa (N/mm <sup>2</sup> ) | Härte                    | Kühl-<br>mittel   |
|--|---|---|--------------------------|---|
| Allgemeine Baustähle   | <b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2)<br><b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500)   | ≤500<br>>500-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Automatenstähle  | <b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36)<br><b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)   | ≤850<br>850-1000                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Vergütungsstähle                                    | <b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30)<br><b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45)<br><b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)  | ≤ 700<br>700-850<br>850-1000              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Legierte Vergütungsstähle                                      | <b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4<br><b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Einsatzstähle                                       | <b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)  | ≤750                                      |                          | <input checked="" type="checkbox"/>   |
| Legierte Einsatzstähle   | <b>1.7043</b> 38Cr4<br><b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Nitrierstähle  | <b>1.8504</b> 34CrAl6<br><b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7  | >850-≤1000<br>≥1000-1200                  |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Werkzeugstähle   | <b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9<br><b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4  | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Schnellarbeitsstähle   | <b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3   | ≥650-1000                                 |                          | <input checked="" type="checkbox"/>   |
| Federstähle  | <b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)   |   | ≤330 HB                  | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Gehärtete Stähle   | -   |   | ≤40-48 HRC<br>>48-60 HRC | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Rostfreie Stähle, geschwefelt<br>austenitisch<br>martensitisch | <b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9<br><b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A)<br><b>1.4057</b> X20CrNi 17 2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2 | ≤850<br>≤850<br>≤850                      |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Gusseisen  | <b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20)<br><b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kugelgraphit- und Tempereguss                                  | <b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMw-350-4(GTW35)<br><b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)  |   | ≤240 HB<br><300 HB       | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Hartguss   | -   |   | ≤350 HB                  | <input checked="" type="checkbox"/>   |
| Neue Gusswerkstoffe GGV  | <b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35)<br><b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6   |   |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Neue Gusswerkstoffe ADI  | <b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000)<br><b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)  | 800-1000<br>1200-1400                     |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Sonderlegierungen  | Nimonic, Inconel, Monel, Hastelloy  | ≤1200                                     |                          | <input checked="" type="checkbox"/>   |
| Titan und Titan-Legierungen                                    | <b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2<br><b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1   | ≤850<br>>850-1200                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Aluminium und Al-Legierungen                                   | <b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1  | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Knetlegierungen   | <b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5   | ≤450                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Gusslegierungen ≤ 10 % Si<br>> 10 % Si                      | <b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9<br><b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg   | ≤600<br>≤600                              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Magnesium-Legierungen  | <b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1   | ≤450                                      |                          | <input type="checkbox"/>  |
| Kupfer, niedriglegiert   | <b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb   | ≤400                                      |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Messing, kurzspanend<br>langspanend                            | <b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2<br><b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5  | ≤600<br>≤600                              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Bronzen, kurzspanend   | <b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn<br><b>2.0790</b> CuNi18Zn19Pb   | ≤600<br>>600-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Bronzen, langspanend   | <b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10<br><b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2   | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kunststoffe, duroplastisch<br>thermoplastisch                  | Epoxidharz, Resopal, Pertinax, Moltopren<br>Plexiglas, Hostalen, Novodur, Makralon  |   | -                        | <input type="checkbox"/><br><input checked="" type="checkbox"/>   |
| Kunststoffe, aramidfaserverstärkt<br>glas-/kohlefaserverstärkt | Kevlar<br>GFK/CFK   |   | -                        | <input type="checkbox"/><br><input type="checkbox"/>  |



# SuperV-Bohrer

## Arbeitsrichtwerte

| Vorschubreihen |       |       |       |       |       |       |       |       |       |       |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Code-Buchstabe | A     | B     | C     | D     | E     | F     | G     | H     | I     |       |
| Werkzeug-Ø mm  | 0,50  | 0,004 | 0,006 | 0,007 | 0,008 | 0,010 | 0,012 | 0,014 | 0,016 | 0,019 |
|                | 1,00  | 0,006 | 0,008 | 0,012 | 0,014 | 0,016 | 0,018 | 0,020 | 0,023 | 0,025 |
|                | 2,00  | 0,020 | 0,025 | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 |
|                | 2,50  | 0,025 | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 |
|                | 3,15  | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,160 |
|                | 4,00  | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,200 |
|                | 5,00  | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 |
|                | 6,30  | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 |
|                | 8,00  | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,315 |
|                | 10,00 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,400 |
|                | 12,50 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 |
|                | 16,00 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 |
|                | 20,00 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,630 |
|                | 25,00 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 0,800 |
|                | 31,50 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 1,000 |
|                | 40,00 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 1,000 | 1,250 |

Werkzeuge mit fett gedruckten Vorschubreihen-Codebuchstaben sind für die entsprechende Werkstoffgruppe vorrangig einzusetzen.

Bedeutung der Kennbuchstaben bei den Typbezeichnungen:

- S** für hochfeste Werkstoffe
- U** für Universalbearbeitung, Kohlenstoffstähle
- VA** für rostfreie Werkstoffe
- X** für Stahlbearbeitung
- AL** für Aluminium
- T** für Tieflochbohrer

### Einsatzhinweise SuperV-T-Bohrer:

Um bei tiefen Bohrungen optimale Bearbeitungsergebnisse zu erzielen, empfehlen wir:

- Herstellen einer zylindrischen Pilotbohrung (Toleranz F9), Bohrtiefe 1 x D mit unseren SuperV-Bohrern Typ U bzw. VA (140° Spitzwinkel, Ø-Toleranz m7). Alternativ kann auch der Pilotbohrfräser Artikel-Nr. 54700 eingesetzt werden.
- Einfahren in Pilotbohrung: Drehzahl ca. 300 U/min, Vorschub ca. 500 mm/min.
- Einstellen des Kühlschmierstoffdruckes und der Drehzahl.
- Kontinuierliches Bohren auf volle Bohrtiefe ohne Entspanzyklus.
- Bei Durchgangsbohrungen mit geradem (90°) Austritt,  $v_f$  ca. 1 mm vor dem Durchbrechen auf 50% reduzieren.
- Bei Durchgangsbohrungen mit schrägem Austritt,  $v_f$  ca. 1 mm vor dem Durchbrechen auf 40% reduzieren.
- Nach Erreichen der Bohrtiefe Drehzahl und Kühlschmierstoff abschalten, Ausfahren im Eilgang.

### Kühlmitteleinsatz:

- Schneidöl, hochaktiviert
- Bohrölemulsion
- ohne Schmiermittel
- nur Luftkühlung

| Werkstoffgruppe  | Werkstoffbeispiele, <b>neue Bezeichnung</b> (in Klammern alte Bezeichnung)<br>Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN  | Zugfestigkeit<br>MPa (N/mm <sup>2</sup> ) | Härte                    | Kühl-<br>mittel   |
|--|---|---|--------------------------|---|
| Allgemeine Baustähle   | <b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2)<br><b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500)   | ≤500<br>>500-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Automatenstähle  | <b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36)<br><b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)   | ≤850<br>850-1000                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Vergütungsstähle                                    | <b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30)<br><b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45)<br><b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)  | ≤ 700<br>700-850<br>850-1000              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Legierte Vergütungsstähle                                      | <b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4<br><b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Einsatzstähle                                       | <b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)  | ≤750                                      |                          | <input checked="" type="checkbox"/>   |
| Legierte Einsatzstähle   | <b>1.7043</b> 38Cr4<br><b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Nitrierstähle  | <b>1.8504</b> 34CrAl6<br><b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7  | >850-≤1000<br>≥1000-1200                  |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Werkzeugstähle   | <b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9<br><b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4  | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Schnellarbeitsstähle   | <b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3   | ≥650-1000                                 |                          | <input checked="" type="checkbox"/>   |
| Federstähle  | <b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)   |   | ≤330 HB                  | <input checked="" type="checkbox"/>   |
| Gehärtete Stähle   | -   |   | ≤40-48 HRC<br>>48-60 HRC | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Rostfreie Stähle, geschwefelt<br>austenitisch<br>martensitisch | <b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9<br><b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A)<br><b>1.4057</b> X20CrNi 17 2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2 | ≤850<br>≤850<br>≤850                      |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Gusseisen  | <b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20)<br><b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kugelgraphit- und Tempereguss                                  | <b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMw-350-4(GTW35)<br><b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)  |   | ≤240 HB<br><300 HB       | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Hartguss   | -   |   | ≤350 HB                  | <input checked="" type="checkbox"/>   |
| Neue Gusswerkstoffe GGV  | <b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35)<br><b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6   |   |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Neue Gusswerkstoffe ADI  | <b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000)<br><b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)  | 800-1000<br>1200-1400                     |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Sonderlegierungen  | Nimonic, Inconel, Monel, Hastelloy  | ≤1200                                     |                          | <input checked="" type="checkbox"/>   |
| Titan und Titan-Legierungen                                    | <b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2<br><b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1   | ≤850<br>>850-1200                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Aluminium und Al-Legierungen                                   | <b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1  | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Knetlegierungen   | <b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5   | ≤450                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Gusslegierungen ≤ 10 % Si<br>> 10 % Si                      | <b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9<br><b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg   | ≤600<br>≤600                              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Magnesium-Legierungen  | <b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1   | ≤450                                      |                          | <input type="checkbox"/>  |
| Kupfer, niedriglegiert   | <b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb   | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Messing, kurzspanend<br>langspanend                            | <b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2<br><b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5  | ≤600<br>≤600                              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Bronzen, kurzspanend   | <b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn<br><b>2.0790</b> CuNi18Zn19Pb   | ≤600<br>>600-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Bronzen, langspanend   | <b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10<br><b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2   | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kunststoffe, duroplastisch                                     | Epoxidharz, Resopal, Pertinax, Moltopren  |   | -                        | <input type="checkbox"/>  |
| thermoplastisch  | Plexiglas, Hostalen, Novodur, Makralon  |   | -                        | <input checked="" type="checkbox"/>   |
| Kunststoffe, aramidfaserverstärkt                              | Kevlar  |   | -                        | <input type="checkbox"/>  |
| glas-/kohlefaserverstärkt                                      | GFK/CFK   |   | -                        | <input type="checkbox"/>  |



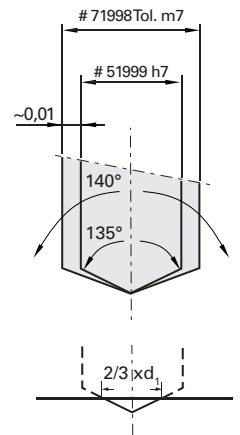


# SuperV-NX Hochleistungs-Kleinstbohrer

## Arbeitsrichtwerte

Vorschubreihen für Hochleistungs-Kleinstbohrer

| Vorschub-Code | A           | B     | C     | D     | E     | F     | G     | H     | I     | J     | K     | L     | M     |       |
|---------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Werkzeug-Ø mm | <b>0,50</b> | 0,006 | 0,012 | 0,018 | 0,022 | 0,030 | 0,035 | 0,040 | 0,045 | 0,050 | 0,050 | 0,055 | 0,060 | 0,060 |
|               | <b>0,80</b> | 0,008 | 0,016 | 0,024 | 0,032 | 0,040 | 0,050 | 0,060 | 0,070 | 0,080 | 0,080 | 0,080 | 0,090 | 0,090 |
|               | <b>1,00</b> | 0,012 | 0,022 | 0,032 | 0,042 | 0,060 | 0,070 | 0,080 | 0,090 | 0,100 | 0,100 | 0,110 | 0,110 | 0,120 |
|               | <b>1,50</b> | 0,021 | 0,036 | 0,051 | 0,066 | 0,090 | 0,100 | 0,120 | 0,130 | 0,150 | 0,150 | 0,160 | 0,170 | 0,180 |
|               | <b>2,00</b> | 0,032 | 0,052 | 0,072 | 0,092 | 0,120 | 0,140 | 0,160 | 0,180 | 0,200 | 0,210 | 0,220 | 0,230 | 0,240 |
|               | <b>2,50</b> | 0,045 | 0,070 | 0,095 | 0,120 | 0,150 | 0,170 | 0,200 | 0,220 | 0,250 | 0,260 | 0,270 | 0,280 | 0,300 |
|               | <b>3,00</b> | 0,060 | 0,090 | 0,120 | 0,150 | 0,180 | 0,210 | 0,240 | 0,270 | 0,300 | 0,310 | 0,330 | 0,340 | 0,360 |



Werkzeuge mit **fett gedruckten** Vorschubreihen-Codebuchstaben sind für die entsprechende Werkstoffgruppe vorrangig einzusetzen.

**Sicherheitshinweise:** Enorm wichtig ist, dass aus Sicherheitsgründen kein Bohrer ohne Abstützung mit einer höheren Drehzahl als  $n = 6.000$  U/min frei drehen darf. Die Zentrifugalkräfte könnten sonst die langen Werkzeuge schon vor dem Erreichen der Werkstückoberfläche brechen!

**Allgemeine Hinweise:** Spielarme Spindeln, fluchtungsgenaue Werkzeugaufnahmen. Wir empfehlen die Anwendung von Hydraulik-Dehnspannfuttern oder Schrumpffuttern sowie Kühlschmierung durch Emulsion oder Öl, Druck min. 40 bar.

### Pilotbohrung

Beim Einsatz des SuperV-NX-Bohrers ab 15xD empfehlen wir die Herstellung einer Pilotbohrung mit 1xD bis 2xD Tiefe. Der SuperV-NX-Bohrer 4xD ist optimal für diese Pilotbohrung geeignet. Sein Spitzenwinkel und seine Durchmesser-toleranz sind darauf abgestimmt.

### Zentrieren

Um bei den SuperV-NX-Bohrern ab 8xD Bohrtiefe die volle Leistung zu erreichen, empfehlen wir das Zentrieren. Hierzu kann der SuperV-NX-Bohrer bis 4xD, Katalog-Nr. 71998, verwendet werden. Der Zentrierdurchmesser sollte ca. 2/3xD haben. Alternativ kann die Zentrierung auch mit dem Stock NC-Anbohrer 142°, Katalog-Nr. 71189, erstellt werden.

### Kühlmitteleinsatz:

- Schneidöl, hochaktiviert ■
- Bohrölemulsion ■
- ohne Schmiermittel
- nur Luftkühlung

| Werkstoffgruppe               | Werkstoffbeispiele, <b>neue Bezeichnung</b> (in Klammern alte Bezeichnung)<br>Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN  | Zugfestigkeit<br>MPa (N/mm <sup>2</sup> ) | Härte                    | Kühl-<br>mittel |
|-------------------------------|---|---|--------------------------|-----------------|
| Allgemeine Baustähle          | <b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2)<br><b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500) | ≤500<br>>500-850                          |                          | ■               |
| Automatenstähle               | <b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36)<br><b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)   | ≤850<br>850-1000                          |                          | ■               |
| Unlegierte Vergütungsstähle   | <b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30)<br><b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45)<br><b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)  | ≤ 700<br>700-850<br>850-1000              |                          | ■               |
| Legierte Vergütungsstähle     | <b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4<br><b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4  | 850-≤1000<br>1000-1200                    |                          | ■               |
| Unlegierte Einsatzstähle      | <b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)  | ≤750                                      |                          | ■               |
| Legierte Einsatzstähle        | <b>1.7043</b> 38Cr4<br><b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5  | 850-≤1000<br>1000-1200                    |                          | ■               |
| Nitrierstähle                 | <b>1.8504</b> 34CrAl6<br><b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7  | ≥850-≤1000<br>>1000-1200                  |                          | ■               |
| Werkzeugstähle                | <b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9<br><b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4                                    | ≤850<br>>850-1000                         |                          | ■               |
| Schnellarbeitsstähle          | <b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3   | ≥650-1000                                 |                          | ■               |
| Federstähle                   | <b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)   |   | ≤330 HB                  | ■               |
| Gehärtete Stähle              | -   |   | ≤40-48 HRC<br>>48-60 HRC | ■               |
| Rostfreie Stähle, geschwefelt | <b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9  | ≤850                                      |                          | ■               |
| austenitisch                  | <b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A)  | ≤850                                      |                          | ■               |
| martensitisch                 | <b>1.4057</b> X20CrNi 17 2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2   | ≤850                                      |                          | ■               |
| Gusseisen                     | <b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20)<br><b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)  | 850-≤1000<br>1000-1200                    |                          | ■               |
| Kugelgraphit- und Temporguss  | <b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMW-350-4(GTW35)<br><b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)  |   | ≤240 HB<br><300 HB       | ■               |
| Hartguss                      | -   |   | ≤350 HB                  | ■               |
| Neue Gusswerkstoffe GGV       | <b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35)<br><b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6   |   |                          | ■               |
| Neue Gusswerkstoffe ADI       | <b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000)<br><b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)  | 800-1000<br>1200-1400                     |                          | ■               |
| Sonderlegierungen             | Nimonic, Inconel, Monel, Hastelloy  | ≤1200                                     |                          | ■               |
| Titan und Titan-Legierungen   | <b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2<br><b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1                                       | ≤850<br>>850-1200                         |                          | ■               |
| Aluminium und Al-Legierungen  | <b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1  | ≤400                                      |                          | ■               |
| Al-Knetlegierungen            | <b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5   | ≤450                                      |                          | ■               |
| Al-Gusslegierungen ≤ 10 % Si  | <b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9   | ≤600                                      |                          | ■               |
| > 10 % Si                     | <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg  | ≤600                                      |                          | ■               |
| Magnesium-Legierungen         | <b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1   | ≤450                                      |                          | ■               |
| Kupfer, niedriglegiert        | <b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb   | ≤400                                      |                          | ■               |
| Messing, kurzspanend          | <b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2   | ≤600                                      |                          | ■               |
| langspanend                   | <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5   | ≤600                                      |                          | ■               |
| Bronzen, kurzspanend          | <b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn   | ≤600                                      |                          | ■               |
| langspanend                   | <b>2.0790</b> CuNi18Zn19Pb  | >600-850                                  |                          | ■               |
| Bronzen, langspanend          | <b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10<br><b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2   | ≤850<br>>850-1000                         |                          | ■               |

≤5×D

≤8×D

≤15×D

≤20×D

|              |              |
|--------------|--------------|
| Katalog-Nr.  | <b>51720</b> |
| Schneidstoff | <b>VHM</b>   |
| Oberfläche   | AlTiN        |
| DIN/Form     | <b>WN</b>    |
| Typ          | M            |
| Innenkühlung | <b>ohne</b>  |
| Katalogseite | 69           |

|              |              |
|--------------|--------------|
| Katalog-Nr.  | <b>51997</b> |
| Schneidstoff | <b>VHM</b>   |
| Oberfläche   | AlTiN        |
| DIN/Form     | <b>WN</b>    |
| Typ          | NX           |
| Innenkühlung | <b>mit</b>   |
| Katalogseite | 71           |

|              |              |
|--------------|--------------|
| Katalog-Nr.  | <b>51998</b> |
| Schneidstoff | <b>VHM</b>   |
| Oberfläche   | AlTiN        |
| DIN/Form     | <b>WN</b>    |
| Typ          | NX           |
| Innenkühlung | <b>mit</b>   |
| Katalogseite | 72           |

|              |              |
|--------------|--------------|
| Katalog-Nr.  | <b>51999</b> |
| Schneidstoff | <b>VHM</b>   |
| Oberfläche   | AlTiN        |
| DIN/Form     | <b>WN</b>    |
| Typ          | NX           |
| Innenkühlung | <b>mit</b>   |
| Katalogseite | 73           |

|              |              |
|--------------|--------------|
| Katalog-Nr.  | <b>51980</b> |
| Schneidstoff | <b>VHM</b>   |
| Oberfläche   | AlTiN        |
| DIN/Form     | <b>WN</b>    |
| Typ          | NX-U         |
| Innenkühlung | <b>mit</b>   |
| Katalogseite | 74           |



| V <sub>c</sub> m/min | VR-Code | V <sub>c</sub> m/min | VR-Code | V <sub>c</sub> m/min | VR-Code | V <sub>c</sub> m/min | VR-Code | V <sub>c</sub> m/min | VR-Code |
|----------------------|---------|----------------------|---------|----------------------|---------|----------------------|---------|----------------------|---------|
| 100                  | G       | 105                  | G       | 105                  | C       | 105                  | C       | 100                  | C       |
| 100                  | G       | 100                  | G       | 100                  | C       | 100                  | C       | 100                  | C       |
| 100                  | G       | 105                  | G       | 105                  | D       | 105                  | D       | 100                  | D       |
| 90                   | F       | 90                   | F       | 90                   | D       | 90                   | D       | 100                  | D       |
| 90                   | G       | 95                   | G       | 95                   | C       | 95                   | C       | 100                  | C       |
| 90                   | G       | 95                   | G       | 95                   | C       | 95                   | C       | 100                  | C       |
| 90                   | F       | 90                   | F       | 90                   | C       | 90                   | C       | 100                  | C       |
| 90                   | F       | 90                   | F       | 90                   | C       | 90                   | C       | 80                   | C       |
| 70                   | E       | 70                   | E       | 70                   | C       | 70                   | C       | 80                   | C       |
| 100                  | F       | 100                  | F       | 100                  | B       | 100                  | B       | 100                  | B       |
| 85                   | F       | 85                   | F       | 85                   | C       | 85                   | C       | 85                   | C       |
| 70                   | E       | 70                   | E       | 70                   | C       | 70                   | C       | 70                   | C       |
| 70                   | E       | 70                   | E       | 70                   | B       | 70                   | B       | 70                   | B       |
| 60                   | E       | 60                   | E       | 60                   | B       | 60                   | B       | 60                   | B       |
| 50                   | E       | 50                   | E       | 50                   | C       | 50                   | C       | 50                   | C       |
| 60                   | E       | 50                   | E       | 50                   | C       | 50                   | C       | 50                   | C       |
|                      |         | 50                   | B       | 50                   | B       | 50                   | B       | 50                   | B       |
|                      |         | 50                   | B       | 50                   | B       | 50                   | B       | 50                   | B       |
|                      |         |                      |         |                      |         |                      |         |                      |         |
|                      |         | 70                   | B       | 70                   | B       | 70                   | B       | 80                   | B       |
|                      |         | 60                   | A       | 60                   | A       | 60                   | A       | 80                   | A       |
|                      |         | 70                   | B       | 70                   | B       | 70                   | B       | 80                   | B       |
| 130                  | K       | 150                  | E       | 150                  | E       | 150                  | E       | 140                  | E       |
| 130                  | K       | 140                  | E       | 140                  | E       | 140                  | E       | 140                  | E       |
| 130                  | K       | 140                  | E       | 140                  | E       | 140                  | E       | 140                  | E       |
| 120                  | J       | 130                  | E       | 130                  | E       | 130                  | E       | 130                  | E       |
|                      |         |                      |         |                      |         |                      |         |                      |         |
|                      |         |                      |         |                      |         |                      |         |                      |         |
|                      |         | 25                   | A       | 25                   | A       | 25                   | A       | 25                   | A       |
|                      |         | 35                   | A       | 35                   | A       | 35                   | A       | 40                   | A       |
|                      |         | 35                   | A       | 35                   | A       | 35                   | A       | 40                   | A       |
|                      |         | 70                   | M       | 70                   | M       | 70                   | M       | 120                  | M       |
|                      |         | 70                   | M       | 70                   | M       | 70                   | M       | 120                  | M       |
|                      |         | 135                  | D       | 135                  | D       | 135                  | D       | 110                  | D       |
|                      |         | 135                  | D       | 135                  | D       | 135                  | D       | 95                   | D       |
|                      |         |                      |         |                      |         |                      |         |                      |         |
|                      |         | 280                  | F       |                      |         |                      |         |                      |         |
|                      |         | 110                  | E       |                      |         |                      |         |                      |         |
|                      |         | 80                   | D       |                      |         |                      |         |                      |         |

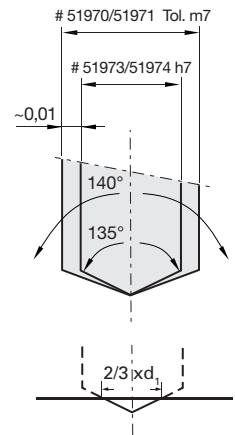
Arbeitsrichtwerte

# SuperV-NX VA Hochleistungs-Kleinstbohrer

## Arbeitsrichtwerte

Vorschubreihen für Hochleistungs-Kleinstbohrer

| Vorschub-Code | A    | B     | C     | D     | E     | F     | G     | H     | I     | J     | K     | L     | M     |       |
|---------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Werkzeug-Ø mm | 0,50 | 0,006 | 0,012 | 0,018 | 0,022 | 0,030 | 0,035 | 0,040 | 0,045 | 0,050 | 0,050 | 0,055 | 0,060 | 0,060 |
|               | 0,80 | 0,008 | 0,016 | 0,024 | 0,032 | 0,040 | 0,050 | 0,060 | 0,070 | 0,080 | 0,080 | 0,090 | 0,090 |       |
|               | 1,00 | 0,012 | 0,022 | 0,032 | 0,042 | 0,060 | 0,070 | 0,080 | 0,090 | 0,100 | 0,100 | 0,110 | 0,110 | 0,120 |
|               | 1,50 | 0,021 | 0,036 | 0,051 | 0,066 | 0,090 | 0,100 | 0,120 | 0,130 | 0,150 | 0,150 | 0,160 | 0,170 | 0,180 |
|               | 2,00 | 0,032 | 0,052 | 0,072 | 0,092 | 0,120 | 0,140 | 0,160 | 0,180 | 0,200 | 0,210 | 0,220 | 0,230 | 0,240 |
|               | 2,50 | 0,045 | 0,070 | 0,095 | 0,120 | 0,150 | 0,170 | 0,200 | 0,220 | 0,250 | 0,260 | 0,270 | 0,280 | 0,300 |
|               | 3,00 | 0,060 | 0,090 | 0,120 | 0,150 | 0,180 | 0,210 | 0,240 | 0,270 | 0,300 | 0,310 | 0,330 | 0,340 | 0,360 |



Werkzeuge mit **fett gedruckten** Vorschubreihen-Codebuchstaben sind für die entsprechende Werkstoffgruppe vorrangig einzusetzen.

**Sicherheitshinweise:** Enorm wichtig ist, dass aus Sicherheitsgründen kein Bohrer ohne Abstützung mit einer höheren Drehzahl als  $n = 6.000$  U/min frei drehen darf. Die Zentrifugalkräfte könnten sonst die langen Werkzeuge schon vor dem Erreichen der Werkstückoberfläche brechen!

**Allgemeine Hinweise:** Spielarme Spindeln, fluchtungsgenaue Werkzeugaufnahmen. Wir empfehlen die Anwendung von Hydraulik-Dehnspannfuttern oder Schrumpffuttern sowie Kühlschmierung durch Emulsion oder Öl, Druck min. 40 bar.

### Pilotbohrung

Beim Einsatz der SuperV-NX VA-Bohrer 10x/15xD empfehlen wir die Herstellung einer Pilotbohrung mit 1xD bis 2xD Tiefe. Die SuperV-NX VA Bohrer 3xD sind optimal für diese Pilotbohrung geeignet. Die Spitzenwinkel und die Durchmesser toleranzen sind darauf abgestimmt.

### Zentrieren

Alternativ kann der SuperV-NX VA Bohrer 10xD auch zentriert werden, um die volle Leistung zu erreichen. Hierzu können die SuperV-NX VA Bohrer 3xD verwendet werden. Der Zentrierdurchmesser sollte ca. 2/3xD haben. Wahlweise kann die Zentrierung auch mit dem Stock NC-Anbohrer 142°, Katalog-Nr. 71189, erstellt werden.

### Kühlmitteleinsatz:

- Schneidöl, hochaktiviert ■
- Bohrölemulsion ■
- ohne Schmiermittel
- nur Luftkühlung

| Werkstoffgruppe  | Werkstoffbeispiele, <b>neue Bezeichnung</b> (in Klammern alte Bezeichnung)<br>Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN  | Zugfestigkeit<br>MPa (N/mm <sup>2</sup> ) | Härte                    | Kühl-<br>mittel |
|--|---|---|--------------------------|-----------------|
| Allgemeine Baustähle   | <b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2)<br><b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500)   | ≤500<br>>500-850                          |                          | ■               |
| Automatenstähle  | <b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36)<br><b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)   | ≤850<br>850-1000                          |                          | ■               |
| Unlegierte Vergütungsstähle                                    | <b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30)<br><b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45)<br><b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)  | ≤ 700<br>700-850<br>850-1000              |                          | ■               |
| Legierte Vergütungsstähle                                      | <b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4<br><b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4  | 850-≤1000<br>1000-1200                    |                          | ■               |
| Unlegierte Einsatzstähle                                       | <b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)  | ≤750                                      |                          | ■               |
| Legierte Einsatzstähle   | <b>1.7043</b> 38Cr4<br><b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5  | 850-≤1000<br>1000-1200                    |                          | ■               |
| Nitrierstähle  | <b>1.8504</b> 34CrAl6<br><b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7  | ≥850-≤1000<br>>1000-1200                  |                          | ■               |
| Werkzeugstähle   | <b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9<br><b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4  | ≤850<br>>850-1000                         |                          | ■               |
| Schnellarbeitsstähle   | <b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3   | ≥650-1000                                 |                          | ■               |
| Federstähle  | <b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)   |   | ≤330 HB                  | ■               |
| Gehärtete Stähle   | -   |   | ≤40-48 HRC<br>>48-60 HRC | ■               |
| Rostfreie Stähle, geschwefelt<br>austenitisch<br>martensitisch | <b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9<br><b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A)<br><b>1.4057</b> X20CrNi 17 2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2 | ≤850<br>≤850<br>≤850                      |                          | ■               |
| Gusseisen  | <b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20)<br><b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)  | 850-≤1000<br>1000-1200                    |                          | ■ □             |
| Kugelgraphit- und Temporguss                                   | <b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMW-350-4(GTW35)<br><b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)  |   | ≤240 HB<br><300 HB       | ■               |
| Hartguss   | -   |   | ≤350 HB                  | ■               |
| Neue Gusswerkstoffe GGV  | <b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35)<br><b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6   |   |                          | ■ □             |
| Neue Gusswerkstoffe ADI  | <b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000)<br><b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)  | 800-1000<br>1200-1400                     |                          | ■ □             |
| Sonderlegierungen  | Nimonic, Inconel, Monel, Hastelloy  | ≤1200                                     |                          | ■               |
| Titan und Titan-Legierungen                                    | <b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2<br><b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1   | ≤850<br>>850-1200                         |                          | ■               |
| Aluminium und Al-Legierungen                                   | <b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1  | ≤400                                      |                          | ■               |
| Al-Knetlegierungen   | <b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5   | ≤450                                      |                          | ■               |
| Al-Gusslegierungen ≤ 10 % Si                                   | <b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9   | ≤600                                      |                          | ■               |
| > 10 % Si  | <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg  | ≤600                                      |                          | ■               |
| Magnesium-Legierungen  | <b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1   | ≤450                                      |                          | □               |
| Kupfer, niedriglegiert   | <b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb   | ≤400                                      |                          | ■               |
| Messing, kurzspanend   | <b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2   | ≤600                                      |                          | ■               |
| langspanend  | <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5   | ≤600                                      |                          | ■               |
| Bronzen, kurzspanend   | <b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn   | ≤600                                      |                          | ■               |
| langspanend  | <b>2.0790</b> CuNi18Zn19Pb  | >600-850                                  |                          | ■               |
| Bronzen, langspanend   | <b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10<br><b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2   | ≤850<br>>850-1000                         |                          | ■               |

### ≤3×D

### ≤3×D

### ≤6×D

### ≤10×D

### ≤15×D

|              |              |
|--------------|--------------|
| Katalog-Nr.  | <b>51970</b> |
| Schneidstoff | <b>VHM</b>   |
| Oberfläche   | TiSiN+       |
| DIN/Form     | <b>WN</b>    |
| Typ          | NX VA        |
| Innenkühlung | <b>ohne</b>  |
| Katalogseite | 75           |

|              |              |
|--------------|--------------|
| Katalog-Nr.  | <b>51971</b> |
| Schneidstoff | <b>VHM</b>   |
| Oberfläche   | TiSiN+       |
| DIN/Form     | <b>WN</b>    |
| Typ          | NX VA        |
| Innenkühlung | <b>axial</b> |
| Katalogseite | 76           |

|              |              |
|--------------|--------------|
| Katalog-Nr.  | <b>51972</b> |
| Schneidstoff | <b>VHM</b>   |
| Oberfläche   | TiSiN+       |
| DIN/Form     | <b>WN</b>    |
| Typ          | NX VA        |
| Innenkühlung | <b>axial</b> |
| Katalogseite | 77           |

|              |              |
|--------------|--------------|
| Katalog-Nr.  | <b>51973</b> |
| Schneidstoff | <b>VHM</b>   |
| Oberfläche   | TiSiN+       |
| DIN/Form     | <b>WN</b>    |
| Typ          | NX VA        |
| Innenkühlung | <b>axial</b> |
| Katalogseite | 78           |

|              |              |
|--------------|--------------|
| Katalog-Nr.  | <b>51974</b> |
| Schneidstoff | <b>VHM</b>   |
| Oberfläche   | TiSiN+       |
| DIN/Form     | <b>WN</b>    |
| Typ          | NX VA        |
| Innenkühlung | <b>axial</b> |
| Katalogseite | 79           |



| V <sub>c</sub><br>m/min | VR-Code  | V <sub>c</sub><br>m/min | VR-Code  | V <sub>c</sub><br>m/min | VR-Code  | V <sub>c</sub><br>m/min | VR-Code  | V <sub>c</sub><br>m/min | VR-Code  |
|-------------------------|----------|-------------------------|----------|-------------------------|----------|-------------------------|----------|-------------------------|----------|
| 90                      | G        | 100                     | E        | 100                     | D        | 100                     | C        | 100                     | B        |
| 90                      | G        | 100                     | E        | 100                     | D        | 100                     | C        | 100                     | B        |
| 90                      | G        | 100                     | E        | 100                     | D        | 100                     | C        | 100                     | B        |
| 90                      | G        | 100                     | E        | 100                     | D        | 100                     | C        | 100                     | B        |
| 90                      | G        | 100                     | E        | 100                     | D        | 100                     | D        | 100                     | B        |
| 90                      | G        | 100                     | E        | 100                     | D        | 100                     | D        | 100                     | B        |
| 90                      | G        | 100                     | E        | 100                     | D        | 100                     | D        | 100                     | B        |
| 80                      | F        | 90                      | E        | 90                      | D        | 90                      | C        | 90                      | C        |
| 80                      | F        | 90                      | E        | 90                      | D        | 90                      | C        | 90                      | C        |
| 90                      | G        | 100                     | E        | 100                     | D        | 100                     | D        | 100                     | B        |
| 80                      | F        | 90                      | E        | 90                      | D        | 90                      | C        | 90                      | C        |
| 80                      | F        | 90                      | E        | 90                      | D        | 90                      | C        | 90                      | C        |
| 40                      | E        | 50                      | E        | 50                      | D        | 50                      | C        | 50                      | B        |
| 40                      | E        | 50                      | E        | 50                      | D        | 50                      | C        | 50                      | B        |
| 40                      | E        | 50                      | E        | 50                      | D        | 50                      | C        | 50                      | B        |
| 35                      | <b>B</b> | 100                     | <b>D</b> | 100                     | <b>C</b> | 100                     | <b>C</b> | 100                     | <b>C</b> |
| 25                      | <b>A</b> | 80                      | <b>C</b> | 80                      | <b>B</b> | 80                      | <b>B</b> | 80                      | <b>B</b> |
| 30                      | <b>A</b> | 80                      | <b>C</b> | 80                      | <b>B</b> | 80                      | <b>B</b> | 80                      | <b>B</b> |
| 15                      | <b>A</b> | 20                      | <b>A</b> | 20                      | <b>A</b> | 20                      | <b>A</b> | 20                      | <b>A</b> |
| 25                      | <b>A</b> | 45                      | <b>A</b> | 45                      | <b>A</b> | 45                      | <b>A</b> | 45                      | <b>A</b> |
| 15                      | <b>A</b> | 30                      | <b>A</b> | 30                      | <b>A</b> | 30                      | <b>A</b> | 30                      | <b>A</b> |
| 270                     | E        | 300                     | E        | 300                     | E        | 300                     | D        | 300                     | C        |
| 270                     | E        | 300                     | E        | 300                     | E        | 300                     | D        | 300                     | C        |
| 180                     | G        | 200                     | G        | 200                     | G        | 200                     | F        | 200                     | E        |
| 115                     | G        | 130                     | G        | 130                     | G        | 130                     | F        | 130                     | E        |
| 125                     | E        | 150                     | E        | 150                     | D        | 150                     | C        | 150                     | B        |
| 125                     | E        | 150                     | E        | 150                     | D        | 150                     | C        | 150                     | B        |
| 125                     | E        | 150                     | E        | 150                     | D        | 150                     | C        | 150                     | B        |
| 125                     | E        | 150                     | E        | 150                     | D        | 150                     | C        | 150                     | B        |
| 125                     | E        | 150                     | E        | 150                     | D        | 150                     | C        | 150                     | B        |
| 125                     | E        | 150                     | E        | 150                     | D        | 150                     | C        | 150                     | B        |
| 125                     | E        | 150                     | E        | 150                     | D        | 150                     | C        | 150                     | B        |

Arbeitsrichtwerte

# Spiralbohrer

## Arbeitsrichtwerte

Werkzeuge mit fett gedruckten Vorschubreihen-Codebuchstaben sind für die entsprechende Werkstoffgruppe vorrangig einzusetzen.

| Vorschubreihen |       |       |       |       |       |       |       |       |       |       |                       |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------|
| Code-Buchstabe | A     | B     | C     | D     | E     | F     | G     | H     | I     |       |                       |
| Werkzeug-Ø mm  | 0,50  | 0,004 | 0,006 | 0,007 | 0,008 | 0,010 | 0,012 | 0,014 | 0,016 | 0,019 | Vorschübe<br>f (mm/U) |
|                | 1,00  | 0,006 | 0,008 | 0,012 | 0,014 | 0,016 | 0,018 | 0,020 | 0,023 | 0,025 |                       |
|                | 2,00  | 0,020 | 0,025 | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 |                       |
|                | 2,50  | 0,025 | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 |                       |
|                | 3,15  | 0,032 | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,160 |                       |
|                | 4,00  | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,200 |                       |
|                | 5,00  | 0,040 | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 |                       |
|                | 6,30  | 0,050 | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 |                       |
|                | 8,00  | 0,063 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,315 |                       |
|                | 10,00 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,400 |                       |
|                | 12,50 | 0,080 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 |                       |
|                | 16,00 | 0,100 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 |                       |
|                | 20,00 | 0,125 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,630 |                       |
|                | 25,00 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 0,800 |                       |
|                | 31,50 | 0,160 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 1,000 |                       |
|                | 40,00 | 0,200 | 0,250 | 0,315 | 0,400 | 0,500 | 0,630 | 0,800 | 1,000 | 1,250 |                       |

### Kühlmitteleinsatz:

- Schneidöl, hochaktiviert
- Bohrölemulsion
- ohne Schmiermittel
- nur Luftkühlung

| Werkstoffgruppe                   | Werkstoffbeispiele, <b>neue Bezeichnung</b> (in Klammern alte Bezeichnung)<br>Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN  | Zugfestigkeit<br>MPa (N/mm <sup>2</sup> ) | Härte                    | Kühl-<br>mittel   |
|-----------------------------------|---|---|--------------------------|---|
| Allgemeine Baustähle              | <b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2)<br><b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500) | ≤500<br>>500-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Automatenstähle                   | <b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36)<br><b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)   | ≤850<br>850-1000                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Vergütungsstähle       | <b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30)<br><b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45)<br><b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)  | ≤ 700<br>700-850<br>850-1000              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Legierte Vergütungsstähle         | <b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4<br><b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Einsatzstähle          | <b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)  | ≤750                                      |                          | <input checked="" type="checkbox"/>   |
| Legierte Einsatzstähle            | <b>1.7043</b> 38Cr4<br><b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Nitrierstähle                     | <b>1.8504</b> 34CrAl6<br><b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7  | >850-≤1000<br>≥1000-1200                  |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Werkzeugstähle                    | <b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9<br><b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4                                    | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Schnellarbeitsstähle              | <b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3   | ≥650-1000                                 |                          | <input checked="" type="checkbox"/>   |
| Federstähle                       | <b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)   |   | ≤330 HB                  | <input checked="" type="checkbox"/>   |
| Gehärtete Stähle                  | -   |   | ≤40-48 HRC<br>>48-60 HRC | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Rostfreie Stähle, geschwefelt     | <b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9  | ≤850                                      |                          | <input checked="" type="checkbox"/>   |
| austenitisch                      | <b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A)  | ≤850                                      |                          | <input checked="" type="checkbox"/>   |
| martensitisch                     | <b>1.4057</b> X20CrNi 17 2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2   | ≤850                                      |                          | <input checked="" type="checkbox"/>   |
| Gusseisen                         | <b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20)<br><b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kugelgraphit- und Temperguss      | <b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMw-350-4(GTW35)<br><b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)  |   | ≤240 HB<br><300 HB       | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Hartguss                          | -   |   | ≤350 HB                  | <input checked="" type="checkbox"/>   |
| Neue Gusswerkstoffe GGV           | <b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35)<br><b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6   |   |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Neue Gusswerkstoffe ADI           | <b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000)<br><b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)  | 800-1000<br>1200-1400                     |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Sonderlegierungen                 | Nimonic, Inconel, Monel, Hastelloy  | ≤1200                                     |                          | <input checked="" type="checkbox"/>   |
| Titan und Titan-Legierungen       | <b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2<br><b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1                                       | ≤850<br>>850-1200                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Aluminium und Al-Legierungen      | <b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1  | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Knetlegierungen                | <b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5   | ≤450                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Gusslegierungen ≤ 10 % Si      | <b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| > 10 % Si                         | <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg  | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| Magnesium-Legierungen             | <b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1   | ≤450                                      |                          | <input type="checkbox"/>  |
| Kupfer, niedriglegiert            | <b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb   | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Messing, kurzspanend              | <b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| langspanend                       | <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| Bronzen, kurzspanend              | <b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn<br><b>2.0790</b> CuNi18Zn19Pb   | ≤600<br>>600-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Bronzen, langspanend              | <b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10<br><b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2   | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kunststoffe, duroplastisch        | Epoxidharz, Resopal, Pertinax, Moltopren  |   | -                        | <input type="checkbox"/>  |
| thermoplastisch                   | Plexiglas, Hostalen, Novodur, Makralon  |   | -                        | <input checked="" type="checkbox"/>   |
| Kunststoffe, aramidfaserverstärkt | Kevlar  |   | -                        | <input type="checkbox"/>  |
| glas-/kohlefaserverstärkt         | GFK/CFK   |   | -                        | <input type="checkbox"/>  |

## ≤5×D

## ≤3×D

## ~3×D

## ~5×D

## ~5×D

|                |              |
|----------------|--------------|
| Katalog-Nr.    | <b>51290</b> |
| Schneidstoff   | <b>VHM</b>   |
| HM-Anwendgsgr. | K/P          |
| Oberfläche     | TiAlN nano   |
| DIN/Form       | <b>WN</b>    |
| Typ            | N            |
| Innenkühlung   | <b>ohne</b>  |
| Katalogseite   | 80           |

|                |              |
|----------------|--------------|
| Katalog-Nr.    | <b>51146</b> |
| Schneidstoff   | <b>VHM</b>   |
| HM-Anwendgsgr. | K/P          |
| Oberfläche     | TiAlN nano   |
| DIN/Form       | <b>6537K</b> |
| Typ            | H            |
| Innenkühlung   | <b>ohne</b>  |
| Katalogseite   | 81           |

|                |               |
|----------------|---------------|
| Katalog-Nr.    | <b>61131</b>  |
| Schneidstoff   | <b>HSS-Co</b> |
| HM-Anwendgsgr. |               |
| Oberfläche     | AlTiZrN       |
| DIN/Form       | <b>1897</b>   |
| Typ            | V18           |
| Innenkühlung   | <b>ohne</b>   |
| Katalogseite   | 87            |

|                |               |
|----------------|---------------|
| Katalog-Nr.    | <b>61232</b>  |
| Schneidstoff   | <b>HSS-Co</b> |
| HM-Anwendgsgr. |               |
| Oberfläche     | AlTiZrN       |
| DIN/Form       | <b>338</b>    |
| Typ            | V18           |
| Innenkühlung   | <b>ohne</b>   |
| Katalogseite   | 89            |

|                |              |
|----------------|--------------|
| Katalog-Nr.    | <b>71018</b> |
| Schneidstoff   | <b>M42</b>   |
| HM-Anwendgsgr. |              |
| Oberfläche     | Bronze-VAP   |
| DIN/Form       | <b>338</b>   |
| Typ            | V16          |
| Innenkühlung   | <b>ohne</b>  |
| Katalogseite   | 91           |



| V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code |
|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|
| 100                     | E       |                         |         | 38                      | F       | 38                      | F       | 35                      | F       |
| 90                      | E       |                         |         | 33                      | E       | 33                      | E       | 30                      | E       |
| 100                     | F       |                         |         | 44                      | F       | 44                      | F       | 40                      | F       |
| 90                      | D       |                         |         | 42                      | E       | 42                      | E       | 40                      | E       |
| 100                     | E       |                         |         | 44                      | E       | 44                      | E       | 40                      | E       |
| 90                      | E       |                         |         | 44                      | E       | 44                      | E       | 40                      | E       |
| 80                      | E       |                         |         |                         |         |                         |         | 35                      | D       |
| 80                      | E       |                         |         |                         |         |                         |         | 20                      | D       |
|                         |         | 80                      | F       |                         |         |                         |         | 16                      | C       |
| 100                     | F       |                         |         | 40                      | F       | 40                      | F       | 36                      | F       |
| 80                      | E       |                         |         |                         |         |                         |         | 20                      | C       |
|                         |         | 65                      | D       |                         |         |                         |         | 15                      | C       |
| 65                      | E       |                         |         |                         |         |                         |         | 16                      | D       |
|                         |         | 80                      | D       |                         |         |                         |         | 12                      | C       |
| 65                      | C       |                         |         |                         |         |                         |         | 15                      | C       |
|                         |         |                         |         |                         |         |                         |         | 12                      | C       |
|                         |         |                         |         |                         |         |                         |         | 15                      | C       |
| 30                      | C       |                         |         |                         |         |                         |         | 8                       | B       |
| 20                      | B       | 40                      | B       |                         |         |                         |         | 4                       | A       |
|                         |         | 30                      | A       |                         |         |                         |         |                         |         |
| 30                      | B       |                         |         | 20                      | D       | 20                      | D       | 18                      | C       |
| 20                      | A       |                         |         | 15                      | C       | 15                      | C       | 14                      | C       |
| 30                      | B       |                         |         | 18                      | C       | 18                      | C       | 16                      | C       |
| 115                     | E       | 90                      | H       | 30                      | F       | 30                      | F       | 35                      | F       |
| 100                     | E       | 80                      | H       | 30                      | F       | 30                      | F       | 30                      | F       |
| 90                      | E       | 80                      | H       |                         |         |                         |         | 30                      | F       |
| 80                      | E       | 70                      | G       |                         |         |                         |         | 28                      | F       |
|                         |         | 30                      | B       |                         |         |                         |         | 10                      | C       |
|                         |         |                         |         |                         |         |                         |         |                         |         |
|                         |         |                         |         |                         |         |                         |         |                         |         |
|                         |         |                         |         |                         |         |                         |         |                         |         |
| 20                      | C       |                         |         | H                       | A       | H                       | A       | 8                       | A       |
| 15                      | A       |                         |         | 12                      | B       | 12                      | B       | 10                      | B       |
| 15                      | A       |                         |         | H                       | B       | H                       | B       | 6                       | B       |
| 260                     | H       |                         |         | 90                      | G       | 90                      | G       | 90                      | G       |
| 260                     | H       |                         |         | 90                      | G       | 90                      | G       | 90                      | G       |
| 195                     | G       |                         |         | 80                      | G       | 80                      | G       | 80                      | G       |
| 155                     | G       |                         |         | 70                      | F       | 70                      | F       | 70                      | F       |
| 235                     | F       |                         |         | 70                      | F       | 70                      | F       | 70                      | F       |
| 100                     | F       |                         |         | 70                      | E       | 70                      | E       | 70                      | E       |
| 235                     | F       |                         |         | 60                      | E       | 60                      | E       | 60                      | E       |
| 235                     | F       |                         |         | 40                      | E       | 40                      | E       | 40                      | E       |
| 155                     | F       |                         |         | 35                      | D       | 35                      | D       | 35                      | D       |
| 155                     | F       |                         |         | 33                      | D       | 33                      | D       | 33                      | D       |
| 90                      | E       |                         |         | 20                      | D       | 20                      | D       | 20                      | D       |
| 65                      | D       |                         |         | 15                      | D       | 15                      | D       | 15                      | D       |
| 50                      | E       |                         |         |                         |         |                         |         | 20                      | D       |
| 65                      | D       |                         |         | 30                      | D       | 30                      | D       | 30                      | E       |
|                         |         |                         |         |                         |         |                         |         |                         |         |
| 100                     | D       |                         |         |                         |         |                         |         |                         |         |

# Tieflochbohrer

## Arbeitsrichtwerte

|                |       | Vorschubreihen |       |       |       |       |       |       |       |
|----------------|-------|----------------|-------|-------|-------|-------|-------|-------|-------|
| Code-Buchstabe |       | K              | L     | M     | N     | O     | P     | Q     | R     |
| Werkzeug-Ø mm  | 1,50  | 0,002          | 0,004 | 0,006 | 0,008 | 0,012 | 0,020 | 0,032 | 0,045 |
|                | 2,00  | 0,003          | 0,005 | 0,007 | 0,010 | 0,016 | 0,028 | 0,046 | 0,055 |
|                | 2,50  | 0,004          | 0,006 | 0,008 | 0,012 | 0,018 | 0,030 | 0,054 | 0,070 |
|                | 4,00  | 0,005          | 0,007 | 0,010 | 0,016 | 0,025 | 0,043 | 0,065 | 0,085 |
|                | 6,00  | 0,007          | 0,009 | 0,013 | 0,024 | 0,035 | 0,061 | 0,085 | 0,120 |
|                | 8,00  | 0,010          | 0,014 | 0,022 | 0,032 | 0,045 | 0,068 | 0,100 | 0,150 |
|                | 10,00 | 0,012          | 0,016 | 0,028 | 0,040 | 0,055 | 0,075 | 0,120 | 0,160 |
|                | 14,00 | 0,020          | 0,025 | 0,035 | 0,050 | 0,065 | 0,085 | 0,130 | 0,180 |
|                | 18,00 | 0,025          | 0,030 | 0,040 | 0,055 | 0,070 | 0,095 | 0,145 | 0,200 |
|                | 20,00 | 0,026          | 0,035 | 0,045 | 0,060 | 0,080 | 0,110 | 0,180 | 0,250 |
|                | 24,00 | 0,027          | 0,036 | 0,047 | 0,065 | 0,085 | 0,130 | 0,185 | 0,300 |
|                | 28,00 | 0,028          | 0,038 | 0,049 | 0,068 | 0,090 | 0,140 | 0,195 | 0,350 |
|                | 30,00 | 0,030          | 0,040 | 0,050 | 0,070 | 0,100 | 0,150 | 0,200 | 0,400 |
|                | 35,00 | 0,035          | 0,045 | 0,055 | 0,075 | 0,120 | 0,180 | 0,250 | 0,450 |
|                | 40,00 | 0,040          | 0,050 | 0,060 | 0,080 | 0,150 | 0,200 | 0,300 | 0,500 |

Vorschube  
f (mm/U)

### Kühlmitteleinsatz:

Schneidöl, hochaktiviert, grenzflächenaktives Schmiermittel mit wirksamen Stoffen (Additiven), die chemisch reagieren und dabei einen besonders haftenden und verschleißmindernden Schmierfilm erzeugen.

Bohrölemulsion

ohne Schmiermittel

nur Luftkühlung



Sämtliche Tieflochbohrer müssen beim Anbohren geführt werden. Tieflochbohrer dürfen nie mit voller Drehzahl frei im Maschinenraum bewegt werden. Bitte beachten Sie die Anwendungsrichtlinien!

| Werkstoffgruppe  | Werkstoffbeispiele, <b>neue Bezeichnung</b> (in Klammern alte Bezeichnung)<br>Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN  | Zugfestigkeit<br>MPa (N/mm <sup>2</sup> ) | Härte                    | Kühl-<br>mittel   |
|--|---|---|--------------------------|---|
| Allgemeine Baustähle   | <b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2)<br><b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500)   | ≤500<br>>500-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Automatenstähle  | <b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36)<br><b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)   | ≤850<br>850-1000                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Vergütungsstähle                                    | <b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30)<br><b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45)<br><b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)  | ≤ 700<br>700-850<br>850-1000              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Legierte Vergütungsstähle                                      | <b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4<br><b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Einsatzstähle                                       | <b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)  | ≤750                                      |                          | <input checked="" type="checkbox"/>   |
| Legierte Einsatzstähle   | <b>1.7043</b> 38Cr4<br><b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Nitrierstähle  | <b>1.8504</b> 34CrAl6<br><b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7  | >850-≤1000<br>>1000-1200                  |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Werkzeugstähle   | <b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9<br><b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4  | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Schnellarbeitsstähle   | <b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3   | ≥650-1000                                 |                          | <input checked="" type="checkbox"/>   |
| Federstähle  | <b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)   |   | ≤330 HB                  | <input checked="" type="checkbox"/>   |
| Gehärtete Stähle   | -   |   | ≤40-48 HRC<br>>48-60 HRC | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Rostfreie Stähle, geschwefelt<br>austenitisch<br>martensitisch | <b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9<br><b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A)<br><b>1.4057</b> X20CrNi 17 2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2 | ≤850<br>≤850<br>≤850                      |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Gusseisen  | <b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20)<br><b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kugelgraphit- und Tempereguss                                  | <b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMw-350-4(GTW35)<br><b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)  |   | ≤240 HB<br><300 HB       | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Hartguss   | -   |   | ≤350 HB                  | <input checked="" type="checkbox"/>   |
| Neue Gusswerkstoffe GGV  | <b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35)<br><b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6   |   |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Neue Gusswerkstoffe ADI  | <b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000)<br><b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)  | 800-1000<br>1200-1400                     |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Sonderlegierungen  | Nimonic, Inconel, Monel, Hastelloy  | ≤1200                                     |                          | <input checked="" type="checkbox"/>   |
| Titan und Titan-Legierungen                                    | <b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2<br><b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1   | ≤850<br>>850-1200                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Aluminium und Al-Legierungen                                   | <b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1  | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Knetlegierungen   | <b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5   | ≤450                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Gusslegierungen ≤ 10 % Si                                   | <b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| > 10 % Si  | <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg  | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| Magnesium-Legierungen  | <b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1   | ≤450                                      |                          | <input type="checkbox"/>  |
| Kupfer, niedriglegiert   | <b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb   | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Messing, kurzspanend   | <b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| langspanend  | <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| Bronzen, kurzspanend   | <b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn<br><b>2.0790</b> CuNi18Zn19Pb   | ≤600<br>>600-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Bronzen, langspanend   | <b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10<br><b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2   | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kunststoffe, duroplastisch                                     | Epoxidharz, Resopal, Pertinax, Moltopren  |   | -                        | <input type="checkbox"/>  |
| thermoplastisch  | Plexiglas, Hostalen, Novodur, Makralon  |   | -                        | <input checked="" type="checkbox"/>   |
| Kunststoffe, aramidfaserverstärkt                              | Kevlar  |   | -                        | <input type="checkbox"/>  |
| glas-/kohlefaserverstärkt                                      | GFK/CFK   |   | -                        | <input type="checkbox"/>  |

Arbeitsrichtwerte



|              |  |
|--------------|--|
| Katalog-Nr.  | <b>65030</b><br><b>65031</b><br><b>65032</b><br><b>65033</b> |
| Schneidstoff | <b>HM</b>  |
| Oberfläche   | TiN  |
| Typ          | <b>SuperT-NXL</b>  |
| Katalogseite | 82/83/84/85  |

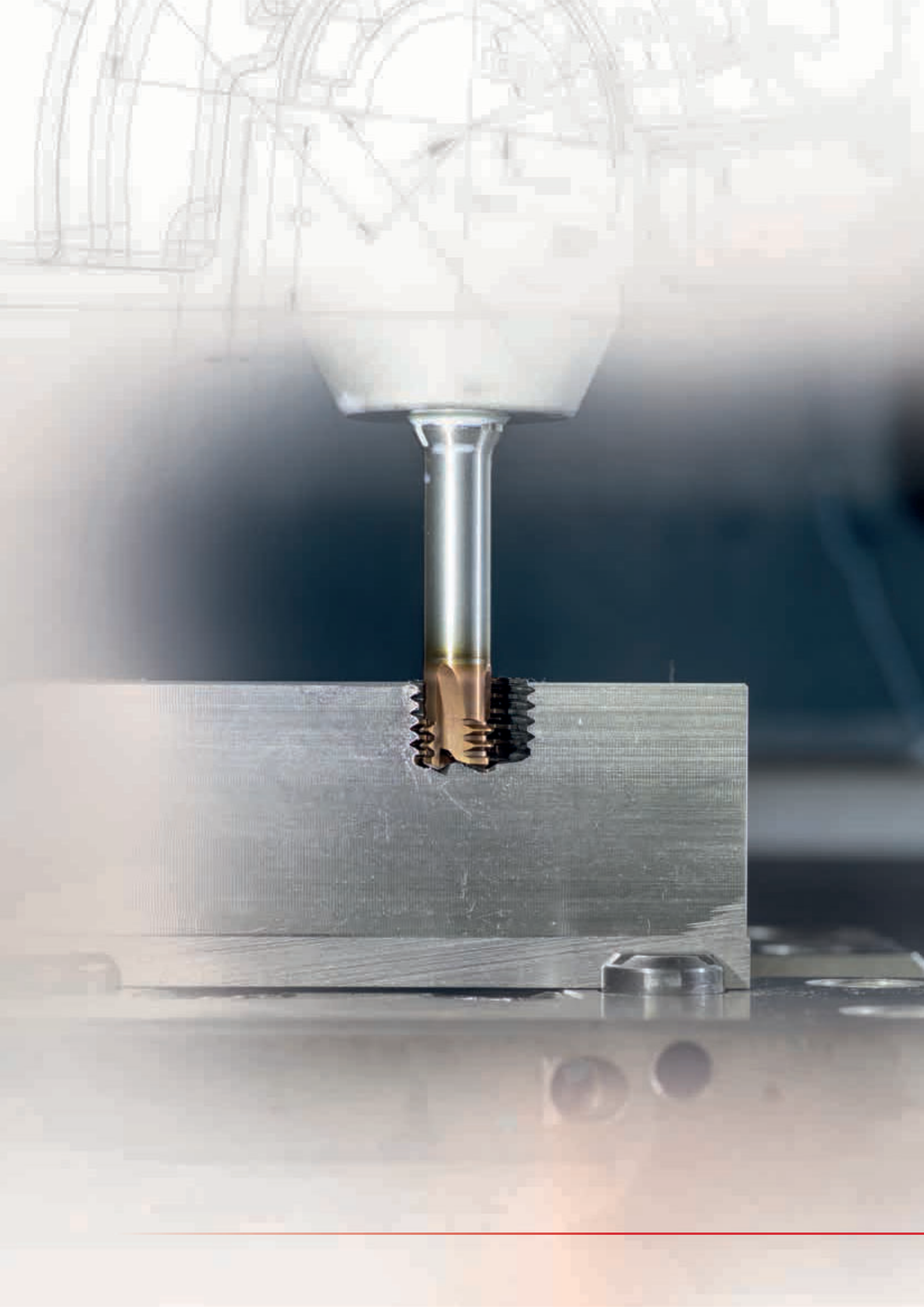


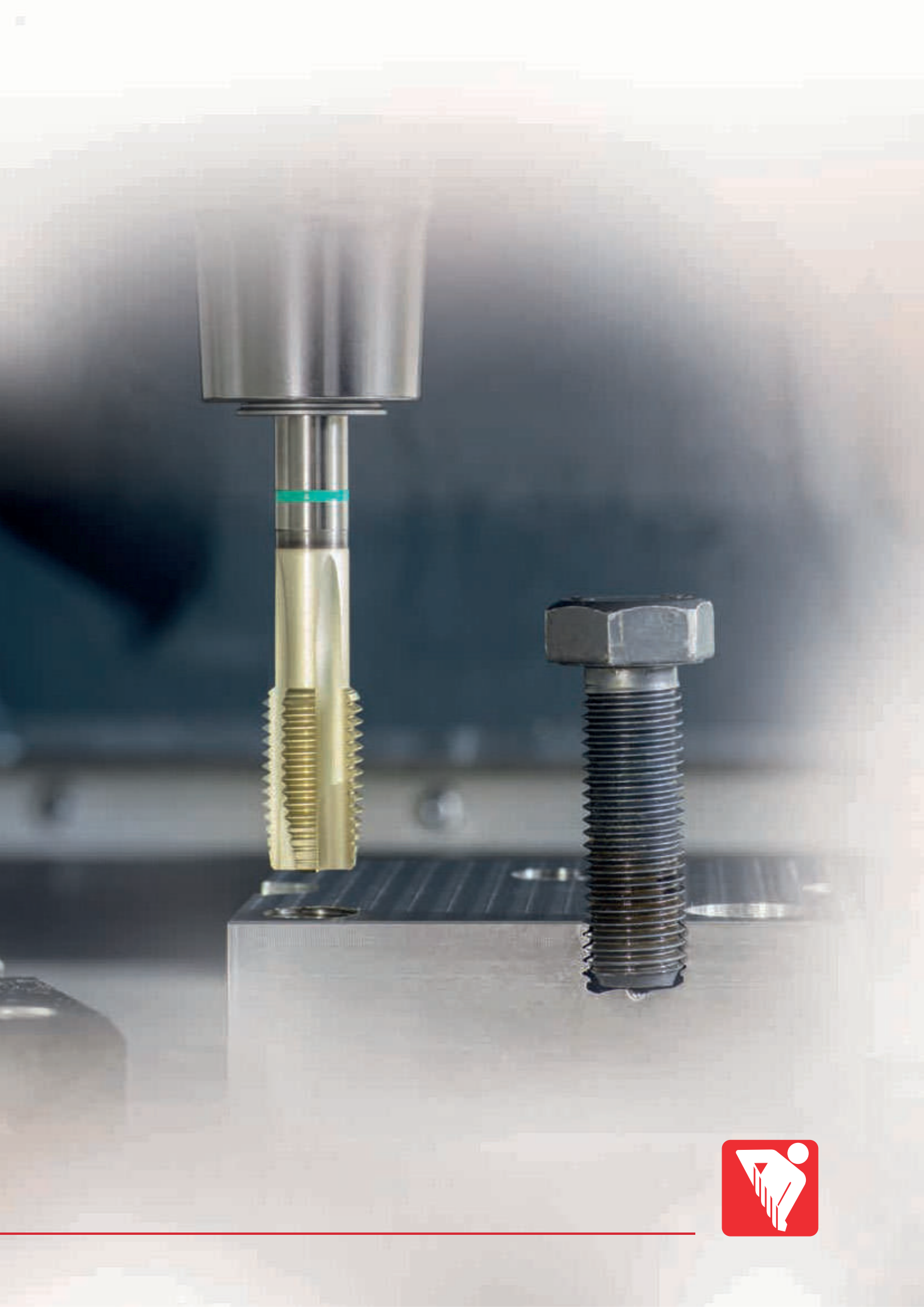
| V <sub>c</sub><br>m/min | VR-Code |
|-------------------------|---------|
| 100                     | N       |
| 85                      | N       |
| 90                      | N       |
| 80                      | N       |
| 90                      | M       |
| 80                      | M       |
| 75                      | M       |
| 75                      | M       |
| 65                      | M       |
| 80                      | N       |
| 75                      | M       |
| 65                      | M       |
| 75                      | M       |
| 65                      | M       |
| 75                      | L       |
| 65                      | L       |
| 55                      | K       |
| 65                      | L       |
| 30                      | L       |
| 25                      | K       |
| 55                      | M       |
| 45                      | M       |
| 35                      | M       |
| 85                      | O       |
| 80                      | O       |
| 80                      | N       |
| 70                      | N       |
| 55                      | M       |
| 35                      | K       |
| 35                      | K       |
| 30                      | K       |
| 150                     | P       |
| 120                     | O       |
| 150                     | P       |
| 130                     | P       |
| 110                     | P       |
| 75                      | N       |
| 120                     | Q       |
| 90                      | Q       |
| 95                      | P       |
| 75                      | P       |
| 70                      | P       |
| 60                      | P       |
| 75                      | N       |
| 70                      | N       |
| 60                      | M       |
| 50                      | M       |



# SuperT

- Einlippenbohrer für höchste Präzision
- Bohrtiefen bis zu 80xD mit nur einem Werkzeug
- herstellbar ab 0,9 mm Nenn-Ø
- mit und ohne Spanteilemut
- universell einsetzbar





# Auswahlempfehlungen für Gewindebohrer



| Bohrungsart     |              |              |              |              |
|-----------------|--------------|--------------|--------------|--------------|
| Schneidstoff    | HSS-E        | HSS-E        | HSS-E-PM     | HSS-E-PM     |
| Schneidrichtung | rechts       | links        | rechts       | rechts       |
| Typ             | ProduktivN-X | ProduktivN-X | ProduktivN-X | ProduktivN-X |
| Form            | B            | B            | B            | B            |
| Kühlung         | außen        | außen        | außen        | radial       |
| Oberfläche      | AlTiZrN      | AlTiZrN      | AlTiZrN      | AlTiZrN      |

| Gewindeart | Baumaße nach DIN 2184-1 | Toleranzfeld | Katalog-Nr./Ø-Bereich/Seite            |                               |                                     |                                     |
|------------|-------------------------|--------------|--|-------------------------------|-------------------------------------|-------------------------------------|
| <b>M</b>   | DIN 371/DIN 376         | 6HX          | 53733<br>M2 - M42<br>Seite 68          | 53734<br>M2 - M30<br>Seite 69 | 53735<br>M3 - M20<br>Seite 70       | 53736<br>M5 - M30<br>Seite 71       |
|            |                         | 6H+0,1       | 53737<br>M2 - M30<br>Seite 72          |                               |                                     |                                     |
|            |                         | 6GX          | 53738<br>M2 - M30<br>Seite 73          |                               |                                     |                                     |
|            | WN überlang             | 6HX          | 53739<br>M3 - M20<br>Seite 74          |                               |                                     |                                     |
| <b>MF</b>  | DIN 374                 | 6HX          | 53778<br>M3x0,35 - M24x2<br>Seite 93   |                               | 53789<br>M8x1 - M24x1.5<br>Seite 94 | 53790<br>M8x1 - M24x1.5<br>Seite 95 |
|            |                         | 6GX          | 53779<br>M6x0,75 - M24x1.5<br>Seite 96 |                               |                                     |                                     |
| <b>UNC</b> | DIN 2184-1              | 2BX          | 53782<br>No.2-56 - 1-8<br>Seite 103    |                               |                                     |                                     |
| <b>UNF</b> | DIN 2184-1              | 2BX          | 53784<br>No.2-64 - 1-12<br>Seite 105   |                               |                                     |                                     |

Arbeitsrichtwerte



**ECONOMY CLASS**  
die günstigste Innengewindeherstellung



**BUSINESS CLASS**  
die wirtschaftliche Innengewindeherstellung



**PREMIUM CLASS**  
die optimale Innengewindeherstellung

# Auswahlempfehlungen für Gewindebohrer

| Materialgruppe                    |   | Zugfestigkeit                    | Materialbeispiel   | Werkstoff-Nr.                        | Empfohlene Schnittgeschwindigkeit $v_c$ m/min |    |    |    |
|-----------------------------------|---|----------------------------------|--|--------------------------------------|---|----|----|----|
| P                                 | Bau-/Automatenstähle, unleg. Vergütungs-/Einsatzstähle          | $\leq 800$ N/mm <sup>2</sup>     | S235JR<br>C15<br>11SMnPb30                               | 1.0037<br>1.0401<br>1.0718           | 20  | 20 | 25 | 25 |
|                                   | Automatenstähle, unlegierte Einsatzstähle, Nitrierstähle        | 800 - 1000 N/mm <sup>2</sup>     | S355J2<br>C60<br>31CrMo12                                | 1.0577<br>1.0601<br>1.8515           | 15  | 15 | 20 | 20 |
|                                   | Legierte Vergütungsstähle, Werkzeugstähle, Schnellarbeitsstähle | 800 - 1200 N/mm <sup>2</sup>     | 42CrMo4<br>36CrNiMo4<br>X36CrMo17<br>HS 6-5-2            | 1.7225<br>1.6511<br>1.2316<br>1.3343 | 10  | 10 | 15 | 15 |
| M                                 | Nichtrostende Stahlwerkstoffe, geschwefelt, austenitisch        | $\leq 1000$ N/mm <sup>2</sup>    | X5CrNi18-10<br>X6CrNiTi18-10<br>X8CrNiS18-9              | 1.4301<br>1.4571<br>1.4305           | 12  | 12 | 15 | 15 |
|                                   | Rost- und säurebeständige Stähle, martensitisch                 | $\leq 1000$ N/mm <sup>2</sup>    | X17CrNi16-2<br>X90CrMoV18<br>X2CrTi12                    | 1.4057<br>1.4112<br>1.4512           | 10  | 10 | 12 | 12 |
|                                   | Duplex und Super Duplex   | $\leq 1300$ N/mm <sup>2</sup>    | X2CrNiMoN22-5-3<br>X2CrNiMoN25-7-4<br>X2CrNiMoCuWN25-7-4 | 1.4462<br>1.4410<br>1.4501           | 6   | 6  | 8  | 8  |
|                                   | Gusseisen   | 300 HB                           | EN-GJL-150<br>EN-GJL-250<br>EN-GJL-300                   | 0.6015<br>0.6025<br>0.6030           | 20  | 20 | 25 | 25 |
| K                                 | Kugelgraphit- und Temperguss                                    | 350 HB                           | EN-GJS-400-15<br>EN-GJS-600-3<br>EN-GJS-700-2            | 0.7040<br>0.7060<br>0.7070           | 20  | 20 | 25 | 25 |
|                                   | ADI GGV   | 1000 N/mm <sup>2</sup><br>350 HB | EN-GJS1000-5<br>EN-GJV250<br>EN-GJV400                   |                                      | 10  | 10 | 15 | 15 |
| N                                 | Aluminium, Aluminium-Knetlegierungen                            | $\leq 450$ N/mm <sup>2</sup>     | Al99,5H<br>AlMgSi1<br>AlZn4,5Mg                          | 3.0250<br>3.2315<br>3.4335           | 10  | 10 | 12 | 12 |
|                                   | Aluminium-Gusslegierungen                                       | $\leq 600$ N/mm <sup>2</sup>     | GD-ALSi5Cu1Mg<br>GD-ALSi8Cu3<br>G-ALSi9Mg<br>G-ALSi12    | 3.2134<br>3.2162<br>3.2373<br>3.2581 | 20  | 20 | 25 | 25 |
|                                   | Magnesium-Legierungen   | $\leq 500$ N/mm <sup>2</sup>     | GDMgAl8Zn1   | 3.5812.08                            |   |    |    |    |
|                                   | Kupfer und Kupferlegierungen                                    | langspanend                      | CuZn20   | 2.0250                               | 20  | 20 | 25 | 25 |
|                                   |   |                                  | CuZn37Pb0,5  | 2.0332                               |   |    |    |    |
|                                   | Kupfer-Sonderleg.   | kurzspanend                      | CuZn39Pb2  | 2.0380                               | 20  | 20 | 25 | 25 |
|                                   |   |                                  | CuZn43Pb2  | 2.0410                               |   |    |    |    |
| Kunststoffe [Thermo-, Duroplaste] | langspanend<br>kurzspanend                                      | PMMA, POM, PVC<br>Pertinax       |  |                                      |   |    |    |    |
| S                                 | Titan und Titanlegierungen                                      | $\leq 1200$ N/mm <sup>2</sup>    | Titan<br>TiAl5Sn2<br>TiAl6V4                             | 3.702<5<br>3.7115<br>3.7165          | 3   | 3  | 5  | 5  |
|                                   | Nickel-, Kobalt-, und Eisen-Legierungen                         | $\leq 1400$ N/mm <sup>2</sup>    | Hastelloy C4<br>Inconel 718<br>Nimonic 105               | 2.4610<br>2.4668<br>2.4634           | 2   | 2  | 3  | 3  |
| H                                 | hochfeste Stähle, gehärtete Stähle                              | 45 - 55 HRC                      |  |                                      |   |    |    |    |
|                                   |   | 55 - 62 HRC                      |  |                                      |   |    |    |    |

# Auswahlempfehlungen für Gewindebohrer



| Bohrungsart     |             |             |             |             |             |
|-----------------|-------------|-------------|-------------|-------------|-------------|
| Schneidstoff    | HSS-E       | HSS-E       | HSS-E-PM    | HSS-E-PM    | HSS-E       |
| Schneidrichtung | rechts      | links       | rechts      | rechts      | rechts      |
| Typ             | IntensivN-X | IntensivN-X | IntensivN-X | IntensivN-X | IntensivN-X |
| Form            | C           | C           | C           | C           | E           |
| Kühlung         | außen       | außen       | außen       | axial       | außen       |
| Oberfläche      | TiAIN-H     | TiAIN-H     | TiAIN-H     | TiAIN-H     | TiAIN-H     |

| Gewindeart | Baumaße nach DIN 2184-1 | Toleranzfeld | Katalog-Nr./Ø-Bereich/Seite             |                               |                                     |                                     |   |
|------------|-------------------------|--------------|---|-------------------------------|-------------------------------------|-------------------------------------|---|
|            |                         |              | 53746<br>M2 - M42<br>Seite 75           | 53747<br>M2 - M30<br>Seite 76 | 53748<br>M3 - M20<br>Seite 77       | 53749<br>M5 - M30<br>Seite 78       | 53760<br>M2 - M30<br>Seite 79           |
| M          | DIN 371/DIN 376         | 6HX          | 53750<br>M2 - M30<br>Seite 80           |                               |                                     |                                     |   |
|            |                         | 6H+0,1       | 53751<br>M2 - M30<br>Seite 81           |                               |                                     |                                     |   |
|            |                         | 6GX          | 53752<br>M3 - M20<br>Seite 82           |                               |                                     |                                     |   |
|            | WN überlang             | 6HX          | 53780<br>M3x0,35 - M24x2<br>Seite 97    |                               | 53791<br>M8x1 - M24x1.5<br>Seite 98 | 53792<br>M8x1 - M24x1.5<br>Seite 99 | 53770<br>M6x0.75 - M24x1.5<br>Seite 100 |
| MF         | DIN 374                 | 6HX          | 53781<br>M6x0.75 - M24x1.5<br>Seite 101 |                               |                                     |                                     |   |
|            |                         | 6GX          | 53783<br>No.2-56 - 1-8<br>Seite 104     |                               |                                     |                                     |   |
| UNC        | DIN 2184-1              | 2BX          | 53785<br>No.2-64 - 1-12<br>Seite 106    |                               |                                     |                                     |   |
| UNF        | DIN 2184-1              | 2BX          |   |                               |                                     |                                     |   |
| G          | DIN 5156                | DIN ISO 228  |   |                               |                                     |                                     | 53775<br>G1/16 - G1<br>Seite 107        |

# Auswahlempfehlungen für Gewindebohrer

| Materialgruppe                    |   | Zugfestigkeit                    | Materialbeispiel   | Werkstoff-Nr.                        | Empfohlene Schnittgeschwindigkeit v <sub>c</sub> m/min |    |    |    |    |
|-----------------------------------|---|----------------------------------|--|--------------------------------------|--|----|----|----|----|
| P                                 | Bau-/Automatenstähle, unleg. Vergütungs-/Einsatzstähle          | ≤800 N/mm <sup>2</sup>           | S235JR<br>C15<br>11SMnPb30                               | 1.0037<br>1.0401<br>1.0718           | 20   | 20 | 25 | 25 | 20 |
|                                   | Automatenstähle, unlegierte Einsatzstähle, Nitrierstähle        | 800 - 1000 N/mm <sup>2</sup>     | S355J2<br>C60<br>31CrMo12                                | 1.0577<br>1.0601<br>1.8515           | 15   | 15 | 20 | 20 | 15 |
|                                   | Legierte Vergütungsstähle, Werkzeugstähle, Schnellarbeitsstähle | 800 - 1200 N/mm <sup>2</sup>     | 42CrMo4<br>36CrNiMo4<br>X36CrMo17<br>HS 6-5-2            | 1.7225<br>1.6511<br>1.2316<br>1.3343 | 10   | 10 | 12 | 12 | 10 |
| M                                 | Nichtrostende Stahlwerkstoffe, geschwefelt, austenitisch        | ≤1000 N/mm <sup>2</sup>          | X5CrNi18-10<br>X6CrNiTi18-10<br>X8CrNiS18-9              | 1.4301<br>1.4571<br>1.4305           | 12   | 12 | 15 | 15 | 12 |
|                                   | Rost- und säurebeständige Stähle, martensitisch                 | ≤1000 N/mm <sup>2</sup>          | X17CrNi16-2<br>X90CrMoV18<br>X2CrTi12                    | 1.4057<br>1.4112<br>1.4512           | 10   | 10 | 12 | 12 | 10 |
|                                   | Duplex und Super Duplex   | ≤1300 N/mm <sup>2</sup>          | X2CrNiMoN22-5-3<br>X2CrNiMoN25-7-4<br>X2CrNiMoCuWN25-7-4 | 1.4462<br>1.4410<br>1.4501           | 6  | 6  | 8  | 8  | 6  |
|                                   | Gusseisen   | 300 HB                           | EN-GJL-150<br>EN-GJL-250<br>EN-GJL-300                   | 0.6015<br>0.6025<br>0.6030           | 20   | 20 | 25 | 25 | 20 |
| K                                 | Kugelgraphit- und Temperguss                                    | 350 HB                           | EN-GJS-400-15<br>EN-GJS-600-3<br>EN-GJS-700-2            | 0.7040<br>0.7060<br>0.7070           | 20   | 20 | 25 | 25 | 20 |
|                                   | ADI GGV   | 1000 N/mm <sup>2</sup><br>350 HB | EN-GJS1000-5<br>EN-GJV250<br>EN-GJV400                   |                                      | 10   | 10 | 15 | 15 | 10 |
| N                                 | Aluminium, Aluminium-Knetlegierungen                            | ≤450 N/mm <sup>2</sup>           | Al99,5H<br>AlMgSi1<br>AlZn4,5Mg                          | 3.0250<br>3.2315<br>3.4335           | 10   | 10 | 12 | 12 | 10 |
|                                   | Aluminium-Gusslegierungen                                       | ≤600 N/mm <sup>2</sup>           | GD-ALSi5Cu1Mg<br>GD-ALSi8Cu3<br>G-ALSi9Mg<br>G-ALSi12    | 3.2134<br>3.2162<br>3.2373<br>3.2581 | 20   | 20 | 25 | 25 | 20 |
|                                   | Magnesium-Legierungen   | ≤500 N/mm <sup>2</sup>           | GDMgAl8Zn1   | 3.5812.08                            |  |    |    |    |    |
|                                   | Kupfer und Kupferlegierungen                                    | langspanend                      | CuZn20   | 2.0250                               | 20   | 20 | 25 | 25 | 20 |
|                                   |   |                                  | CuZn37Pb0,5  | 2.0332                               |  |    |    |    |    |
|                                   | Kupfer-Sonderleg.   | kurzspanend                      | CuZn39Pb2  | 2.0380                               | 20   | 20 | 25 | 25 | 20 |
|                                   |   |                                  | CuZn43Pb2  | 2.0410                               |  |    |    |    |    |
| Kunststoffe [Thermo-, Duroplaste] | langspanend   | PMMA, POM, PVC                   |  | 10                                   | 10   | 15 | 15 | 10 |    |
| kurzspanend                       | Pertinax  |                                  |  |                                      |  |    |    |    |    |
| S                                 | Titan und Titanlegierungen                                      | ≤ 1200 N/mm <sup>2</sup>         | Titan<br>TiAl5Sn2<br>TiAl6V4                             | 3.702<5<br>3.7115<br>3.7165          | 3  | 3  | 5  | 5  | 3  |
|                                   | Nickel-, Kobalt-, und Eisen-Legierungen                         | ≤ 1400 N/mm <sup>2</sup>         | Hastelloy C4<br>Inconel 718<br>Nimonic 105               | 2.4610<br>2.4668<br>2.4634           | 2  | 2  | 3  | 3  | 2  |
| H                                 | hochfeste Stähle, gehärtete Stähle                              | 45 - 55 HRC                      |  |                                      |  |    |    |    |    |
|                                   |   | 55 - 62 HRC                      |  |                                      |  |    |    |    |    |

# Auswahlempfehlungen für Gewindebohrer



| Bohrungsart  |             |             |            |            |            |
|--------------|-------------|-------------|------------|------------|------------|
| Schneidstoff | HSS-E       | HSS-E-PM    | HSS-E      | HSS-E      | HSS-E-PM   |
| Typ          | Produktiv H | Produktiv H | Intensiv H | Intensiv H | Intensiv H |
| Form         | B           | B           | C          | C          | C          |
| Oberfläche   | TiCN        | TiCN        | nitriert   | TiCN       | TiAlN      |

| Gewindeart | Baumaße nach DIN 2184-1 | Toleranzfeld | Katalog-Nr./Ø-Bereich/Seite    |                                |  |                                |                                |
|------------|-------------------------|--------------|--------------------------------|--------------------------------|--|--------------------------------|--------------------------------|
|            |                         |              | 53642<br>M2 - M10<br>Seite 86  | 53640<br>M3 - M10<br>Seite 87  | 73661<br>M3 - M10<br>Seite 88              | 53661<br>M2 - M10<br>Seite 90  | 53664<br>M3 - M10<br>Seite 91  |
| M          | DIN 371                 | ISO 2<br>6H  | 53642<br>M12 - M20<br>Seite 86 | 53640<br>M12 - M16<br>Seite 87 | 73664<br>M12 - M20<br>Seite 89             | 53661<br>M12 - M20<br>Seite 90 | 53664<br>M12 - M20<br>Seite 91 |
|            | DIN 376                 | ISO 2<br>6H  |                                |                                | 73647<br>M8x0.75 -<br>M24x1.5<br>Seite 102 |                                |                                |
| MF         | DIN 374                 | ISO 2<br>6H  |                                |                                |  |                                |                                |

| Materialgruppe | Zugfestigkeit                | Materialbeispiel | Werkstoff-Nr. | Empfohlene Schnittgeschwindigkeit v <sub>c</sub> m/min |    |    |    |   |
|----------------|------------------------------|------------------|---------------|--|----|----|----|---|
|                |                              |                  |               | 6  | 10 | 10 | 12 | 6 |
| P              | ≤800 N/mm <sup>2</sup>       | S235JR           | 1.0037        |  |    |    |    |   |
|                |                              | C15              | 1.0401        |  |    |    |    |   |
|                |                              | 11SMnPb30        | 1.0718        |  |    |    |    |   |
| P              | 800 - 1000 N/mm <sup>2</sup> | S355J2           | 1.0577        |  |    |    |    |   |
|                |                              | C60              | 1.0601        | 6  | 10 |    |    |   |
|                |                              | 31CrMo12         | 1.8515        |  |    |    |    |   |
| P              | 800 - 1200 N/mm <sup>2</sup> | 42CrMo4          | 1.7225        |  |    |    |    |   |
|                |                              | 36CrNiMo4        | 1.6511        | 12   | 15 | 10 | 12 | 6 |
|                |                              | X36CrMo17        | 1.2316        |  |    |    |    |   |
|                |                              | HS 6-5-2         | 1.3343        |  |    |    |    |   |



# Auswahlempfehlungen für Gewindebohrer



| Bohrungsart  |             |       | max. 1,5 x D |
|--------------|-------------|-------|--------------|
| Schneidstoff | HSS-E       | HSS-E | HSS-E-PM     |
| Typ          | Produktiv N | H     | H            |
| Form         | B           | C     | D            |
| Oberfläche   | TiN         | TiCN  | TiCN         |

| Gewindeart | Baumaße nach DIN 2184-1 | Toleranzfeld | Katalog-Nr./Ø-Bereich/Seite    |  |                               |
|------------|-------------------------|--------------|--------------------------------|--|-------------------------------|
| M          | DIN 371                 | ISO 2<br>6H  | 63033<br>M3 - M10<br>Seite 83  |  |                               |
|            |                         | 6HX          |                                |  | 53676<br>M3 - M16<br>Seite 92 |
|            | DIN 376                 | ISO 2<br>6H  | 63033<br>M12 - M20<br>Seite 83 |  |                               |
|            |                         | 6HX          |                                | 53646<br>M16 - M39<br>Seite 84                 |                               |
|            | ~ DIN 376               | 6HX          |                                | 53647 (WN, Überlänge)<br>M16 - M39<br>Seite 85 |                               |

|   | Materialgruppe   | Zugfestigkeit                | Materialbeispiel | Werkstoff-Nr. | Empfohlene Schnittgeschwindigkeit v <sub>c</sub> m/min |    |   |
|---|--|------------------------------|------------------|---------------|--|----|---|
| P   | Bau-/Automatenstähle, unlegierte Vergütungs-/Einsatzstähle | ≤800 N/mm <sup>2</sup>       | S235JR           | 1.0037        | 15   |    |   |
|   |  |                              | C15              | 1.0401        |  |    |   |
|   |  |                              | 11SMnPb30        | 1.0718        |  |    |   |
|   | Automatenstähle, unlegierte Einsatzstähle, Nitrierstähle   | 800 - 1000 N/mm <sup>2</sup> | S355J2           | 1.0577        | 12   | 15 |   |
|   |  |                              | C60              | 1.0601        |  |    |   |
|   |  |                              | 31CrMo12         | 1.8515        |  |    |   |
| Legierte Vergütungsstähle, Werkzeugstähle, Schnellarbeitsstähle | 800 - 1200 N/mm <sup>2</sup>                               | 42CrMo4                      | 1.7225           | 8             | 12   |    |   |
|   |  | 36CrNiMo4                    | 1.6511           |               |  |    |   |
|   |  | X36CrMo17                    | 1.2316           |               |  |    |   |
|   |  | HS 6-5-2                     | 1.3343           |               |  |    |   |
| K   | Gusseisen  | 300 HB                       | EN-GJL-150       | 0.6015        | 25   |    |   |
|   |  |                              | EN-GJL-250       | 0.6025        |  |    |   |
|   |  |                              | EN-GJL-300       | 0.6030        |  |    |   |
|   | Kugelgraphit- und Temperguss                               | 350 HB                       | EN-GJS-400-15    | 0.7040        | 20   |    |   |
|   |  |                              | EN-GJS-600-3     | 0.7060        |  |    |   |
|   |  |                              | EN-GJS-700-2     | 0.7070        |  |    |   |
| ADI GGV   | 1000 N/mm <sup>2</sup>                                     | EN-GJS1000-5                 |                  | 15            |  |    |   |
|   | 350 HB   | EN-GJV250<br>EN-GJV400       |                  |               |  |    |   |
| H   | Hochfeste Stähle, gehärtete Stähle                         | 45-55 HRC                    | Hardox 500       |               |  |    | 3 |
|   |  | 55-62 HRC                    |                  |               |  |    |   |

Arbeitsrichtwerte

# Auswahlempfehlungen für Gewindeformer



| Bohrungsart  |                    |                    |             |
|--------------|--------------------|--------------------|-------------|
| Schneidstoff | HSS-E-PM           | HSS-E-PM           | HSS-E-PM    |
| Typ          | Durativ N-X        | Durativ N-X        | Durativ N-X |
| Form         | C mit Schmiernuten | C mit Schmiernuten | E           |
| Oberfläche   | TiCN               | TiCN               | TiCN        |
| Kühlung      | außen              | radial             | axial*      |

| Gewindeart | Baumaße nach DIN 2184-1 | Toleranzfeld | Katalog-Nr./Ø-Bereich/Seite            |                                    |                                    |
|------------|-------------------------|--------------|--|------------------------------------|------------------------------------|
|            |                         |              |  |                                    |                                    |
| M          | ~ DIN 371               | 4/6HX        | 53630<br>M1-M20<br>Seite 108           | 53610<br>M5-M20<br>Seite 114       | 53618<br>M2*-M10<br>Seite 115      |
|            |                         | 6GX          | 53631<br>M2-M10<br>Seite 109           |                                    |                                    |
|            | ~ DIN 376               | 6HX          | 53630<br>M12-M20<br>Seite 108          |                                    | 53618<br>M12-M20<br>Seite 115      |
|            |                         | 6GX          | 53631<br>M12-M20<br>Seite 109          |                                    |                                    |
| MF         | ~ DIN 374               | 6HX          | 53632<br>M3x0,35-M24x2<br>Seite 110    | 53612<br>M8x1-M20x1.5<br>Seite 116 | 53619<br>M8x1-M20x1.5<br>Seite 117 |
| UNC        | ~ DIN 371<br>~ DIN 376  | 2BX          | 53633<br>No.4-40 - 3/4-10<br>Seite 111 |                                    |                                    |
| UNF        | ~ DIN 374               | 2BX          | 53634<br>No.4-48 - 3/4-16<br>Seite 112 |                                    |                                    |
| G          | DIN 2189                | X            | 53635<br>G1/8 - G1/2<br>Seite 113      |                                    |                                    |

Alle Werkzeuge ab M2 mit Schmiernuten.  
\* ab M5 mit IKZ

# Auswahlempfehlungen für Gewindeformer

| Materialgruppe |    | Zugfestigkeit   | Materialbeispiel                 | Werkstoff-Nr.          | Empfohlene Schnittgeschwindigkeit $v_c$ m/min |    |    |    |
|----------------|----|---|----------------------------------|------------------------|---|----|----|----|
| P              | P1 | Bau-/Automatenstähle, unlegierte Vergütungs-/Einsatzstähle      | $\leq 800$ N/mm <sup>2</sup>     | S235JR                 | 1.0037  | 25 | 25 | 25 |
|                |    |   |                                  | C15                    | 1.0401  |    |    |    |
|                |    |   |                                  | 11SMnPb30              | 1.0718  |    |    |    |
| P              | P2 | Automatenstähle, unlegierte Einsatzstähle, Nitrierstähle        | 800 - 1000 N/mm <sup>2</sup>     | S355J2                 | 1.0577  | 25 | 25 | 25 |
|                |    |   |                                  | C60                    | 1.0601  |    |    |    |
|                |    |   |                                  | 31CrMo12               | 1.8515  |    |    |    |
| P              | P3 | Legierte Vergütungsstähle, Werkzeugstähle, Schnellarbeitsstähle | 800 - 1200 N/mm <sup>2</sup>     | 42CrMo4                | 1.7225  | 15 | 15 | 15 |
|                |    |   |                                  | 36CrNiMo4              | 1.6511  |    |    |    |
|                |    |   |                                  | X36CrMo17              | 1.2316  |    |    |    |
| M              | M1 | Nichtrostende Stahlwerkstoffe, geschwefelt, austenitisch        | $\leq 1000$ N/mm <sup>2</sup>    | X5CrNi18-10            | 1.4301  | 15 | 15 | 15 |
|                |    |   |                                  | X6CrNiTi18-10          | 1.4571  |    |    |    |
|                |    |   |                                  | X8CrNiS18-9            | 1.4305  |    |    |    |
| M              | M2 | Rost- und säurebeständige Stähle, martensitisch                 | $\leq 1000$ N/mm <sup>2</sup>    | X17CrNi16-2            | 1.4057  | 10 | 10 | 10 |
|                |    |   |                                  | X90CrMoV18             | 1.4112  |    |    |    |
|                |    |   |                                  | X2CrTi12               | 1.4512  |    |    |    |
| M              | M3 | Duplex und Super Duplex   | $\leq 1300$ N/mm <sup>2</sup>    | X2CrNiMoN22-5-3        | 1.4462  | 6  | 6  | 6  |
|                |    |   |                                  | X2CrNiMoN25-7-4        | 1.4410  |    |    |    |
|                |    |   |                                  | X2CrNiMoCuWN25-7-4     | 1.4501  |    |    |    |
| K              | K1 | Gusseisen   | 300 HB                           | EN-GJL-150             | 0.6015  |    |    |    |
|                |    |   |                                  | EN-GJL-250             | 0.6025  |    |    |    |
|                |    |   |                                  | EN-GJL-300             | 0.6030  |    |    |    |
| K              | K2 | Kugelgraphit- und Temperguss                                    | 350 HB                           | EN-GJS-400-15          | 0.7040  | 30 | 30 | 30 |
|                |    |   |                                  | EN-GJS-600-3           | 0.7060  |    |    |    |
|                |    |   |                                  | EN-GJS-700-2           | 0.7070  |    |    |    |
| K              | K3 | ADI GGV   | 1000 N/mm <sup>2</sup><br>350 HB | EN-GJS1000-5           |   | 25 | 25 | 25 |
|                |    |   |                                  | EN-GJV250<br>EN-GJV400 |   |    |    |    |
| N              | N1 | Aluminum, Aluminium-Knetlegierungen                             | $\leq 450$ N/mm <sup>2</sup>     | Al99,5H                | 3.0250  | 15 | 15 | 15 |
|                |    |   |                                  | AlMgSi1                | 3.2315  |    |    |    |
|                |    |   |                                  | AlZn4,5Mg              | 3.4335  |    |    |    |
| N              | N2 | Aluminium-Gusslegierungen                                       | $\leq 600$ N/mm <sup>2</sup>     | GD-AlSi5Cu1Mg          | 3.2134  | 30 | 30 | 30 |
|                |    |   |                                  | GD-AlSi8Cu3            | 3.2162  |    |    |    |
|                |    |   |                                  | G-AlSi9Mg              | 3.2373  |    |    |    |
|                |    |   |                                  | G-AlSi12               | 3.2581  |    |    |    |
| N              | N3 | Magnesium-Legierungen   | $\leq 500$ N/mm <sup>2</sup>     | GDMgAl8Zn1             | 3.5812.08                                     |    |    |    |
|                |    |   |                                  |                        |   |    |    |    |
| N              | N4 | Kupfer und Kupferlegierungen                                    | langspanend<br>kurzspanend       | CuZn20                 | 2.0250  | 30 | 30 | 30 |
|                |    |   |                                  | CuZn37Pb0,5            | 2.0332  |    |    |    |
|                |    |   |                                  | CuZn39Pb2<br>CuZn43Pb2 | 2.0380<br>2.0410                              |    |    |    |
| N              | N5 | Kupfer-Sonderlegierungen  | $\leq 1400$ N/mm <sup>2</sup>    | Ampco                  |   |    |    |    |
|                |    |   |                                  |                        |   |    |    |    |
| N              | N6 | Kunststoffe [Thermoplaste, Duroplaste]                          | langspanend<br>kurzspanend       | PMMA, POM, PVC         |   |    |    |    |
|                |    |   |                                  | Pertinax               |   |    |    |    |
| S              | S1 | Titan und Titan-Legierungen                                     | $\leq 1200$ N/mm <sup>2</sup>    | Titan                  | 3.7025  | 8  | 8  | 8  |
|                |    |   |                                  | TiAl5Sn2               | 3.7115  |    |    |    |
|                |    |   |                                  | TiAl6V4                | 3.7165  |    |    |    |
| S              | S2 | Nickel-, Kobalt-, und Eisen-Legierungen                         | $\leq 1400$ N/mm <sup>2</sup>    | Hastelloy C4           | 2.4610  | 8  | 8  | 8  |
|                |    |   |                                  | Inconel 718            | 2.4668  |    |    |    |
|                |    |   |                                  | Nimonic 105            | 2.4634  |    |    |    |
| H              | H1 | Hochfeste Stähle, gehärtete Stähle                              | 45 - 55 HRC                      |                        |   |    |    |    |
|                |    |   |                                  | 55 - 62 HRC            |   |    |    |    |

# Arbeitsrichtwerte

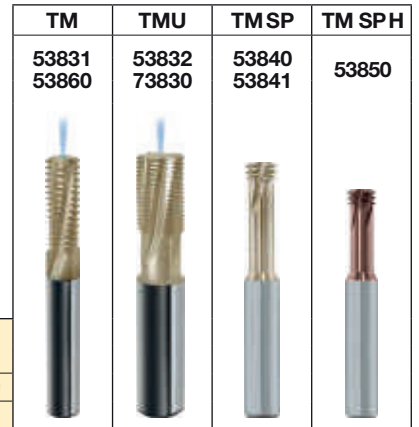
## Gewindefräser und Mikro-Gewindefräser

| ISO  | Werkstoffgruppe   | Härte                      | Materialbeispiel | Werkstoff-Nr. | Schnittgeschw. $v_c$ (m/min) |     |
|--|---|----------------------------|------------------|---------------|------------------------------|-----|
| P  | P1 Bau/Automatenstähle, unlegierte Vergütungs-/ Einsatzstähle | < 800 N/mm <sup>2</sup>    | S235JR           | 1.0037        | 90                           |     |
|  |   |                            | C15              | 1.0401        |                              |     |
|  |   |                            | 11SMnPb30        | 1.0718        |                              |     |
|  | P2 Automatenstähle, unlegierte Einsatzstähle, Nitrierstähle   | 800-1000 N/mm <sup>2</sup> | S355J2           | 1.0577        | 80                           |     |
|  |   |                            | C60              | 1.0601        |                              |     |
|  |   |                            | 31CrMo12         | 1.8515        |                              |     |
| P3 Legierte Vergütungsstähle, Werkzeugstähle, Schnellarbeitsstähle | 800-1200 N/mm <sup>2</sup>                                    | 42CrMo4                    | 1.7225           | 70            |                              |     |
|  |   | 36CrNiMo4                  | 1.6511           |               |                              |     |
|  |   | X36CrMo17                  | 1.2316           |               |                              |     |
| M  | M1 Nichtrostende Stahlwerkstoffe, geschwefelt, austenitisch   | < 1000 N/mm <sup>2</sup>   | X5CrNi18-10      | 1.4301        | 55                           |     |
|  |   |                            | X6CrNiTi18-10    | 1.4571        |                              |     |
|  |   |                            | X8CrNiS18-9      | 1.4305        |                              |     |
|  | M2 Rost und säurebeständige Stähle, martensitisch             | < 1000 N/mm <sup>2</sup>   | X17CrNi16-2      | 1.4057        | 50                           |     |
|  |   |                            | X90CrMoV18       | 1.4112        |                              |     |
|  |   |                            | X2CrTi12         | 1.4512        |                              |     |
| M3 Duplex und Super Duplex   | < 1300 N/mm <sup>2</sup>                                      | X2CrNiMoN22-5-3            | 1.4462           | 45            |                              |     |
|  |   | X2CrNiMoN25-7-4            | 1.441            |               |                              |     |
|  |   | X2CrNiMoCuWn25-7-4         | 1.4501           |               |                              |     |
| K  | K1 Gusseisen  | 300 HB                     | EN-GJL-150       | 0.6015        | 120                          |     |
|  |   |                            | EN-GJL-250       | 0.6025        |                              |     |
|  |   |                            | EN-GJL-300       | 0.603         |                              |     |
|  | K2 Kugelgraphit- und Temperguss                               | 350 HB                     | EN-GJS-400-15    | 0.704         | 100                          |     |
|  |   |                            | EN-GJS-600-3     | 0.706         |                              |     |
|  |   |                            | EN-GJS-700-2     | 0.707         |                              |     |
| K3 ADI, GGV  | 1000 N/mm <sup>2</sup><br>350 HB                              | EN-GJS1000-5               |                  | 80            |                              |     |
|  |   | EN-GJV250                  |                  |               |                              |     |
|  |   | EN-GJV400                  |                  |               |                              |     |
| N  | N1 Aluminium, Aluminium-Knetlegierung                         | < 450 N/mm <sup>2</sup>    | Al99,5H          | 3.025         | 250                          |     |
|  |   |                            | AlMgSi1          | 3.2315        |                              |     |
|  |   |                            | AlZn4,5Mg        | 3.4335        |                              |     |
|  | N2 Aluminium- Gusslegierungen                                 | < 600 N/mm <sup>2</sup>    | GD-AlSi5Cu1Mg    | 3.2134        | 230                          |     |
|  |   |                            | GD-AlSi8Cu3      | 3.2162        |                              |     |
|  |   |                            | G-AlSi9Mg        | 3.2373        |                              |     |
|  | N3 Magnesium-Legierungen                                      | < 500 N/mm <sup>2</sup>    | G-AlSi12         | 3.2581        | 180                          |     |
|  |   |                            | GDMgAl8Zn1       | 3.5812.08     |                              |     |
|  |   |                            | CuZn20           | 2.025         |                              |     |
|  | N4 Kuper und Kupferlegierungen                                | langspanend                |                  | CuZn37Pb0,5   | 2.0332                       | 130 |
|  |   | kurzspanend                |                  | CuZn39Pb2     | 2.038                        |     |
|  |   |                            |                  | CuZn43Pb2     | 2.041                        |     |
| N5 Kupfer-Sonderlegierungen  | < 1400 N/mm <sup>2</sup>                                      |                            | Ampco            |               | 160                          |     |
|  |   |                            |                  |               |                              |     |
|  |   |                            |                  |               |                              |     |
| N6 Kunststoffe [ Thermoplaste, Duroplaste ]                        | langspanend   |                            | PMMA, POM,PVC    |               | 300                          |     |
|  | kurzspanend   |                            | Pertinax         |               |                              |     |
|  |   |                            |                  |               |                              |     |
| S  | S1 Titan und Titanlegierungen                                 | < 1200 N/mm <sup>2</sup>   | Titan            | 3.7025        | 40                           |     |
|  |   |                            | TiAl5Sn2         | 3.7115        |                              |     |
|  |   |                            | TiAl6V4          | 3.7165        |                              |     |
|  | S2 Nickel-, Kobalt- und Eisen-Legierungen                     | < 1400 N/mm <sup>2</sup>   |                  | Hastelloy C4  | 2.461                        | 30  |
|  |   |                            | Inconel 718      | 2.4668        |                              |     |
| H  | H1 H2 Hochfeste Stähle, gehärtete Stähle                      | 45-55 HRC                  | Hardox           |               | 45                           |     |
|  |   | 55-62 HRC                  | PM30             |               |                              | 40  |

**Bitte beachten:**

Die in den jeweiligen Spalten angegebenen Schnittwerte sind Richtwerte, diese müssen je nach Einsatzbedingungen (Material, Schmierung, Werkzeugspannung, Maschine, usw.) angepasst werden.

**Je nach Einsatzfall können die optimalen Schnittwerte um bis zu ±30% der Tabelle abweichen!**



| Frästeildurchmesser [ d <sub>1</sub> ] / Vorschub pro Zahn [ f <sub>z</sub> ] [ Gegenlauf ] |      |       |       |       |       |       |       |       |       |       |       |       |       |       |   |   |   |   |
|---|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---|---|---|---|
| Ø1  | Ø2   | Ø3    | Ø4    | Ø5    | Ø6    | Ø7    | Ø8    | Ø9    | Ø10   | Ø12   | Ø14   | Ø16   | Ø18   | Ø20   |   |   |   |   |
| mm  | mm   | mm    | mm    | mm    | mm    | mm    | mm    | mm    | mm    | mm    | mm    | mm    | mm    | mm    |   |   |   |   |
| 0,01  | 0,02 | 0,02  | 0,025 | 0,03  | 0,035 | 0,045 | 0,05  | 0,055 | 0,06  | 0,06  | 0,065 | 0,065 | 0,07  | 0,08  | ● | ● | ● |   |
| 0,01  | 0,02 | 0,02  | 0,025 | 0,03  | 0,035 | 0,045 | 0,05  | 0,055 | 0,06  | 0,06  | 0,065 | 0,065 | 0,07  | 0,08  | ● | ● | ● |   |
| 0,01  | 0,02 | 0,02  | 0,025 | 0,03  | 0,035 | 0,045 | 0,05  | 0,055 | 0,06  | 0,06  | 0,065 | 0,065 | 0,07  | 0,08  | ○ | ● | ● | ○ |
| 0,01  | 0,02 | 0,025 | 0,03  | 0,03  | 0,03  | 0,035 | 0,04  | 0,05  | 0,055 | 0,06  | 0,065 | 0,065 | 0,07  | 0,075 | ○ | ● | ● |   |
| 0,01  | 0,02 | 0,025 | 0,03  | 0,03  | 0,03  | 0,035 | 0,04  | 0,05  | 0,055 | 0,06  | 0,065 | 0,065 | 0,07  | 0,075 | ○ | ● | ● |   |
| 0,01  | 0,02 | 0,025 | 0,03  | 0,035 | 0,04  | 0,045 | 0,05  | 0,06  | 0,065 | 0,07  | 0,08  | 0,09  | 0,1   | 0,12  | ● | ● | ● |   |
| 0,01  | 0,02 | 0,025 | 0,03  | 0,035 | 0,04  | 0,045 | 0,05  | 0,06  | 0,065 | 0,07  | 0,08  | 0,09  | 0,1   | 0,12  | ● | ● | ● |   |
| 0,01  | 0,02 | 0,025 | 0,03  | 0,035 | 0,04  | 0,045 | 0,05  | 0,06  | 0,065 | 0,07  | 0,08  | 0,09  | 0,1   | 0,12  | ● | ● | ● | ○ |
| 0,02  | 0,03 | 0,035 | 0,04  | 0,045 | 0,05  | 0,055 | 0,06  | 0,065 | 0,07  | 0,08  | 0,085 | 0,09  | 0,1   | 0,12  | ● | ● | ● |   |
| 0,02  | 0,03 | 0,035 | 0,04  | 0,045 | 0,05  | 0,055 | 0,06  | 0,065 | 0,07  | 0,08  | 0,085 | 0,09  | 0,1   | 0,12  | ● | ● | ● |   |
| 0,02  | 0,03 | 0,035 | 0,04  | 0,045 | 0,05  | 0,055 | 0,06  | 0,065 | 0,07  | 0,08  | 0,085 | 0,09  | 0,1   | 0,12  | ● | ● | ● |   |
| 0,01  | 0,02 | 0,025 | 0,03  | 0,035 | 0,04  | 0,045 | 0,05  | 0,055 | 0,06  | 0,065 | 0,07  | 0,075 | 0,08  | 0,09  | ● | ● | ● |   |
| 0,01  | 0,02 | 0,025 | 0,03  | 0,035 | 0,04  | 0,045 | 0,05  | 0,055 | 0,06  | 0,06  | 0,065 | 0,07  | 0,075 | 0,08  | ● | ● | ● |   |
| 0,02  | 0,03 | 0,04  | 0,045 | 0,05  | 0,055 | 0,06  | 0,07  | 0,08  | 0,09  | 0,09  | 0,1   | 0,12  | 0,13  | 0,15  | ● | ● | ● |   |
| 0,01  | 0,01 | 0,015 | 0,02  | 0,025 | 0,03  | 0,035 | 0,04  | 0,04  | 0,045 | 0,05  | 0,055 | 0,06  | 0,065 | 0,07  | ● | ● | ● |   |
| 0,01  | 0,01 | 0,015 | 0,02  | 0,025 | 0,03  | 0,035 | 0,04  | 0,04  | 0,045 | 0,05  | 0,055 | 0,06  | 0,065 | 0,07  | ● | ● | ● | ● |
| x   | 0,01 | 0,015 | 0,02  | 0,025 | 0,03  | 0,03  | 0,035 | 0,04  | 0,045 | 0,05  | 0,055 | 0,06  | 0,065 | 0,07  | ○ | ○ | ● | ● |
| x   | 0,01 | 0,015 | 0,02  | 0,025 | 0,03  | 0,03  | 0,035 | 0,04  | 0,045 | 0,05  | 0,055 | 0,06  | 0,065 | 0,07  | ○ | ○ | ● | ● |

**Allgemeine Empfehlung:**

- 1.) Ab 2,5xD Gewindetiefe sollte im Gewinde Ø in 2 Durchgängen programmiert werden. [ 2/3-1/3 im Gegenlauf ]
- 2.) Allgemein im VA und in der Hartbearbeitung ab >HRC40 ist zu empfehlen das wir im Gewinde Ø in 2 Durchgängen programmieren. [ 2/3-1/3 im Gegenlauf ]

- optimal geeignet
- gut geeignet
- nicht geeignet

# Arbeitsrichtwerte

## MTM-NX 2,5xD (Bitte beachten, Linkslauf M4)

| ISO                                       | Werkstoffgruppe  | Härte                            | Materialbeispiel | Werkstoff-Nr. | Schnittgeschw. $v_c$ (m/min) |
|---|--|----------------------------------|------------------|---------------|------------------------------|
| P   | P1 Bau-/Automatenstähle, unlegierte Vergütungs-/ Einsatzstähle     | < 800 N/mm <sup>2</sup>          | S235JR           | 1.0037        | 100                          |
|   |  |                                  | C15              | 1.0401        |                              |
|   |  |                                  | 11SMnPb30        | 1.0718        |                              |
|   | P2 Automatenstähle, unlegierte Einsatzstähle, Nitrierstähle        | 800-1000 N/mm <sup>2</sup>       | S355J2           | 1.0577        | 90                           |
|   |  |                                  | C60              | 1.0601        |                              |
|   | P3 Legierte Vergütungsstähle, Werkzeugstähle, Schnellarbeitsstähle | 800-1200 N/mm <sup>2</sup>       | 42CrMo4          | 1.7225        | 80                           |
| 36CrNiMo4                                 |  |                                  | 1.6511           |               |                              |
| X36CrMo17                                 |  |                                  | 1.2316           |               |                              |
| HS 6-5-2                                  |  |                                  | 1.3343           |               |                              |
| M   | M1 Nichtrostende Stahlwerkstoffe, geschwefelt, austenitisch        | < 1000 N/mm <sup>2</sup>         | X5CrNi18-10      | 1.4301        | 65                           |
|   |  |                                  | X6CrNiTi18-10    | 1.4571        |                              |
|   |  |                                  | X8CrNiS18-9      | 1.4305        |                              |
|   | M2 Rost- und säurebeständige Stähle, martensitisch                 | < 1000 N/mm <sup>2</sup>         | X17CrNi16-2      | 1.4057        | 60                           |
|   |  |                                  | X90CrMoV18       | 1.4112        |                              |
|   | M3 Duplex und Super Duplex   | < 1300 N/mm <sup>2</sup>         | X2CrNiMoN22-5-3  | 1.4462        | 55                           |
| X2CrNiMoN25-7-4                           |  |                                  | 1.441            |               |                              |
| K   | K1 Gusseisen   | 300 HB                           | EN-GJL-150       | 0.6015        | 140                          |
|   |  |                                  | EN-GJL-250       | 0.6025        |                              |
|   |  |                                  | EN-GJL-300       | 0.603         |                              |
|   | K2 Kugelgraphit- und Temperguss                                    | 350 HB                           | EN-GJS-400-15    | 0.704         | 120                          |
|   |  |                                  | EN-GJS-600-3     | 0.706         |                              |
|   | K3 ADI, GGV  | 1000 N/mm <sup>2</sup><br>350 HB | EN-GJS1000-5     |               | 100                          |
| EN-GJV250                                 |  |                                  |                  |               |                              |
| N   | N1 Aluminium, Aluminium-Knetlegierung                              | < 450 N/mm <sup>2</sup>          | Al99,5H          | 3.025         | 280                          |
|   |  |                                  | AlMgSi1          | 3.2315        |                              |
|   |  |                                  | AlZn4,5Mg        | 3.4335        |                              |
|   | N2 Aluminium-Gusslegierungen                                       | < 600 N/mm <sup>2</sup>          | GD-ALSi5Cu1Mg    | 3.2134        | 250                          |
|   |  |                                  | GD-ALSi8Cu3      | 3.2162        |                              |
|   |  |                                  | G-ALSi9Mg        | 3.2373        |                              |
|   | N3 Magnesium-Legierungen   | < 500 N/mm <sup>2</sup>          | GDMgAl8Zn1       | 3.5812.08     | 200                          |
|   |  |                                  | CuZn20           | 2.025         |                              |
|   | N4 Kupfer und Kupferlegierungen                                    | langspanend                      | CuZn37Pb0,5      | 2.0332        | 140                          |
|   |  | kurzspanend                      | CuZn39Pb2        | 2.038         |                              |
|   | N5 Kupfer-Sonderlegierungen  | < 1400 N/mm <sup>2</sup>         | CuZn43Pb2        | 2.041         | 130                          |
|   |  |                                  | Ampco            |               |                              |
| N6 Kunststoffe [Thermoplaste, Duroplaste] | langspanend<br>kurzspanend   | PMMA, POM,PVC<br>Pertinax        |                  | 300           |                              |
| S   | S1 Titan und Titan-Legierungen                                     | < 1200 N/mm <sup>2</sup>         | Titan            | 3.7025        | 55                           |
|   |  |                                  | TiAl5Sn2         | 3.7115        |                              |
|   |  |                                  | TiAl6V4          | 3.7165        |                              |
|   | S2 Nickel-, Kobalt- und Eisen-Legierungen                          | < 1400 N/mm <sup>2</sup>         | Hastelloy C4     | 2.461         | 40                           |
| Inconel 718                               |  |                                  | 2.4668           |               |                              |
| H   | H1 H2 Hochfeste Stähle, gehärtete Stähle                           | 45-55 HRC                        | Hardox           |               | 50                           |
|   |  | 55-66 HRC                        | PM30             |               | x                            |

### Bitte beachten:

Die in den jeweiligen Spalten angegebenen Schnittwerte sind Richtwerte, diese müssen je nach Einsatzbedingungen (Material, Schmierung, Werkzeugspannung, Maschine, usw.) angepasst werden.

**Je nach Einsatzfall können die optimalen Schnittwerte um bis zu ±30% der Tabelle abweichen!**



| Frästeildurchmesser [d1] / Vorschub pro Zahn [f <sub>z</sub> ] [Gleichlauf] |            |           |            |            |           |            |            |           |           |            |           |            |   |
|---|------------|-----------|------------|------------|-----------|------------|------------|-----------|-----------|------------|-----------|------------|---|
| Ø1  | Ø2         | Ø3        | Ø4         | Ø5         | Ø6        | Ø7         | Ø8         | Ø9        | Ø10       | Ø12        | Ø14       | Ø16        |   |
| mm  | mm         | mm        | mm         | mm         | mm        | mm         | mm         | mm        | mm        | mm         | mm        | mm         |   |
| 0,01  | 0,02       | 0,02      | 0,025      | 0,03       | 0,03      | 0,035      | 0,035      | 0,04      | 0,045     | 0,05       | 0,055     | 0,06       | ● |
| 0,01  | 0,02       | 0,02      | 0,025      | 0,03       | 0,03      | 0,035      | 0,035      | 0,04      | 0,045     | 0,05       | 0,055     | 0,06       | ● |
| 0,01  | 0,02       | 0,02      | 0,025      | 0,03       | 0,03      | 0,035      | 0,035      | 0,04      | 0,045     | 0,05       | 0,055     | 0,06       | ● |
| 0,008   | 0,015      | 0,02      | 0,025      | 0,03       | 0,03      | 0,03       | 0,035      | 0,04      | 0,04      | 0,045      | 0,05      | 0,055      | ● |
| 0,008   | 0,015      | 0,02      | 0,025      | 0,03       | 0,03      | 0,03       | 0,035      | 0,04      | 0,04      | 0,045      | 0,05      | 0,055      | ● |
| 0,008   | 0,015      | 0,02      | 0,025      | 0,03       | 0,03      | 0,03       | 0,035      | 0,04      | 0,04      | 0,045      | 0,05      | 0,055      | ● |
| 0,01  | 0,02       | 0,02      | 0,025      | 0,03       | 0,03      | 0,035      | 0,035      | 0,04      | 0,045     | 0,05       | 0,055     | 0,06       | ● |
| 0,01  | 0,02       | 0,02      | 0,025      | 0,03       | 0,03      | 0,035      | 0,035      | 0,04      | 0,045     | 0,05       | 0,055     | 0,06       | ● |
| 0,01  | 0,02       | 0,02      | 0,025      | 0,03       | 0,03      | 0,035      | 0,035      | 0,04      | 0,045     | 0,05       | 0,055     | 0,06       | ● |
| 0,01  | 0,02       | 0,025     | 0,03       | 0,035      | 0,04      | 0,045      | 0,05       | 0,055     | 0,06      | 0,065      | 0,07      | 0,075      | ● |
| 0,01  | 0,02       | 0,025     | 0,03       | 0,035      | 0,04      | 0,045      | 0,05       | 0,055     | 0,06      | 0,065      | 0,07      | 0,075      | ● |
| 0,01  | 0,02       | 0,025     | 0,03       | 0,035      | 0,04      | 0,045      | 0,05       | 0,055     | 0,06      | 0,065      | 0,07      | 0,075      | ● |
| 0,01  | 0,02       | 0,025     | 0,03       | 0,035      | 0,04      | 0,045      | 0,05       | 0,055     | 0,06      | 0,065      | 0,07      | 0,075      | ● |
| 0,01  | 0,02       | 0,025     | 0,03       | 0,035      | 0,04      | 0,045      | 0,05       | 0,055     | 0,06      | 0,065      | 0,07      | 0,075      | ● |
| 0,01  | 0,02       | 0,025     | 0,03       | 0,035      | 0,04      | 0,045      | 0,05       | 0,055     | 0,06      | 0,065      | 0,07      | 0,075      | ● |
| 0,005   | 0,007      | 0,012     | 0,015      | 0,02       | 0,025     | 0,03       | 0,035      | 0,035     | 0,04      | 0,045      | 0,045     | 0,05       | ● |
| 0,005   | 0,007      | 0,012     | 0,015      | 0,02       | 0,025     | 0,03       | 0,035      | 0,035     | 0,04      | 0,045      | 0,045     | 0,05       | ● |
| 0,005<br>x  | 0,008<br>x | 0,01<br>x | 0,012<br>x | 0,015<br>x | 0,02<br>x | 0,025<br>x | 0,025<br>x | 0,03<br>x | 0,03<br>x | 0,035<br>x | 0,04<br>x | 0,045<br>x | ● |

- optimal geeignet
- gut geeignet
- nicht geeignet

# Arbeitsrichtwerte

## TMC-NX 2xD IK

| ISO                                       | Werkstoffgruppe  | Härte                            | Materialbeispiel   | Werkstoff-Nr. | Schnittgeschw. $v_c$ (m/min) |
|---|--|----------------------------------|--------------------|---------------|------------------------------|
| P   | P1 Bau-/Automatenstähle, unlegierte Vergütungs-/ Einsatzstähle     | < 800 N/mm <sup>2</sup>          | S235JR             | 1.0037        | 100                          |
|   |  |                                  | C15                | 1.0401        |                              |
|   |  |                                  | 11SMnPb30          | 1.0718        |                              |
|   | P2 Automatenstähle, unlegierte Einsatzstähle, Nitrierstähle        | 800-1000 N/mm <sup>2</sup>       | S355J2             | 1.0577        | 90                           |
|   |  |                                  | C60                | 1.0601        |                              |
|   | P3 Legierte Vergütungsstähle, Werkzeugstähle, Schnellarbeitsstähle | 800-1200 N/mm <sup>2</sup>       | 31CrMo12           | 1.8515        | 80                           |
| 42CrMo4                                   |  |                                  | 1.7225             |               |                              |
| 36CrNiMo4                                 |  |                                  | 1.6511             |               |                              |
| X36CrMo17                                 |  |                                  | 1.2316             |               |                              |
| M   | M1 Nichtrostende Stahlwerkstoffe, geschwefelt, austenitisch        | < 1000 N/mm <sup>2</sup>         | HS 6-5-2           | 1.3343        | 60                           |
|   |  |                                  | X5CrNi18-10        | 1.4301        |                              |
|   |  |                                  | X6CrNiTi18-10      | 1.4571        |                              |
|   | M2 Rost- und säurebeständige Stähle, martensitisch                 | < 1000 N/mm <sup>2</sup>         | X8CrNiS18-9        | 1.4305        | 55                           |
|   |  |                                  | X17CrNi16-2        | 1.4057        |                              |
|   | M3 Duplex und Super Duplex   | < 1300 N/mm <sup>2</sup>         | X90CrMoV18         | 1.4112        | 50                           |
| X2CrTi12                                  |  |                                  | 1.4512             |               |                              |
| K   | K1 Gusseisen   | 300 HB                           | X2CrNiMoN22-5-3    | 1.4462        | 120                          |
|   |  |                                  | X2CrNiMoN25-7-4    | 1.441         |                              |
|   |  |                                  | X2CrNiMoCuWn25-7-4 | 1.4501        |                              |
|   | K2 Kugelgraphit- und Temperguss                                    | 350 HB                           | EN-GJL-150         | 0.6015        | 100                          |
|   |  |                                  | EN-GJL-250         | 0.6025        |                              |
|   |  |                                  | EN-GJL-300         | 0.603         |                              |
|   | K3 ADI, GGK  | 1000 N/mm <sup>2</sup><br>350 HB | EN-GJS-400-15      | 0.704         | 90                           |
|   |  |                                  | EN-GJS-600-3       | 0.706         |                              |
|   |  |                                  | EN-GJS-700-2       | 0.707         |                              |
| N   | N1 Aluminium, Aluminium-Knetlegierung                              | < 450 N/mm <sup>2</sup>          | EN-GJS1000-5       | 0.704         | x                            |
|   |  |                                  | EN-GJV250          | 0.706         |                              |
|   |  |                                  | EN-GJV400          | 0.707         |                              |
|   | N2 Aluminium-Gusslegierungen                                       | < 600 N/mm <sup>2</sup>          | Al99,5H            | 3.025         | x                            |
|   |  |                                  | AlMgSi1            | 3.2315        |                              |
|   |  |                                  | AlZn4,5Mg          | 3.4335        |                              |
|   | N3 Magnesium-Legierungen   | < 500 N/mm <sup>2</sup>          | GD-ALSi5Cu1Mg      | 3.2134        | x                            |
|   |  |                                  | GD-ALSi8Cu3        | 3.2162        |                              |
|   |  |                                  | G-ALSi9Mg          | 3.2373        |                              |
|   | N4 Kupfer und Kupferlegierungen                                    | langspanend                      | G-ALSi12           | 3.2581        | 90                           |
| GDMgAl8Zn1                                |  |                                  | 3.5812.08          |               |                              |
| N5 Kupfer-Sonderlegierungen               | kurzspanend  | CuZn20                           | 2.025              | 70            |                              |
|   |  | CuZn37Pb0,5                      | 2.0332             |               |                              |
|   |  | CuZn39Pb2                        | 2.038              |               |                              |
|   |  | CuZn43Pb2                        | 2.041              |               |                              |
| N6 Kunststoffe [Thermoplaste, Duroplaste] | langspanend<br>kurzspanend   | Ampco                            |                    | x             |                              |
|   |  | PMMA, POM, PVC<br>Pertinax       |                    |               |                              |
| S   | S1 Titan und Titan-Legierungen                                     | < 1200 N/mm <sup>2</sup>         | Titan              | 3.7025        | 55                           |
|   |  |                                  | TiAl5Sn2           | 3.7115        |                              |
|   |  |                                  | TiAl6V4            | 3.7165        |                              |
|   | S2 Nickel-, Kobalt- und Eisen-Legierungen                          | < 1400 N/mm <sup>2</sup>         | Hastelloy C4       | 2.461         | 45                           |
| Inconel 718                               |  |                                  | 2.4668             |               |                              |
| H   | H1 H2 Hochfeste Stähle, gehärtete Stähle                           | 45-55 HRC<br>55-66 HRC           | Nimonic            | 2.4634        | x                            |
|   |  |                                  | Hardox<br>PM30     |               |                              |

### Bitte beachten:

Die in den jeweiligen Spalten angegebenen Schnittwerte sind Richtwerte, diese müssen je nach Einsatzbedingungen (Material, Schmierung, Werkzeugspannung, Maschine, usw.) angepasst werden.

**Je nach Einsatzfall können die optimalen Schnittwerte um bis zu ±30% der Tabelle abweichen!**





| Frästeildurchmesser [d1] / Vorschub pro Zahn [f <sub>z</sub> ] [Gegenlauf] |       |       |       |       |       |       |       |       |       |       |   |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---|
| Ø2   | Ø3    | Ø4    | Ø5    | Ø6    | Ø7    | Ø8    | Ø9    | Ø10   | Ø12   | Ø14   |   |
| mm   | mm    | mm    | mm    | mm    | mm    | mm    | mm    | mm    | mm    | mm    |   |
| 0,01   | 0,015 | 0,02  | 0,02  | 0,025 | 0,025 | 0,025 | 0,03  | 0,03  | 0,035 | 0,04  | ● |
| 0,01   | 0,015 | 0,02  | 0,02  | 0,025 | 0,025 | 0,025 | 0,03  | 0,03  | 0,035 | 0,04  | ● |
| 0,01   | 0,015 | 0,02  | 0,02  | 0,025 | 0,025 | 0,025 | 0,03  | 0,03  | 0,035 | 0,04  | ● |
| 0,005  | 0,01  | 0,015 | 0,015 | 0,02  | 0,02  | 0,02  | 0,025 | 0,025 | 0,03  | 0,03  | ● |
| 0,005  | 0,01  | 0,015 | 0,015 | 0,02  | 0,02  | 0,02  | 0,025 | 0,025 | 0,03  | 0,03  | ● |
| 0,005  | 0,01  | 0,015 | 0,015 | 0,02  | 0,02  | 0,02  | 0,025 | 0,025 | 0,03  | 0,03  | ● |
| 0,01   | 0,02  | 0,025 | 0,03  | 0,03  | 0,035 | 0,04  | 0,04  | 0,045 | 0,05  | 0,06  | ● |
| 0,01   | 0,02  | 0,025 | 0,03  | 0,03  | 0,035 | 0,04  | 0,04  | 0,045 | 0,05  | 0,06  | ● |
| 0,01   | 0,02  | 0,025 | 0,03  | 0,03  | 0,035 | 0,04  | 0,04  | 0,045 | 0,05  | 0,06  | ● |
| x  | x     | x     | x     | x     | x     | x     | x     | x     | x     | x     |   |
| x  | x     | x     | x     | x     | x     | x     | x     | x     | x     | x     |   |
| x  | x     | x     | x     | x     | x     | x     | x     | x     | x     | x     |   |
| 0,01   | 0,015 | 0,02  | 0,02  | 0,025 | 0,025 | 0,025 | 0,03  | 0,03  | 0,035 | 0,04  | ● |
| 0,005  | 0,01  | 0,015 | 0,015 | 0,02  | 0,02  | 0,02  | 0,025 | 0,025 | 0,03  | 0,035 | ● |
| x  | x     | x     | x     | x     | x     | x     | x     | x     | x     | x     |   |
| 0,01   | 0,015 | 0,015 | 0,02  | 0,025 | 0,025 | 0,025 | 0,03  | 0,03  | 0,035 | 0,035 | ● |
| 0,005  | 0,01  | 0,01  | 0,015 | 0,02  | 0,02  | 0,02  | 0,025 | 0,025 | 0,03  | 0,03  | ○ |
| x  | x     | x     | x     | x     | x     | x     | x     | x     | x     | x     |   |
| x  | x     | x     | x     | x     | x     | x     | x     | x     | x     | x     |   |

- optimal geeignet
- gut geeignet
- nicht geeignet

# Arbeitsrichtwerte

## TMD-NX 2,5xD (Bitte beachten, Linkslauf M4)

| ISO             | Werkstoffgruppe                        | Härte                              | Materialbeispiel          | Werkstoff-Nr. | Schnittgeschw. $V_c$ (m/min) |    |
|-----------------|--|------------------------------------|---------------------------|---------------|------------------------------|----|
| P               | P1                                     | < 800 N/mm <sup>2</sup>            | S235JR                    | 1.0037        | 80                           |    |
|                 |  |                                    | C15                       | 1.0401        |                              |    |
|                 |  |                                    | 11SMnPb30                 | 1.0718        |                              |    |
|                 | P2                                     | 800-1000 N/mm <sup>2</sup>         | S355J2                    | 1.0577        | 70                           |    |
|                 |  |                                    | C60                       | 1.0601        |                              |    |
|                 |  |                                    | 31CrMo12                  | 1.8515        |                              |    |
| P3              | 800-1200 N/mm <sup>2</sup>             | 42CrMo4                            | 1.7225                    | 70            |                              |    |
|                 |  | 36CrNiMo4                          | 1.6511                    |               |                              |    |
|                 |  | X36CrMo17                          | 1.2316                    |               |                              |    |
|                 |  | HS 6-5-2                           | 1.3343                    |               |                              |    |
| M               | M1                                     | < 1000 N/mm <sup>2</sup>           | X5CrNi18-10               | 1.4301        | 55                           |    |
|                 |  |                                    | X6CrNiTi18-10             | 1.4571        |                              |    |
|                 |  |                                    | X8CrNiS18-9               | 1.4305        |                              |    |
|                 | M2                                     | < 1000 N/mm <sup>2</sup>           | X17CrNi16-2               | 1.4057        | 50                           |    |
|                 |  |                                    | X90CrMoV18                | 1.4112        |                              |    |
|                 | M3                                     | < 1300 N/mm <sup>2</sup>           | X2CrTi12                  | 1.4512        | 50                           |    |
| X2CrNiMoN22-5-3 |  |                                    | 1.4462                    |               |                              |    |
| K               | K1                                     | 300 HB                             | EN-GJL-150                | 0.6015        | 80                           |    |
|                 |  |                                    | EN-GJL-250                | 0.6025        |                              |    |
|                 |  |                                    | EN-GJL-300                | 0.603         |                              |    |
|                 | K2                                     | 350 HB                             | EN-GJS-400-15             | 0.704         | 75                           |    |
|                 |  |                                    | EN-GJS-600-3              | 0.706         |                              |    |
|                 | K3                                     | 1000 N/mm <sup>2</sup><br>350 HB   | EN-GJS-700-2              | 0.707         | 65                           |    |
| EN-GJS1000-5    |  |                                    |                           |               |                              |    |
| N               | N1                                     | < 450 N/mm <sup>2</sup>            | Al99,5H                   | 3.025         | x                            |    |
|                 |  |                                    | AlMgSi1                   | 3.2315        |                              |    |
|                 |  |                                    | AlZn4,5Mg                 | 3.4335        |                              |    |
|                 | N2                                     | < 600 N/mm <sup>2</sup>            | GD-AlSi5Cu1Mg             | 3.2134        | 120                          |    |
|                 |  |                                    | GD-AlSi8Cu3               | 3.2162        |                              |    |
|                 |  |                                    | G-AlSi9Mg                 | 3.2373        |                              |    |
|                 | N3                                     | < 500 N/mm <sup>2</sup>            | G-AlSi12                  | 3.2581        | x                            |    |
|                 |  |                                    | GDMgAl8Zn1                | 3.5812.08     |                              |    |
|                 | N4                                     | Kupfer und Kupferlegierungen       | langspanend               | CuZn20        | 2.025                        | 80 |
|                 |  |                                    | kurzspanend               | CuZn37Pb0,5   | 2.0332                       |    |
|                 | N5                                     | Kupfer-Sonderlegierungen           | < 1400 N/mm <sup>2</sup>  | CuZn39Pb2     | 2.038                        | 65 |
|                 |  |                                    |                           | CuZn43Pb2     | 2.041                        |    |
| N6              | Kunststoffe [Thermoplaste, Duroplaste] | langspanend<br>kurzspanend         | Ampco                     |               | x                            |    |
|                 |  |                                    | PMMA, POM,PVC<br>Pertinax |               |                              |    |
| S               | S1                                     | < 1200 N/mm <sup>2</sup>           | Titan                     | 3.7025        | 45                           |    |
|                 |  |                                    | TiAl5Sn2                  | 3.7115        |                              |    |
|                 |  |                                    | TiAl6V4                   | 3.7165        |                              |    |
|                 | S2                                     | < 1400 N/mm <sup>2</sup>           | Hastelloy C4              | 2.461         | 45                           |    |
| Inconel 718     |  |                                    | 2.4668                    |               |                              |    |
| H               | H1<br>H2                               | Hochfeste Stähle, gehärtete Stähle | Nimonic                   | 2.4634        | 40                           |    |
|                 |  |                                    | Hardox                    |               |                              |    |
|                 |  |                                    | PM30                      |               | 30                           |    |

### Bitte beachten:

Die in den jeweiligen Spalten angegebenen Schnittwerte sind Richtwerte, diese müssen je nach Einsatzbedingungen (Material, Schmierung, Werkzeugspannung, Maschine, usw.) angepasst werden.

**Je nach Einsatzfall können die optimalen Schnittwerte um bis zu ±30 % der Tabelle abweichen!**

**TMD-NX**

 53948  
 53949  
 53950


| Frästeildurchmesser [d1] / Vorschub pro Zahn [f <sub>z</sub> ] |       |           |           |           |           |           |           |           |           |          |   |
|--|-------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|---|
| Ø1-1,8   |       | Ø1,81-2,4 | Ø2,41-2,7 | Ø2,71-3,1 | Ø3,11-3,8 | Ø3,81-4,6 | Ø4,61-6,2 | Ø6,21-7,5 | Ø7,51-9,0 | Ø9,01-16 |   |
| mm   | mm    | mm        | mm        | mm        | mm        | mm        | mm        | mm        | mm        | mm       |   |
| 0,008  | 0,008 | 0,012     | 0,014     | 0,018     | 0,026     | 0,028     | 0,030     | 0,035     | 0,040     | 0,048    | ● |
| 0,008  | 0,008 | 0,012     | 0,014     | 0,018     | 0,026     | 0,028     | 0,030     | 0,035     | 0,040     | 0,048    | ● |
| 0,007  | 0,007 | 0,010     | 0,011     | 0,012     | 0,016     | 0,020     | 0,025     | 0,030     | 0,036     | 0,044    | ● |
| 0,007  | 0,007 | 0,010     | 0,011     | 0,012     | 0,016     | 0,020     | 0,025     | 0,030     | 0,036     | 0,044    | ● |
| 0,007  | 0,007 | 0,010     | 0,011     | 0,012     | 0,016     | 0,020     | 0,025     | 0,030     | 0,036     | 0,044    | ● |
| 0,005  | 0,005 | 0,007     | 0,008     | 0,010     | 0,014     | 0,016     | 0,018     | 0,020     | 0,026     | 0,033    | ● |
| 0,008  | 0,008 | 0,012     | 0,014     | 0,016     | 0,020     | 0,024     | 0,030     | 0,036     | 0,040     | 0,048    | ● |
| 0,008  | 0,008 | 0,012     | 0,014     | 0,016     | 0,020     | 0,024     | 0,030     | 0,036     | 0,040     | 0,048    | ● |
| 0,007  | 0,007 | 0,011     | 0,013     | 0,015     | 0,018     | 0,022     | 0,028     | 0,033     | 0,038     | 0,046    | ● |
| x  | x     | x         | x         | x         | x         | x         | x         | x         | x         | x        | ○ |
| 0,007  | 0,007 | 0,011     | 0,013     | 0,015     | 0,018     | 0,022     | 0,028     | 0,033     | 0,038     | 0,046    | ○ |
| x  | x     | x         | x         | x         | x         | x         | x         | x         | x         | x        | ○ |
| 0,008  | 0,008 | 0,012     | 0,014     | 0,016     | 0,020     | 0,024     | 0,030     | 0,036     | 0,040     | 0,048    | ● |
| 0,007  | 0,007 | 0,010     | 0,011     | 0,012     | 0,016     | 0,020     | 0,025     | 0,030     | 0,036     | 0,048    | ● |
| x  | x     | x         | x         | x         | x         | x         | x         | x         | x         | x        | ○ |
| 0,007  | 0,007 | 0,010     | 0,011     | 0,012     | 0,016     | 0,020     | 0,025     | 0,030     | 0,036     | 0,044    | ● |
| 0,007  | 0,007 | 0,010     | 0,011     | 0,012     | 0,016     | 0,020     | 0,025     | 0,030     | 0,036     | 0,044    | ● |
| 0,007  | 0,007 | 0,010     | 0,011     | 0,012     | 0,016     | 0,020     | 0,025     | 0,030     | 0,036     | 0,044    | ● |
| 0,007  | 0,007 | 0,010     | 0,011     | 0,012     | 0,016     | 0,020     | 0,025     | 0,030     | 0,036     | 0,044    | ● |
| 0,005  | 0,005 | 0,008     | 0,009     | 0,010     | 0,014     | 0,018     | 0,022     | 0,028     | 0,033     | 0,042    | ● |

- optimal geeignet
- gut geeignet
- nicht geeignet

Arbeitsrichtwerte

# Kernlochdurchmesser Gewindeschneiden

| Metrische ISO-Regelgewinde<br>DIN 13 |                    |   |                             |            | Metrische ISO-Feingewinde<br>DIN 13 |                    |   |                             |             | UNC-Gewinde<br>ASME B1.1 |                     |   |                            |              |        |        |
|--------------------------------------|--------------------|---|-----------------------------|------------|-------------------------------------|--------------------|---|-----------------------------|-------------|--------------------------|---------------------|---|----------------------------|--------------|--------|--------|
| Nenn-<br>Ø                           | Steig-<br>ung<br>P | Kern-<br>loch-<br>(Bohr-)<br>Ø<br>DIN 336<br>mm | Kern-Ø<br>Muttergewinde 6H* |            | Nenn-<br>Ø                          | Steig-<br>ung<br>P | Kern-<br>loch-<br>(Bohr-)<br>Ø<br>DIN 336<br>mm | Kern-Ø<br>Muttergewinde 6H* |             | Nenn-<br>Ø               | Gang<br>pro<br>inch | Kern-<br>loch-<br>(Bohr-)<br>Ø<br>DIN 336<br>mm | Kern-Ø<br>Muttergewinde 2B |              |        |        |
|                                      |                    |   | min.<br>mm                  | max.<br>mm |                                     |                    |   | min.<br>mm                  | max.<br>mm  |                          |                     |   | min.<br>mm                 | max.<br>mm   |        |        |
| M 1                                  | 0,25               | <b>0,75</b>                                     | 0,729                       | 0,785      | M 2,5 x 0,35                        | <b>2,15</b>        | 2,121   | 2,221                       | M 22 x 1,00 | <b>21,00</b>             | 20,917              | 21,153  | Nr. 1 - 64                 | <b>1,55</b>  | 1,425  | 1,580  |
| M 1,1                                | 0,25               | <b>0,85</b>                                     | 0,829                       | 0,885      | M 3,0 x 0,35                        | <b>2,65</b>        | 2,621   | 2,721                       | M 22 x 1,50 | <b>20,50</b>             | 20,376              | 20,676  | Nr. 2 - 56                 | <b>1,85</b>  | 1,694  | 1,872  |
| M 1,2                                | 0,25               | <b>0,95</b>                                     | 0,929                       | 0,985      | M 3,5 x 0,35                        | <b>3,15</b>        | 3,121   | 3,221                       | M 22 x 2,00 | <b>20,00</b>             | 19,835              | 20,210  | Nr. 3 - 48                 | <b>2,10</b>  | 1,941  | 2,146  |
| M 1,4                                | 0,30               | <b>1,10</b>                                     | 1,075                       | 1,142      | M 4,0 x 0,50                        | <b>3,50</b>        | 3,459   | 3,599                       | M 24 x 1,00 | <b>23,00</b>             | 22,917              | 23,153  | Nr. 4 - 40                 | <b>2,35</b>  | 2,157  | 2,385  |
| M 1,6                                | 0,35               | <b>1,25</b>                                     | 1,221                       | 1,321      | M 4,5 x 0,50                        | <b>4,00</b>        | 3,959   | 4,099                       | M 24 x 1,50 | <b>22,50</b>             | 22,376              | 22,676  | Nr. 5 - 40                 | <b>2,65</b>  | 2,487  | 2,698  |
| M 1,8                                | 0,35               | <b>1,45</b>                                     | 1,421                       | 1,521      | M 5,0 x 0,50                        | <b>4,50</b>        | 4,459   | 4,599                       | M 24 x 2,00 | <b>22,00</b>             | 21,835              | 22,210  | Nr. 6 - 32                 | <b>2,85</b>  | 2,642  | 2,896  |
| M 2                                  | 0,40               | <b>1,60</b>                                     | 1,567                       | 1,679      | M 5,5 x 0,50                        | <b>5,00</b>        | 4,959   | 5,099                       | M 25 x 1,00 | <b>24,00</b>             | 23,917              | 24,153  | Nr. 8 - 32                 | <b>3,50</b>  | 3,302  | 3,531  |
| M 2,2                                | 0,45               | <b>1,75</b>                                     | 1,713                       | 1,838      | M 6,0 x 0,75                        | <b>5,20</b>        | 5,188   | 5,378                       | M 25 x 1,50 | <b>23,50</b>             | 23,376              | 23,676  | Nr. 10 - 24                | <b>3,90</b>  | 3,683  | 3,937  |
| M 2,5                                | 0,45               | <b>2,05</b>                                     | 2,013                       | 2,138      | M 7,0 x 0,75                        | <b>6,20</b>        | 6,188   | 6,378                       | M 25 x 2,00 | <b>23,00</b>             | 22,835              | 23,210  | Nr. 12 - 24                | <b>4,50</b>  | 4,343  | 4,597  |
| M 3                                  | 0,50               | <b>2,50</b>                                     | 2,459                       | 2,599      | M 8,0 x 0,50                        | <b>7,50</b>        | 7,459   | 7,599                       | M 27 x 1,00 | <b>26,00</b>             | 25,917              | 26,153  | 1/4 - 20                   | <b>5,10</b>  | 4,978  | 5,258  |
| M 3,5                                | 0,60               | <b>2,90</b>                                     | 2,850                       | 3,010      | M 8,0 x 0,75                        | <b>7,20</b>        | 7,188   | 7,378                       | M 27 x 1,50 | <b>25,50</b>             | 25,376              | 25,676  | 5/16 - 18                  | <b>6,60</b>  | 6,401  | 6,731  |
| M 4                                  | 0,70               | <b>3,30</b>                                     | 3,242                       | 3,422      | M 8,0 x 1,00                        | <b>7,00</b>        | 6,917   | 7,153                       | M 27 x 2,00 | <b>25,00</b>             | 24,835              | 25,210  | 3/8 - 16                   | <b>8,00</b>  | 7,798  | 8,153  |
| M 4,5                                | 0,75               | <b>3,70</b>                                     | 3,688                       | 3,878      | M 9,0 x 0,75                        | <b>8,20</b>        | 8,188   | 8,378                       | M 28 x 1,00 | <b>27,00</b>             | 26,917              | 27,153  | 7/16 - 14                  | <b>9,40</b>  | 9,144  | 9,550  |
| M 5                                  | 0,80               | <b>4,20</b>                                     | 4,134                       | 4,334      | M 9,0 x 1,00                        | <b>8,00</b>        | 7,917   | 8,153                       | M 28 x 1,50 | <b>26,50</b>             | 26,376              | 26,676  | 1/2 - 13                   | <b>10,80</b> | 10,592 | 11,024 |
| M 6                                  | 1,00               | <b>5,00</b>                                     | 4,917                       | 5,153      | M 10 x 0,75                         | <b>9,20</b>        | 9,188   | 9,378                       | M 28 x 2,00 | <b>26,00</b>             | 25,835              | 26,210  | 9/16 - 12                  | <b>12,20</b> | 11,989 | 12,446 |
| M 7                                  | 1,00               | <b>6,00</b>                                     | 5,917                       | 6,153      | M 10 x 1,00                         | <b>9,00</b>        | 8,917   | 9,153                       | M 30 x 1,00 | <b>29,00</b>             | 28,917              | 29,153  | 5/8 - 11                   | <b>13,50</b> | 13,386 | 13,868 |
| M 8                                  | 1,25               | <b>6,80</b>                                     | 6,647                       | 6,912      | M 10 x 1,25                         | <b>8,80</b>        | 8,647   | 8,912                       | M 30 x 1,50 | <b>28,50</b>             | 28,376              | 28,676  | 3/4 - 10                   | <b>16,50</b> | 16,307 | 16,840 |
| M 9                                  | 1,25               | <b>7,80</b>                                     | 7,647                       | 7,912      | M 11 x 0,75                         | <b>10,20</b>       | 10,188  | 10,378                      | M 30 x 2,00 | <b>28,00</b>             | 27,835              | 28,210  | 7/8 - 9                    | <b>19,50</b> | 19,177 | 19,761 |
| M 10                                 | 1,50               | <b>8,50</b>                                     | 8,376                       | 8,676      | M 11 x 1,00                         | <b>10,00</b>       | 9,917   | 10,153                      | M 30 x 3,00 | <b>27,00</b>             | 26,752              | 27,252  | 1 - 8                      | <b>22,25</b> | 21,971 | 22,606 |
| M 11                                 | 1,50               | <b>9,50</b>                                     | 9,376                       | 9,676      | M 12 x 1,00                         | <b>11,00</b>       | 10,917  | 11,153                      | M 32 x 1,50 | <b>30,50</b>             | 30,376              | 30,676  | 1 1/8 - 7                  | <b>25,00</b> | 24,638 | 25,349 |
| M 12                                 | 1,75               | <b>10,20</b>                                    | 10,106                      | 10,441     | M 12 x 1,25                         | <b>10,80</b>       | 10,647  | 10,912                      | M 32 x 2,00 | <b>30,00</b>             | 29,835              | 30,210  | 1 1/4 - 7                  | <b>28,00</b> | 27,813 | 28,524 |
| M 14                                 | 2,00               | <b>12,00</b>                                    | 11,835                      | 12,210     | M 12 x 1,50                         | <b>10,50</b>       | 10,376  | 10,676                      | M 33 x 1,50 | <b>31,50</b>             | 31,376              | 31,676  | 1 3/8 - 6                  | <b>30,75</b> | 30,353 | 31,115 |
| M 16                                 | 2,00               | <b>14,00</b>                                    | 13,835                      | 14,210     | M 14 x 1,00                         | <b>13,00</b>       | 12,917  | 13,153                      | M 33 x 2,00 | <b>31,00</b>             | 30,835              | 31,210  | 1 1/2 - 6                  | <b>34,00</b> | 33,528 | 34,290 |
| M 18                                 | 2,50               | <b>15,50</b>                                    | 15,294                      | 15,744     | M 14 x 1,25                         | <b>12,80</b>       | 12,647  | 12,912                      | M 33 x 3,00 | <b>30,00</b>             | 29,752              | 30,252  | 1 3/4 - 5                  | <b>39,50</b> | 38,938 | 39,802 |
| M 20                                 | 2,50               | <b>17,50</b>                                    | 17,294                      | 17,744     | M 14 x 1,50                         | <b>12,50</b>       | 12,376  | 12,676                      | M 35 x 1,50 | <b>33,50</b>             | 33,376              | 33,676  | 2 - 4,5                    | <b>45,00</b> | 44,679 | 45,593 |
| M 22                                 | 2,50               | <b>19,50</b>                                    | 19,294                      | 19,744     | M 15 x 1,00                         | <b>14,00</b>       | 13,917  | 14,153                      | M 36 x 1,50 | <b>34,50</b>             | 34,376              | 34,676  |                            |              |        |        |
| M 24                                 | 3,00               | <b>21,00</b>                                    | 20,752                      | 21,252     | M 15 x 1,50                         | <b>13,50</b>       | 13,376  | 13,676                      |             |                          |                     |   |                            |              |        |        |
| M 27                                 | 3,00               | <b>24,00</b>                                    | 23,752                      | 24,252     | M 16 x 1,00                         | <b>15,00</b>       | 14,917  | 15,153                      |             |                          |                     |   |                            |              |        |        |
| M 30                                 | 3,50               | <b>26,50</b>                                    | 26,211                      | 26,771     | M 16 x 1,25                         | <b>14,80</b>       | 14,647  | 14,912                      |             |                          |                     |   |                            |              |        |        |
| M 33                                 | 3,50               | <b>29,50</b>                                    | 29,211                      | 29,771     | M 16 x 1,50                         | <b>14,50</b>       | 14,376  | 14,676                      |             |                          |                     |   |                            |              |        |        |
| M 36                                 | 4,00               | <b>32,00</b>                                    | 31,670                      | 32,270     | M 17 x 1,00                         | <b>16,00</b>       | 15,917  | 16,153                      |             |                          |                     |   |                            |              |        |        |
| M 39                                 | 4,00               | <b>35,00</b>                                    | 34,670                      | 35,270     | M 17 x 1,50                         | <b>15,50</b>       | 15,376  | 15,676                      |             |                          |                     |   |                            |              |        |        |
| M 42                                 | 4,50               | <b>37,50</b>                                    | 37,129                      | 37,799     | M 18 x 1,00                         | <b>17,00</b>       | 16,917  | 17,153                      |             |                          |                     |   |                            |              |        |        |
| M 45                                 | 4,50               | <b>40,50</b>                                    | 40,129                      | 40,799     | M 18 x 1,50                         | <b>16,50</b>       | 16,376  | 16,676                      |             |                          |                     |   |                            |              |        |        |
| M 48                                 | 5,00               | <b>43,00</b>                                    | 42,587                      | 43,297     | M 20 x 1,00                         | <b>19,00</b>       | 18,917  | 19,153                      |             |                          |                     |   |                            |              |        |        |
| M 52                                 | 5,00               | <b>47,00</b>                                    | 46,587                      | 47,297     | M 20 x 1,50                         | <b>18,50</b>       | 18,376  | 18,676                      |             |                          |                     |   |                            |              |        |        |
| M 56                                 | 5,50               | <b>50,50</b>                                    | 50,046                      | 50,796     | M 20 x 2,00                         | <b>18,00</b>       | 17,835  | 18,210                      |             |                          |                     |   |                            |              |        |        |

\* M 1,1 bis M 1,4 Kern-Ø Muttergewinde 5H

Die jeweils passenden Spiralbohrer finden Sie unter anderem in unserem Gesamtkatalog oder auch unter [www.stock.de](http://www.stock.de).

| MJ-Gewinde<br>DIN ISO 5855 |   |                    |                                      |                             |            |
|----------------------------|---|--------------------|--------------------------------------|-----------------------------|------------|
| Nenn-<br>Ø                 | x | Steig-<br>ung<br>P | Kern-<br>loch-<br>(Bohr-)<br>Ø<br>mm | Kern-Ø<br>Muttergewinde 5H* |            |
|                            |   |                    |                                      | min.<br>mm                  | max.<br>mm |
| MJ 3                       | x | 0,50               | <b>2,60</b>                          | 2,513                       | 2,653      |
| MJ 4                       | x | 0,70               | <b>3,40</b>                          | 3,318                       | 3,498      |
| MJ 5                       | x | 0,80               | <b>4,30</b>                          | 4,221                       | 4,421      |
| MJ 6                       | x | 0,50               | <b>5,55</b>                          | 5,513                       | 5,625      |
| MJ 6                       | x | 0,75               | <b>5,35</b>                          | 5,269                       | 5,419      |
| MJ 6                       | x | 1,00               | <b>5,10</b>                          | 5,026                       | 5,216      |
| MJ 8                       | x | 0,50               | <b>7,55</b>                          | 7,513                       | 7,625      |
| MJ 8                       | x | 0,75               | <b>7,35</b>                          | 7,269                       | 7,419      |
| MJ 8                       | x | 1,00               | <b>7,10</b>                          | 7,026                       | 7,216      |
| MJ 8                       | x | 1,25               | <b>6,90</b>                          | 6,782                       | 6,994      |
| MJ 10                      | x | 1,00               | <b>9,10</b>                          | 9,026                       | 9,216      |
| MJ 10                      | x | 1,25               | <b>8,90</b>                          | 8,782                       | 8,994      |
| MJ 10                      | x | 1,50               | <b>8,60</b>                          | 8,539                       | 8,775      |
| MJ 12                      | x | 1,75               | <b>10,40</b>                         | 10,295                      | 10,560     |
| MJ 16                      | x | 2,00               | <b>14,20</b>                         | 14,051                      | 14,351     |

\* MJ 3 x 0,50 bis MJ 5 x 0,80 Kern-Ø Muttergewinde 6H

| UNJC-Gewinde<br>ISO 3161 |                     |                                      |                            |            |
|--------------------------|---------------------|--------------------------------------|----------------------------|------------|
| Nenn-<br>Ø               | Gang<br>pro<br>inch | Kern-<br>loch-<br>(Bohr-)<br>Ø<br>mm | Kern-Ø<br>Muttergewinde 3B |            |
|                          |                     |                                      | min.<br>mm                 | max.<br>mm |
| Nr. 6                    | - 32                | <b>2,85</b>                          | 2,733                      | 2,939      |
| Nr. 8                    | - 32                | <b>3,55</b>                          | 3,393                      | 3,599      |
| Nr. 10                   | - 24                | <b>4,00</b>                          | 3,795                      | 4,064      |
| Nr. 12                   | - 24                | <b>4,60</b>                          | 4,455                      | 4,704      |
| 1/4                      | - 20                | <b>5,30</b>                          | 5,113                      | 5,387      |
| 5/16                     | - 18                | <b>6,75</b>                          | 6,563                      | 6,833      |
| 3/8                      | - 16                | <b>8,20</b>                          | 7,978                      | 8,255      |
| 7/16                     | - 14                | <b>9,60</b>                          | 9,346                      | 9,639      |
| 1/2                      | - 13                | <b>11,00</b>                         | 10,798                     | 11,095     |
| 9/16                     | - 12                | <b>12,40</b>                         | 12,228                     | 12,482     |
| 5/8                      | - 11                | <b>13,80</b>                         | 13,627                     | 13,904     |

| UNJF-Gewinde<br>ISO 3161 |                     |                                      |                            |            |
|--------------------------|---------------------|--------------------------------------|----------------------------|------------|
| Nenn-<br>Ø               | Gang<br>pro<br>inch | Kern-<br>loch-<br>(Bohr-)<br>Ø<br>mm | Kern-Ø<br>Muttergewinde 3B |            |
|                          |                     |                                      | min.<br>mm                 | max.<br>mm |
| Nr. 6                    | - 40                | <b>3,00</b>                          | 2,888                      | 3,053      |
| Nr. 8                    | - 36                | <b>3,60</b>                          | 3,480                      | 3,663      |
| Nr. 10                   | - 32                | <b>4,20</b>                          | 4,054                      | 4,255      |
| Nr. 12                   | - 28                | <b>4,75</b>                          | 4,602                      | 4,816      |
| 1/4                      | - 28                | <b>5,60</b>                          | 5,466                      | 5,662      |
| 5/16                     | - 24                | <b>7,00</b>                          | 6,906                      | 7,109      |
| 3/8                      | - 24                | <b>8,60</b>                          | 8,494                      | 8,679      |
| 7/16                     | - 20                | <b>10,00</b>                         | 9,876                      | 10,084     |
| 1/2                      | - 20                | <b>11,60</b>                         | 11,463                     | 11,661     |
| 9/16                     | - 18                | <b>13,00</b>                         | 12,913                     | 13,122     |
| 5/8                      | - 18                | <b>14,60</b>                         | 14,501                     | 14,702     |

| UNF-Gewinde ASME B1.1 |               |                              |                         |         | BSW-(Whitworth)-Gewinde BS84 |               |                      |                      |         | (Whitworth-) Rohrgewinde (nach DIN-ISO 228-1) |               |                              |                      |         | Stahlpanzerrohr-Gewinde nach DIN 40430 |               |                      |                      |         |
|-----------------------|---------------|------------------------------|-------------------------|---------|------------------------------|---------------|----------------------|----------------------|---------|---|---------------|------------------------------|----------------------|---------|--|---------------|----------------------|----------------------|---------|
| Nenn-Ø                | Gang pro inch | Kernloch-(Bohr-)Ø DIN 336 mm | Kern-Ø Muttergewinde 2B |         | Nenn-Ø inch                  | Gang pro inch | Kernloch-(Bohr-)Ø mm | Kern-Ø Muttergewinde |         | Nenn-Ø inch                                   | Gang pro inch | Kernloch-(Bohr-)Ø DIN 336 mm | Kern-Ø Muttergewinde |         | Nenn-Ø inch                            | Gang pro inch | Kernloch-(Bohr-)Ø mm | Kern-Ø Muttergewinde |         |
|                       |               |                              | min. mm                 | max. mm |                              |               |                      | min. mm              | max. mm |   |               |                              | min. mm              | max. mm |  |               |                      | min. mm              | max. mm |
| Nr. 1 - 72            |               | <b>1,55</b>                  | 1,473                   | 1,610   | W 1/16                       | 60            | <b>1,20</b>          | 1,045                | 1,230   | G 1/16  | 28            | <b>6,80</b>                  | 6,561                | 6,843   | Pg 7                                   | 20            | <b>11,40</b>         | 11,280               | 11,430  |
| Nr. 2 - 64            |               | <b>1,85</b>                  | 1,755                   | 1,910   | W 3/32                       | 48            | <b>1,80</b>          | 1,704                | 1,912   | G 1/8   | 28            | <b>8,80</b>                  | 8,566                | 8,848   | Pg 9                                   | 18            | <b>14,00</b>         | 13,860               | 14,010  |
| Nr. 3 - 56            |               | <b>2,15</b>                  | 2,024                   | 2,197   | W 1/8                        | 40            | <b>2,50</b>          | 2,362                | 2,591   | G 1/4   | 19            | <b>11,80</b>                 | 11,445               | 11,890  | Pg 11                                  | 18            | <b>17,30</b>         | 17,260               | 17,410  |
| Nr. 4 - 48            |               | <b>2,40</b>                  | 2,271                   | 2,459   | W 5/32                       | 32            | <b>3,20</b>          | 2,952                | 3,214   | G 3/8   | 19            | <b>15,25</b>                 | 14,950               | 15,395  | Pg 13,5                                | 18            | <b>19,00</b>         | 19,060               | 19,210  |
| Nr. 5 - 44            |               | <b>2,70</b>                  | 2,550                   | 2,741   | W 3/16                       | 24            | <b>3,60</b>          | 3,407                | 3,745   | G 1/2   | 14            | <b>19,00</b>                 | 18,631               | 19,172  | Pg 16                                  | 18            | <b>21,30</b>         | 21,160               | 21,310  |
| Nr. 6 - 40            |               | <b>2,95</b>                  | 2,819                   | 3,023   | W 7/32                       | 24            | <b>4,50</b>          | 4,201                | 4,539   | G 5/8   | 14            | <b>21,00</b>                 | 20,587               | 21,128  | Pg 21                                  | 16            | <b>26,90</b>         | 26,780               | 27,030  |
| Nr. 8 - 36            |               | <b>3,50</b>                  | 3,404                   | 3,607   | W 1/4                        | 20            | <b>5,10</b>          | 4,724                | 5,156   | G 3/4   | 14            | <b>24,50</b>                 | 24,117               | 24,658  | Pg 29                                  | 16            | <b>35,50</b>         | 35,480               | 35,730  |
| Nr. 10 - 32           |               | <b>4,10</b>                  | 3,962                   | 4,166   | W 5/16                       | 18            | <b>6,50</b>          | 6,130                | 6,590   | G 7/8   | 14            | <b>28,25</b>                 | 27,877               | 28,418  | Pg 36                                  | 16            | <b>45,50</b>         | 45,480               | 45,730  |
| Nr. 12 - 28           |               | <b>4,60</b>                  | 4,496                   | 4,724   | W 3/8                        | 16            | <b>7,90</b>          | 7,492                | 7,987   | G 1   | 11            | <b>30,75</b>                 | 30,291               | 30,931  | Pg 42                                  | 16            | <b>52,50</b>         | 52,480               | 52,730  |
| 1/4 - 28              |               | <b>5,50</b>                  | 5,359                   | 5,588   | W 7/16                       | 14            | <b>9,20</b>          | 8,789                | 9,330   | G 1 1/8                                       | 11            | <b>35,50</b>                 | 34,939               | 35,579  | Pg 48                                  | 16            | <b>57,80</b>         | 57,780               | 58,030  |
| 5/16 - 24             |               | <b>6,90</b>                  | 6,782                   | 7,036   | W 1/2                        | 12            | <b>10,50</b>         | 9,989                | 10,591  | G 1 1/4                                       | 11            | <b>39,50</b>                 | 38,952               | 39,592  |  |               |                      |                      |         |
| 3/8 - 24              |               | <b>8,50</b>                  | 8,382                   | 8,636   | W 9/16                       | 12            | <b>12,00</b>         | 11,577               | 12,179  | G 1 1/2                                       | 11            | <b>45,25</b>                 | 44,845               | 45,485  |  |               |                      |                      |         |
| 7/16 - 20             |               | <b>9,90</b>                  | 9,728                   | 10,033  | W 5/8                        | 11            | <b>13,50</b>         | 12,918               | 13,558  | G 1 3/4                                       | 11            | <b>51,00</b>                 | 50,788               | 51,428  |  |               |                      |                      |         |
| 1/2 - 20              |               | <b>11,50</b>                 | 11,328                  | 11,608  | W 3/4                        | 10            | <b>16,25</b>         | 15,797               | 16,483  | G 2   | 11            | <b>57,00</b>                 | 56,656               | 57,296  |  |               |                      |                      |         |
| 9/16 - 18             |               | <b>12,90</b>                 | 12,751                  | 13,081  | W 7/8                        | 9             | <b>19,25</b>         | 18,611               | 19,353  |   |               |                              |                      |         |  |               |                      |                      |         |
| 5/8 - 18              |               | <b>14,50</b>                 | 14,351                  | 14,681  | W 1                          | 8             | <b>22,00</b>         | 21,334               | 22,147  |   |               |                              |                      |         |  |               |                      |                      |         |
| 3/4 - 16              |               | <b>17,50</b>                 | 17,323                  | 17,678  | W 1 1/8                      | 7             | <b>24,50</b>         | 23,928               | 24,832  |   |               |                              |                      |         |  |               |                      |                      |         |
| 7/8 - 14              |               | <b>20,40</b>                 | 20,269                  | 20,650  | W 1 1/4                      | 7             | <b>27,75</b>         | 27,103               | 28,007  |   |               |                              |                      |         |  |               |                      |                      |         |
| 1 - 12                |               | <b>23,25</b>                 | 23,114                  | 23,571  | W 1 3/8                      | 6             | <b>30,50</b>         | 29,504               | 30,528  |   |               |                              |                      |         |  |               |                      |                      |         |
| 1 1/8 - 12            |               | <b>26,50</b>                 | 26,289                  | 26,746  | W 1 1/2                      | 6             | <b>33,50</b>         | 32,679               | 33,703  |   |               |                              |                      |         |  |               |                      |                      |         |
| 1 1/4 - 12            |               | <b>29,50</b>                 | 29,464                  | 29,921  | W 1 5/8                      | 5             | <b>35,50</b>         | 34,769               | 35,963  |   |               |                              |                      |         |  |               |                      |                      |         |
| 1 3/8 - 12            |               | <b>32,75</b>                 | 32,639                  | 33,096  | W 1 3/4                      | 5             | <b>39,00</b>         | 37,944               | 39,138  |   |               |                              |                      |         |  |               |                      |                      |         |
| 1 1/2 - 12            |               | <b>36,00</b>                 | 35,814                  | 36,271  | W 2                          | 4,5           | <b>44,50</b>         | 43,571               | 44,877  |   |               |                              |                      |         |  |               |                      |                      |         |

| NPT ANSI B 2.1<br>Amerik. kegeliges Rohrgewinde Kegel 1:16 |  |              |       |        |               |  |                                       |                       |                       |
|--|--|--------------|-------|--------|---------------|--|---------------------------------------|-----------------------|-----------------------|
| Ausführung A<br>(möglichst vermeiden)                      |  | Ausführung B |       | Nenn-Ø | Gang pro inch | Kernloch-Ø zylindr. (A) d <sub>1</sub> | Kernloch-Ø konisch (B) D <sub>1</sub> | Einschneidtiefe ET mm | Bohrtiefe BT (min) mm |
|  |  |              | 1/16  | - 27   | <b>6,15</b>   | 6,39                                   | 9,29                                  | 10,7                  |                       |
|  |  |              | 1/8   | - 27   | <b>8,40</b>   | 8,74                                   | 9,32                                  | 10,8                  |                       |
|  |  |              | 1/4   | - 18   | <b>11,10</b>  | 11,36                                  | 13,52                                 | 15,6                  |                       |
|  |  |              | 3/8   | - 18   | <b>14,30</b>  | 14,80                                  | 13,83                                 | 16,0                  |                       |
|  |  |              | 1/2   | - 14   | <b>17,90</b>  | 18,32                                  | 18,07                                 | 20,8                  |                       |
|  |  |              | 3/4   | - 14   | <b>23,30</b>  | 23,67                                  | 18,55                                 | 21,3                  |                       |
|  |  |              | 1     | - 11,5 | <b>29,00</b>  | 29,69                                  | 22,29                                 | 25,6                  |                       |
|  |  |              | 1 1/4 | - 11,5 | <b>37,70</b>  | 38,45                                  | 22,80                                 | 26,1                  |                       |
|  |  |              | 1 1/2 | - 11,5 | <b>43,70</b>  | 44,52                                  | 22,80                                 | 26,1                  |                       |
|  |  |              | 2     | - 11,5 | <b>55,60</b>  | 56,56                                  | 23,20                                 | 26,5                  |                       |
|  |  |              | 2 1/2 | - 8    | <b>66,30</b>  | 67,62                                  | 31,75                                 | 36,3                  |                       |
|  |  |              | 3     | - 8    | <b>82,30</b>  | 83,52                                  | 33,74                                 | 38,5                  |                       |

| EG-Gewinde Metr./Metr. Fein (EG M 14 x 1,25) für Gewindedrahteinsätze DIN 8140 |                 |                      |                      |         |
|--|-----------------|----------------------|----------------------|---------|
| Nenn-Ø   | x Steigung P mm | Kernloch-(Bohr-)Ø mm | Kern-Ø Muttergewinde |         |
|  |                 |                      | min. mm              | max. mm |
| EG M 4   | 0,70            | <b>4,20</b>          | 4,152                | 4,292   |
| EG M 5   | 0,80            | <b>5,25</b>          | 5,174                | 5,334   |
| EG M 6   | 1,00            | <b>6,30</b>          | 6,217                | 6,407   |
| EG M 8   | 1,25            | <b>8,40</b>          | 8,271                | 8,483   |
| EG M 10  | 1,50            | <b>10,50</b>         | 10,324               | 10,560  |
| EG M 12  | 1,75            | <b>12,50</b>         | 12,379               | 12,644  |
| EG M 14 x  | 1,25            | <b>14,40</b>         | 14,271               | 14,483  |
| EG M 16  | 2,00            | <b>16,50</b>         | 16,433               | 16,733  |

| EG UNC (UNC-STI) Gewinde für Gewindedrahteinsätze ASME B18.29.1 |               |                      |                      |         |
|---|---------------|----------------------|----------------------|---------|
| Nenn-Ø  | Gang pro inch | Kernloch-(Bohr-)Ø mm | Kern-Ø Muttergewinde |         |
|   |               |                      | min. mm              | max. mm |
| EG Nr. 6 - 32   |               | <b>3,80</b>          | 3,678                | 3,879   |
| EG Nr. 8 - 32   |               | <b>4,40</b>          | 4,338                | 4,524   |
| EG Nr. 10 - 24  |               | <b>5,20</b>          | 5,055                | 5,283   |
| EG Nr. 12 - 24  |               | <b>5,80</b>          | 5,715                | 5,944   |
| EG 1/4 - 20   |               | <b>6,70</b>          | 6,624                | 6,868   |
| EG 5/16 - 18  |               | <b>8,40</b>          | 8,242                | 8,489   |
| EG 3/8 - 16   |               | <b>10,00</b>         | 9,868                | 10,127  |
| EG 7/16 - 14  |               | <b>11,60</b>         | 11,506               | 11,783  |
| EG 1/2 - 13   |               | <b>13,30</b>         | 13,122               | 13,393  |
| EG 9/16 - 12  |               | <b>14,90</b>         | 14,747               | 15,032  |
| EG 5/8 - 11   |               | <b>16,50</b>         | 16,375               | 16,673  |

| EG UNF (UNF-STI) Gewinde für Gewindedrahteinsätze ASME B18.29.1 |               |                      |                      |         |
|---|---------------|----------------------|----------------------|---------|
| Nenn-Ø  | Gang pro inch | Kernloch-(Bohr-)Ø mm | Kern-Ø Muttergewinde |         |
|   |               |                      | min. mm              | max. mm |
| EG Nr. 6 - 40   |               | <b>3,70</b>          | 3,644                | 3,818   |
| EG Nr. 8 - 36   |               | <b>4,40</b>          | 4,321                | 4,498   |
| EG Nr. 10 - 32  |               | <b>5,10</b>          | 4,999                | 5,184   |
| EG Nr. 12 - 28  |               | <b>5,70</b>          | 5,682                | 5,809   |
| EG 1/4 - 28   |               | <b>6,60</b>          | 6,546                | 6,721   |
| EG 5/16 - 24  |               | <b>8,25</b>          | 8,166                | 8,352   |
| EG 3/8 - 24   |               | <b>9,80</b>          | 9,754                | 9,931   |
| EG 7/16 - 20  |               | <b>11,50</b>         | 11,389               | 11,585  |
| EG 1/2 - 20   |               | <b>13,10</b>         | 12,974               | 13,172  |
| EG 9/16 - 18  |               | <b>14,70</b>         | 14,592               | 14,798  |
| EG 5/8 - 18   |               | <b>16,25</b>         | 16,180               | 16,386  |

Arbeitsrichtwerte

# Empfohlene Bohrdurchmesser Gewindeformen

| Metrische ISO-Gewinde<br>DIN 13 |            |              |         |         |                          |         |
|---------------------------------|------------|--------------|---------|---------|--------------------------|---------|
| Nenn-Ø                          | Steigung P | Bohr-Ø       | Bohr-Ø  |         | Kern-Ø Muttergewinde 7H* |         |
|                                 |            |              | min. mm | max. mm | min. mm                  | max. mm |
| M1                              | 0,25       | <b>0,90</b>  | 0,89    | 0,92    | 0,729                    | 0,819   |
| M1,2                            | 0,25       | <b>1,10</b>  | 1,09    | 1,12    | 0,929                    | 1,019   |
| M1,4                            | 0,30       | <b>1,28</b>  | 1,27    | 1,30    | 1,075                    | 1,181   |
| M1,6                            | 0,35       | <b>1,46</b>  | 1,45    | 1,48    | 1,221                    | 1,346   |
| M1,7                            | 0,35       | <b>1,56</b>  | 1,55    | 1,58    | 1,321                    | 1,446   |
| M1,8                            | 0,35       | <b>1,66</b>  | 1,65    | 1,68    | 1,421                    | 1,546   |
| M 2                             | 0,40       | <b>1,85</b>  | 1,84    | 1,88    | 1,567                    | 1,679   |
| M 2,2                           | 0,45       | <b>2,00</b>  | 2,01    | 2,05    | 1,713                    | 1,838   |
| M 2,5                           | 0,45       | <b>2,30</b>  | 2,28    | 2,32    | 2,013                    | 2,138   |
| M 3                             | 0,50       | <b>2,80</b>  | 2,78    | 2,85    | 2,459                    | 2,639   |
| M 3,5                           | 0,60       | <b>3,25</b>  | 3,23    | 3,30    | 2,850                    | 3,050   |
| M 4                             | 0,70       | <b>3,70</b>  | 3,68    | 3,76    | 3,242                    | 3,466   |
| M 4,5                           | 0,75       | <b>4,20</b>  |         |         |                          |         |
| M 5                             | 0,80       | <b>4,65</b>  | 4,62    | 4,71    | 4,134                    | 4,384   |
| M 6                             | 1,00       | <b>5,55</b>  | 5,52    | 5,62    | 4,917                    | 5,217   |
| M 7                             | 1,00       | <b>6,55</b>  | 6,52    | 6,62    | 5,917                    | 6,217   |
| M 8                             | 1,25       | <b>7,40</b>  | 7,36    | 7,47    | 6,647                    | 6,982   |
| M 9                             | 1,25       | <b>8,40</b>  | 8,36    | 8,47    | 7,647                    | 7,982   |
| M 10                            | 1,50       | <b>9,30</b>  | 9,26    | 9,38    | 8,376                    | 8,751   |
| M 11                            | 1,50       | <b>10,30</b> | 10,26   | 10,38   | 9,376                    | 9,751   |
| M 12                            | 1,75       | <b>11,20</b> | 11,15   | 11,29   | 10,106                   | 10,531  |
| M 14                            | 2,00       | <b>13,10</b> | 13,05   | 13,20   | 11,835                   | 12,310  |
| M 16                            | 2,00       | <b>15,10</b> | 15,05   | 15,20   | 13,835                   | 14,310  |
| M 18                            | 2,50       | <b>16,90</b> | 16,83   | 17,02   | 15,294                   | 15,854  |
| M 20                            | 2,50       | <b>18,90</b> | 18,83   | 19,02   | 17,294                   | 17,854  |
| M 22                            | 2,50       | <b>20,90</b> | 20,83   | 21,02   | 19,294                   | 19,854  |
| M 24                            | 3,00       | <b>22,70</b> | 22,62   | 22,80   | 20,752                   | 21,382  |
| M 27                            | 3,00       | <b>25,70</b> | 25,62   | 25,80   | 23,752                   | 24,382  |
| M 30                            | 3,50       | <b>28,50</b> | 28,40   | 28,60   | 26,211                   | 26,921  |
| M 33                            | 3,50       | <b>31,50</b> | 31,40   | 31,60   | 29,211                   | 29,921  |
| M 36                            | 4,00       | <b>34,30</b> | 34,17   | 34,40   | 31,670                   | 32,420  |
| M 39                            | 4,00       | <b>37,30</b> | 37,17   | 37,40   | 34,670                   | 35,420  |
| M 42                            | 4,50       | <b>40,10</b> | 39,95   | 40,20   | 37,129                   | 37,979  |

\* M 2 bis M 2,5 Kern-Ø Muttergewinde 6H

| Metrische ISO-Feingewinde<br>DIN 13 |            |              |         |         |                          |         |             |            |              |         |         |                          |         |
|-------------------------------------|------------|--------------|---------|---------|--------------------------|---------|-------------|------------|--------------|---------|---------|--------------------------|---------|
| Nenn-x Ø                            | Steigung P | Bohr-Ø       | Bohr-Ø  |         | Kern-Ø Muttergewinde 7H* |         | Nenn-x Ø    | Steigung P | Bohr-Ø       | Bohr-Ø  |         | Kern-Ø Muttergewinde 7H* |         |
|                                     |            |              | min. mm | max. mm | min. mm                  | max. mm |             |            |              | min. mm | max. mm | min. mm                  | max. mm |
| M 2,5 x 0,35                        |            | <b>2,35</b>  | 2,35    | 2,38    | 2,121                    | 2,221   | M 17 x 1,00 |            | <b>16,55</b> | 16,52   | 16,62   | 15,917                   | 16,217  |
| M 3 x 0,35                          |            | <b>2,85</b>  | 2,85    | 2,88    | 2,621                    | 2,721   | M 17 x 1,50 |            | <b>16,30</b> | 16,26   | 16,38   | 15,376                   | 15,751  |
| M 4 x 0,35                          |            | <b>3,85</b>  | 3,85    | 3,88    | 3,621                    | 3,721   | M 18 x 1,00 |            | <b>17,55</b> | 17,52   | 17,62   | 16,917                   | 17,217  |
| M 4 x 0,50                          |            | <b>3,80</b>  | 3,78    | 3,83    | 3,459                    | 3,639   | M 18 x 1,50 |            | <b>17,30</b> | 17,26   | 17,38   | 16,376                   | 16,751  |
| M 5 x 0,50                          |            | <b>4,80</b>  | 4,78    | 4,83    | 4,459                    | 4,639   | M 18 x 2,00 |            | <b>17,10</b> | 17,05   | 17,20   | 15,835                   | 16,310  |
| M 5,5 x 0,50                        |            | <b>5,30</b>  | 5,28    | 5,33    | 4,959                    | 5,139   | M 20 x 1,00 |            | <b>19,55</b> | 19,52   | 19,62   | 18,917                   | 19,217  |
| M 6 x 0,75                          |            | <b>5,65</b>  | 5,62    | 5,70    | 5,188                    | 5,424   | M 20 x 1,50 |            | <b>19,30</b> | 19,26   | 19,38   | 18,376                   | 19,751  |
| M 7 x 0,75                          |            | <b>6,65</b>  | 6,62    | 6,70    | 6,188                    | 6,424   | M 24 x 1,00 |            | <b>23,55</b> | 23,52   | 23,62   | 22,917                   | 23,217  |
| M 8 x 0,75                          |            | <b>7,65</b>  | 7,62    | 7,70    | 7,188                    | 7,424   | M 24 x 1,50 |            | <b>23,30</b> | 23,26   | 23,38   | 22,376                   | 22,751  |
| M 8 x 1,00                          |            | <b>7,55</b>  | 7,52    | 7,62    | 6,917                    | 7,217   | M 24 x 2,00 |            | <b>23,10</b> | 23,05   | 23,20   | 21,835                   | 22,310  |
| M 9 x 0,75                          |            | <b>8,65</b>  | 8,62    | 8,70    | 8,188                    | 8,424   | M 27 x 1,50 |            | <b>26,30</b> | 26,26   | 26,38   | 25,376                   | 25,751  |
| M 9 x 1,00                          |            | <b>8,55</b>  | 8,52    | 8,62    | 7,917                    | 8,217   | M 30 x 1,50 |            | <b>29,30</b> | 29,26   | 29,38   | 28,376                   | 28,751  |
| M 10 x 0,75                         |            | <b>9,65</b>  | 9,62    | 9,70    | 9,188                    | 9,424   | M 33 x 1,50 |            | <b>32,30</b> | 32,26   | 32,38   | 31,376                   | 31,751  |
| M 10 x 1,00                         |            | <b>9,55</b>  | 9,52    | 9,62    | 8,917                    | 9,217   | M 36 x 1,50 |            | <b>35,30</b> | 35,26   | 35,38   | 34,376                   | 34,751  |
| M 10 x 1,25                         |            | <b>9,40</b>  | 9,36    | 9,47    | 8,647                    | 8,982   | M 39 x 1,50 |            | <b>38,30</b> | 38,26   | 38,38   | 37,376                   | 37,751  |
| M 11 x 0,75                         |            | <b>10,65</b> | 10,62   | 10,70   | 10,188                   | 10,424  | M 42 x 1,50 |            | <b>41,30</b> | 41,26   | 41,38   | 42,376                   | 42,751  |
| M 11 x 1,00                         |            | <b>10,55</b> | 10,52   | 10,62   | 9,917                    | 10,217  |             |            |              |         |         |                          |         |
| M 12 x 1,00                         |            | <b>11,55</b> | 11,52   | 11,62   | 10,917                   | 11,217  |             |            |              |         |         |                          |         |
| M 12 x 1,25                         |            | <b>11,40</b> | 11,36   | 11,47   | 10,647                   | 10,982  |             |            |              |         |         |                          |         |
| M 12 x 1,50                         |            | <b>11,30</b> | 11,26   | 11,38   | 10,376                   | 10,751  |             |            |              |         |         |                          |         |
| M 14 x 1,00                         |            | <b>13,55</b> | 13,52   | 13,62   | 12,917                   | 13,217  |             |            |              |         |         |                          |         |
| M 14 x 1,25                         |            | <b>13,40</b> | 13,36   | 13,47   | 12,647                   | 12,982  |             |            |              |         |         |                          |         |
| M 14 x 1,50                         |            | <b>13,30</b> | 13,26   | 13,38   | 12,376                   | 12,751  |             |            |              |         |         |                          |         |
| M 15 x 1,00                         |            | <b>14,55</b> | 14,52   | 14,62   | 13,917                   | 14,217  |             |            |              |         |         |                          |         |
| M 15 x 1,50                         |            | <b>14,30</b> | 14,26   | 14,38   | 13,376                   | 13,751  |             |            |              |         |         |                          |         |
| M 16 x 1,00                         |            | <b>15,55</b> | 15,52   | 15,62   | 14,917                   | 15,217  |             |            |              |         |         |                          |         |
| M 16 x 1,50                         |            | <b>15,30</b> | 15,26   | 15,38   | 14,376                   | 14,751  |             |            |              |         |         |                          |         |

\* M 2,5 x 0,35 bis M 4 x 0,35 Kern-Ø Muttergewinde 6H

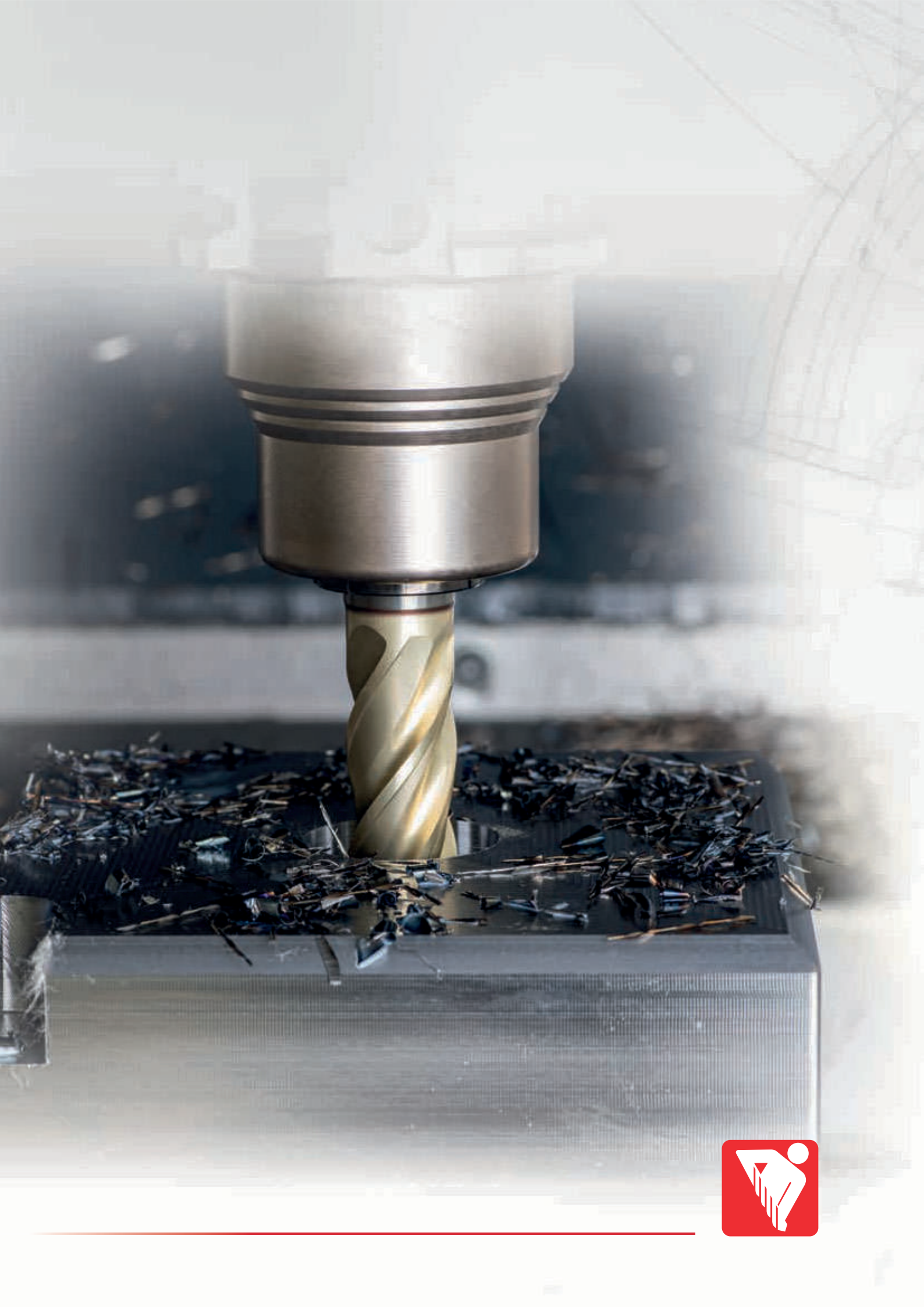
## Kerndurchmesser-Toleranzfeld beim Gewindeformen (nach DIN 13, Teil 50)

Aus Festigkeitsgründen ist es nicht erforderlich, die Kerndurchmessertoleranzen der Toleranzklasse 6H einzuhalten; die Toleranzklasse 7H genügt dem Anspruch, dass die Flankenüberdeckung von Außen- und Muttergewinde 0,32 x P nicht unterschreiten soll. Außerdem haben geformte Gewinde wegen des nicht unterbrochenen Faserverlaufs und der erfolgten Kaltverfestigung im Regelfall eine höhere Festigkeit als geschnittene Gewinde.

| UNC-Gewinde<br>ASME B1.1 |      |              |          |       |                         |         |
|--------------------------|------|--------------|----------|-------|-------------------------|---------|
| Nenn-Ø                   | Gang | Bohr-Ø       | Bohr-Ø   |       | Kern-Ø Muttergewinde 2B |         |
|                          |      |              | pro inch | mm    | min. mm                 | max. mm |
| Nr. 1 - 64               |      | <b>1,68</b>  | 1,67     | 1,70  | 1,425                   | 1,580   |
| Nr. 2 - 56               |      | <b>1,98</b>  | 1,97     | 2,01  | 1,694                   | 1,872   |
| Nr. 3 - 48               |      | <b>2,28</b>  | 2,27     | 2,32  | 1,941                   | 2,146   |
| Nr. 4 - 40               |      | <b>2,55</b>  | 2,54     | 2,59  | 2,157                   | 2,385   |
| Nr. 5 - 40               |      | <b>2,90</b>  | 2,89     | 2,94  | 2,487                   | 2,698   |
| Nr. 6 - 32               |      | <b>3,15</b>  | 3,14     | 3,19  | 2,642                   | 2,896   |
| Nr. 8 - 32               |      | <b>3,80</b>  | 3,78     | 3,82  | 3,302                   | 3,531   |
| Nr. 10 - 24              |      | <b>4,35</b>  | 4,33     | 4,39  | 3,683                   | 3,937   |
| Nr. 12 - 24              |      | <b>5,00</b>  | 4,97     | 5,03  | 4,343                   | 4,597   |
| 1/4 - 20                 |      | <b>5,75</b>  | 5,72     | 5,80  | 4,978                   | 5,258   |
| 5/16 - 18                |      | <b>7,30</b>  | 7,26     | 7,37  | 6,401                   | 6,731   |
| 3/8 - 16                 |      | <b>8,80</b>  | 8,77     | 8,88  | 7,798                   | 8,153   |
| 7/16 - 14                |      | <b>10,30</b> | 10,27    | 10,37 | 9,144                   | 9,550   |
| 1/2 - 13                 |      | <b>11,80</b> | 11,77    | 11,88 | 10,592                  | 11,024  |
| 9/16 - 12                |      | <b>13,30</b> | 13,28    | 13,39 | 11,989                  | 12,446  |
| 5/8 - 11                 |      | <b>14,80</b> | 14,78    | 14,90 | 13,386                  | 13,868  |
| 3/4 - 10                 |      | <b>17,90</b> | 17,85    | 17,97 | 16,307                  | 16,840  |
| 7/8 - 9                  |      | <b>21,00</b> | 20,95    | 21,10 | 19,177                  | 19,761  |
| 1 - 8                    |      | <b>24,00</b> | 23,95    | 24,12 | 21,971                  | 22,606  |

| UNF-Gewinde<br>ASME B1.1 |      |              |          |       |                         |         |
|--------------------------|------|--------------|----------|-------|-------------------------|---------|
| Nenn-Ø                   | Gang | Bohr-Ø       | Bohr-Ø   |       | Kern-Ø Muttergewinde 2B |         |
|                          |      |              | pro inch | mm    | min. mm                 | max. mm |
| Nr. 1 - 72               |      | <b>1,70</b>  | 1,69     | 1,72  | 1,473                   | 1,610   |
| Nr. 2 - 64               |      | <b>2,00</b>  | 1,99     | 2,03  | 1,755                   | 1,910   |
| Nr. 3 - 56               |      | <b>2,30</b>  | 2,29     | 2,34  | 2,024                   | 2,197   |
| Nr. 4 - 48               |      | <b>2,60</b>  | 2,59     | 2,63  | 2,271                   | 2,459   |
| Nr. 5 - 44               |      | <b>2,90</b>  | 2,89     | 2,93  | 2,550                   | 2,741   |
| Nr. 6 - 40               |      | <b>3,20</b>  | 3,19     | 3,24  | 2,819                   | 3,023   |
| Nr. 8 - 36               |      | <b>3,85</b>  | 3,83     | 3,88  | 3,404                   | 3,607   |
| Nr. 10 - 32              |      | <b>4,45</b>  | 4,43     | 4,49  | 3,962                   | 4,166   |
| Nr. 12 - 28              |      | <b>5,10</b>  | 5,07     | 5,13  | 4,496                   | 4,724   |
| 1/4 - 28                 |      | <b>5,95</b>  | 5,92     | 5,99  | 5,359                   | 5,588   |
| 5/16 - 24                |      | <b>7,45</b>  | 7,42     | 7,50  | 6,782                   | 7,036   |
| 3/8 - 24                 |      | <b>9,05</b>  | 9,02     | 9,10  | 8,838                   | 9,103   |
| 7/16 - 20                |      | <b>10,55</b> | 10,48    | 10,58 | 9,728                   | 10,033  |
| 1/2 - 20                 |      | <b>12,10</b> | 12,08    | 12,18 | 11,328                  | 11,608  |
| 9/16 - 18                |      | <b>13,65</b> | 13,61    | 13,72 | 12,751                  | 13,081  |
| 5/8 - 18                 |      | <b>15,25</b> | 15,21    | 15,32 | 14,351                  | 14,681  |
| 3/4 - 16                 |      | <b>18,35</b> | 18,30    | 18,41 | 17,323                  | 17,678  |
| 7/8 - 14                 |      | <b>21,40</b> | 21,35    | 21,49 | 20,269                  | 20,650  |
| 1 - 12                   |      | <b>24,45</b> | 24,40    | 24,54 | 23,114                  | 23,571  |

| (Whitworth-) Rohrgewinde G<br>DIN EN ISO 228-1 |      |              |          |       |                      |         |
|--|------|--------------|----------|-------|----------------------|---------|
| Nenn-Ø   | Gang | Bohr-Ø       | Bohr-Ø   |       | Kern-Ø Muttergewinde |         |
|  |      |              | pro inch | mm    | min. mm              | max. mm |
| G 1/16 28                                      |      | <b>7,30</b>  | 7,28     | 7,35  | 6,561                | 6,843   |
| G 1/8 28                                       |      | <b>9,30</b>  | 9,28     | 9,35  | 8,566                | 8,848   |
| G 1/4 19                                       |      | <b>12,50</b> | 12,48    | 12,55 | 11,445               | 11,890  |
| G 3/8 19                                       |      | <b>16,00</b> | 15,98    | 16,05 | 14,950               | 15,395  |
| G 1/2 14                                       |      | <b>20,00</b> | 19,98    | 20,12 | 18,631               | 19,172  |
| G 5/8 14                                       |      | <b>22,00</b> | 21,98    | 22,12 | 20,587               | 21,128  |
| G 3/4 14                                       |      | <b>25,50</b> | 25,48    | 25,62 | 24,117               | 24,658  |
| G 7/8 14                                       |      | <b>29,25</b> | 29,23    | 29,37 | 27,877               | 28,418  |
| G 1 11   |      | <b>32,00</b> | 31,98    | 32,15 | 30,291               | 30,931  |
| G 1 1/4 11                                     |      | <b>40,75</b> | 40,70    | 40,85 | 38,952               | 39,592  |



# SuperF-UT stabile Verhältnisse

Empfehlung für glattschneidige Fräswerkzeuge.



| Korrekturfaktoren       |                      |                      |
|-------------------------|----------------------|----------------------|
| $a_p$ Schruppen > 1,5xD | <b>!</b> $v_c$ -25 % | <b>!</b> $f_z$ -25 % |
| mittellange Werkzeuge   | <b>!</b> $v_c$ -40 % | <b>!</b> $f_z$ -40 % |
| extralange Werkzeuge    | <b>!</b> $v_c$ -60 % | <b>!</b> $f_z$ -55 % |

| Material  | Härte                         | Anwendung  | $a_e$ max. | $v_c$ | $f_z$ (mm/z) bei Nenn-Ø |       |       |       |       |       |       |       |       |
|---|-------------------------------|------------|------------|-------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
|   |                               |            |            |       | 3                       | 4     | 6     | 8     | 10    | 12    | 16    | 20    | 25    |
| <b>P Bau- und Automatenstähle, unlegierte Vergütungs- und Einsatzstähle</b><br>1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937<br>1.0718 11SMnPb30, 1.0736 11SMn37, 1.0402 C22, 1.1178 C30E<br>1.0503 C45, 1.1191 C30E, 1.0301 C10, 1.1121 C10E<br>1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9   | ≤ 850<br>N/mm <sup>2</sup>    | Nuten      | 1xD        | 180   | 0,016                   | 0,021 | 0,031 | 0,042 | 0,060 | 0,072 | 0,100 | 0,120 | 0,150 |
|   |                               | Schruppen  | 0,75xD     | 210   | 0,018                   | 0,024 | 0,036 | 0,048 | 0,069 | 0,083 | 0,110 | 0,140 | 0,170 |
|   |                               | Schlichten | 0,02xD     | 360   | 0,017                   | 0,023 | 0,034 | 0,046 | 0,066 | 0,079 | 0,110 | 0,130 | 0,170 |
| <b>P Automatenstähle, unlegierte Einsatzstähle, Nitrierstähle</b><br>1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20, 1.0601 C60, 1.1221 C60E<br>1.7043 38Cr4, 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5<br>1.8504 34CrAl6, 1.8519 31CrMoV9, 1.8550 34CrAlNi7  | 850-1200<br>N/mm <sup>2</sup> | Nuten      | 1xD        | 160   | 0,014                   | 0,019 | 0,029 | 0,038 | 0,055 | 0,066 | 0,090 | 0,110 | 0,140 |
|   |                               | Schruppen  | 0,75xD     | 190   | 0,017                   | 0,022 | 0,033 | 0,044 | 0,063 | 0,076 | 0,100 | 0,130 | 0,160 |
|   |                               | Schlichten | 0,02xD     | 320   | 0,016                   | 0,021 | 0,032 | 0,042 | 0,061 | 0,073 | 0,100 | 0,120 | 0,150 |
| <b>P Legierte Vergütungsstähle, Werkzeug- und Schnellarbeitsstähle</b><br>1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4, 1.5710 36NiCr6,<br>1.7035 41Cr4, 1.7225 42CrMo4, 1.2080 X210Cr12, 1.2083 X42Cr13,<br>1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2,<br>1.3344 S 6-5-3, Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 | 850-1400<br>N/mm <sup>2</sup> | Nuten      | 1xD        | 135   | 0,014                   | 0,018 | 0,027 | 0,036 | 0,050 | 0,060 | 0,080 | 0,100 | 0,130 |
|   |                               | Schruppen  | 0,75xD     | 160   | 0,016                   | 0,021 | 0,031 | 0,041 | 0,058 | 0,069 | 0,090 | 0,120 | 0,140 |
|   |                               | Schlichten | 0,02xD     | 270   | 0,015                   | 0,020 | 0,030 | 0,040 | 0,055 | 0,066 | 0,090 | 0,110 | 0,140 |
| <b>H Gehärteter Stahl</b><br>Werkzeugstahl, Vergütungstahl, Federstahl,<br>Schnellarbeitsstahl, Einsatzstahl, etc.<br>z.B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4;<br>1.2379 X155CrVMo12-1; 1.2080 X210Cr12; 1.3343 S 6-5-2   | ≤ 55 HRC                      | Nuten      | 1xD        | 70    | 0,011                   | 0,014 | 0,021 | 0,028 | 0,040 | 0,048 | 0,060 | 0,080 | 0,100 |
|   |                               | Schruppen  | 0,33xD     | 100   | 0,014                   | 0,018 | 0,027 | 0,036 | 0,052 | 0,062 | 0,080 | 0,100 | 0,130 |
|   |                               | Schlichten | 0,01xD     | 140   | 0,011                   | 0,014 | 0,021 | 0,028 | 0,040 | 0,048 | 0,060 | 0,080 | 0,100 |
| <b>M Rostfreier Stahl</b><br>1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9<br>USA = 303, 410, 420F, 430, 430F  | ≤ 750<br>N/mm <sup>2</sup>    | Nuten      | 1xD        | 120   | 0,014                   | 0,018 | 0,027 | 0,036 | 0,050 | 0,060 | 0,080 | 0,100 | 0,130 |
|   |                               | Schruppen  | 0,75xD     | 140   | 0,016                   | 0,021 | 0,031 | 0,041 | 0,058 | 0,069 | 0,090 | 0,120 | 0,140 |
|   |                               | Schlichten | 0,02xD     | 240   | 0,015                   | 0,020 | 0,030 | 0,040 | 0,055 | 0,066 | 0,090 | 0,110 | 0,140 |
| <b>M Rostfreier Stahl</b><br>1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8<br>USA = 304, 304L, 420   | 750-850<br>N/mm <sup>2</sup>  | Nuten      | 1xD        | 80    | 0,012                   | 0,016 | 0,024 | 0,032 | 0,045 | 0,054 | 0,070 | 0,090 | 0,110 |
|   |                               | Schruppen  | 0,75xD     | 100   | 0,014                   | 0,018 | 0,028 | 0,037 | 0,052 | 0,062 | 0,080 | 0,100 | 0,130 |
|   |                               | Schlichten | 0,02xD     | 160   | 0,013                   | 0,018 | 0,026 | 0,035 | 0,050 | 0,059 | 0,080 | 0,100 | 0,120 |
| <b>M Rostfreier Stahl</b><br>1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10<br>USA = 310, 316, 316B, 316L, 317  | ≤ 850<br>N/mm <sup>2</sup>    | Nuten      | 1xD        | 60    | 0,011                   | 0,014 | 0,021 | 0,028 | 0,040 | 0,048 | 0,060 | 0,080 | 0,100 |
|   |                               | Schruppen  | 0,60xD     | 80    | 0,013                   | 0,017 | 0,025 | 0,034 | 0,048 | 0,058 | 0,080 | 0,100 | 0,120 |
|   |                               | Schlichten | 0,01xD     | 120   | 0,011                   | 0,014 | 0,021 | 0,028 | 0,040 | 0,048 | 0,060 | 0,080 | 0,100 |
| <b>S Sonderlegierungen (Nickelbasis "Ni")</b><br>Nimonic, Inconel, Monel, Hastelloy   | ≤ 1.300<br>N/mm <sup>2</sup>  | Nuten      | 1xD        | 30    | 0,008                   | 0,011 | 0,017 | 0,022 | 0,032 | 0,038 | 0,050 | 0,060 | 0,080 |
|   |                               | Schruppen  | 0,60xD     | 40    | 0,010                   | 0,013 | 0,020 | 0,027 | 0,038 | 0,046 | 0,060 | 0,080 | 0,100 |
|   |                               | Schlichten | 0,01xD     | 60    | 0,008                   | 0,011 | 0,017 | 0,022 | 0,032 | 0,038 | 0,050 | 0,060 | 0,080 |
| <b>Ti Titanlegierungen ("Ti")</b><br>3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2<br>3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5  | ≤ 1.300<br>N/mm <sup>2</sup>  | Nuten      | 1xD        | 60    | 0,012                   | 0,016 | 0,024 | 0,032 | 0,045 | 0,054 | 0,070 | 0,090 | 0,110 |
|   |                               | Schruppen  | 0,60xD     | 80    | 0,014                   | 0,019 | 0,029 | 0,038 | 0,054 | 0,065 | 0,090 | 0,110 | 0,140 |
|   |                               | Schlichten | 0,02xD     | 120   | 0,013                   | 0,018 | 0,026 | 0,035 | 0,050 | 0,059 | 0,080 | 0,100 | 0,120 |
| <b>K Gusseisen, Grauguss, Temperguss und Kugelgraphitguss</b><br>0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20),<br>0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)   | ≤ 240 HB                      | Nuten      | 1xD        | 160   | 0,017                   | 0,022 | 0,033 | 0,044 | 0,065 | 0,078 | 0,100 | 0,130 | 0,160 |
|   |                               | Schruppen  | 0,75xD     | 190   | 0,019                   | 0,025 | 0,038 | 0,051 | 0,075 | 0,090 | 0,120 | 0,150 | 0,190 |
|   |                               | Schlichten | 0,02xD     | 320   | 0,018                   | 0,024 | 0,036 | 0,048 | 0,072 | 0,086 | 0,110 | 0,140 | 0,180 |
| <b>K Gusseisen, Grauguss, Temperguss und Kugelgraphitguss</b><br>0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35),<br>0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)   | ≥ 240 HB                      | Nuten      | 1xD        | 140   | 0,015                   | 0,020 | 0,030 | 0,040 | 0,055 | 0,066 | 0,090 | 0,110 | 0,140 |
|   |                               | Schruppen  | 0,75xD     | 170   | 0,017                   | 0,023 | 0,035 | 0,046 | 0,063 | 0,076 | 0,100 | 0,130 | 0,160 |
|   |                               | Schlichten | 0,02xD     | 280   | 0,017                   | 0,022 | 0,033 | 0,044 | 0,061 | 0,073 | 0,100 | 0,120 | 0,150 |
| <b>N Aluminum, Alu-Knetlegierungen, Alulegierungen</b><br>3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1<br>3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5  | bis 3 % Si                    | Nuten      | 1xD        | 500   | 0,020                   | 0,026 | 0,039 | 0,052 | 0,080 | 0,096 | 0,130 | 0,160 | 0,200 |
|   |                               | Schruppen  | 0,75xD     | 600   | 0,022                   | 0,030 | 0,045 | 0,060 | 0,092 | 0,110 | 0,150 | 0,180 | 0,230 |
|   |                               | Schlichten | 0,02xD     | 1000  | 0,021                   | 0,029 | 0,043 | 0,057 | 0,088 | 0,106 | 0,140 | 0,180 | 0,220 |
| <b>N Aluminum-Gusslegierungen</b><br>3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9<br>3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, -G-AlSi12CuNiMg  | ≥ 7 % Si                      | Nuten      | 1xD        | 230   | 0,017                   | 0,022 | 0,033 | 0,044 | 0,060 | 0,072 | 0,100 | 0,120 | 0,150 |
|   |                               | Schruppen  | 0,75xD     | 300   | 0,019                   | 0,025 | 0,038 | 0,051 | 0,069 | 0,083 | 0,110 | 0,140 | 0,170 |
|   |                               | Schlichten | 0,02xD     | 460   | 0,018                   | 0,024 | 0,036 | 0,048 | 0,066 | 0,079 | 0,110 | 0,130 | 0,170 |
| <b>N Magnesium-Legierungen</b><br>MgMn2, G-MgAl8Zn1, G-MgAl6Zn3   |                               | Nuten      | 1xD        | 180   | 0,015                   | 0,020 | 0,030 | 0,040 | 0,055 | 0,066 | 0,090 | 0,110 | 0,140 |
|   |                               | Schruppen  | 0,75xD     | 210   | 0,017                   | 0,023 | 0,035 | 0,046 | 0,063 | 0,076 | 0,100 | 0,130 | 0,160 |
|   |                               | Schlichten | 0,02xD     | 360   | 0,017                   | 0,022 | 0,033 | 0,044 | 0,061 | 0,073 | 0,100 | 0,120 | 0,150 |
| <b>N NE-Metalle (Kupfer, Messing oder Messing je kurz- und langspanend)</b><br>2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb, 2.0380 CuZn39Pb2,<br>2.0401 CuZn39Pb3, 2.0410 ... 2.0250 CuZn20, 2.0280 CuZn33,<br>2.0332 CuZn37Pb0,5, 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 ...<br>2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10                            | ≤ 850<br>N/mm <sup>2</sup>    | Nuten      | 1xD        | 250   | 0,017                   | 0,022 | 0,033 | 0,044 | 0,060 | 0,072 | 0,100 | 0,120 | 0,150 |
|   |                               | Schruppen  | 0,75xD     | 290   | 0,019                   | 0,025 | 0,038 | 0,051 | 0,069 | 0,083 | 0,110 | 0,140 | 0,170 |
|   |                               | Schlichten | 0,02xD     | 500   | 0,018                   | 0,024 | 0,036 | 0,048 | 0,066 | 0,079 | 0,110 | 0,130 | 0,170 |



# SuperF-UT instabile Verhältnisse

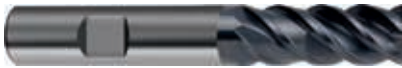
Empfehlung für kordelverzahnte Fräswerkzeuge.



| Korrekturfaktoren      |                      |                      |
|------------------------|----------------------|----------------------|
| $a_p$ Schruppen >1,5xD | <b>!</b> $v_c$ -25 % | <b>!</b> $f_z$ -25 % |
| mittellange Werkzeuge  | <b>!</b> $v_c$ -40 % | <b>!</b> $f_z$ -40 % |
| extralange Werkzeuge   | <b>!</b> $v_c$ -60 % | <b>!</b> $f_z$ -55 % |

| Material  | Härte                         | Anwendung | $a_e$ max. | $v_c$ | $f_z$ (mm/z) bei Nenn-Ø |       |       |       |       |       |       |       |       |  |
|---|-------------------------------|-----------|------------|-------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--|
|   |                               |           |            |       | 3                       | 4     | 6     | 8     | 10    | 12    | 16    | 20    | 25    |  |
| <b>P Bau- und Automatenstähle, unlegierte Vergütungs- und Einsatzstähle</b><br>1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937<br>1.0718 11SMnPb30, 1.0736 11SMn37, 1.0402 C22, 1.1178 C30E<br>1.0503 C45, 1.1191 C30E, 1.0301 C10, 1.1121 C10E<br>1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9   | ≤850<br>N/mm <sup>2</sup>     | Nuten     | 1xD        | 135   | 0,010                   | 0,013 | 0,020 | 0,026 | 0,035 | 0,042 | 0,055 | 0,066 | 0,088 |  |
|   |                               | Schruppen | 0,75xD     | 160   | 0,011                   | 0,015 | 0,023 | 0,031 | 0,041 | 0,048 | 0,066 | 0,077 | 0,099 |  |
| <b>P Automatenstähle, unlegierte Einsatzstähle, Nitrierstähle</b><br>1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20, 1.0601 C60, 1.1221 C60E<br>1.7043 38Cr4, 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5<br>1.8504 34CrAl6, 1.8519 31CrMoV9, 1.8550 34CrAlNi7  | 850-1200<br>N/mm <sup>2</sup> | Nuten     | 1xD        | 120   | 0,010                   | 0,013 | 0,020 | 0,026 | 0,035 | 0,042 | 0,055 | 0,066 | 0,088 |  |
|   |                               | Schruppen | 0,75xD     | 140   | 0,011                   | 0,015 | 0,023 | 0,031 | 0,041 | 0,048 | 0,066 | 0,077 | 0,099 |  |
| <b>P Legierte Vergütungsstähle, Werkzeug- und Schnellarbeitsstähle</b><br>1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4, 1.5710 36NiCr6,<br>1.7035 41Cr4, 1.7225 42CrMo4, 1.2080 X210Cr12, 1.2083 X42Cr13,<br>1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2,<br>1.3344 S 6-5-3, Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 | 850-1400<br>N/mm <sup>2</sup> | Nuten     | 1xD        | 100   | 0,009                   | 0,012 | 0,019 | 0,024 | 0,033 | 0,040 | 0,055 | 0,066 | 0,088 |  |
|   |                               | Schruppen | 0,75xD     | 120   | 0,011                   | 0,014 | 0,021 | 0,029 | 0,039 | 0,045 | 0,066 | 0,077 | 0,099 |  |
| <b>H Gehärteter Stahl</b><br>Werkzeugstahl, Vergütungstahl, Federstahl, Schnellarbeitsstahl,<br>Einsatzstahl, etc. z. B.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4;<br>1.2379 X155CrVMo12-1; 1.2080 X210Cr12; 1.3343 S 6-5-2   | ≤55HRC                        | Nuten     | 1xD        | 55    | 0,007                   | 0,009 | 0,013 | 0,018 | 0,024 | 0,029 | 0,044 | 0,044 | 0,066 |  |
|   | 55-63HRC                      | Schruppen | 0,33xD     | 80    | 0,009                   | 0,011 | 0,018 | 0,023 | 0,032 | 0,037 | 0,055 | 0,066 | 0,077 |  |
| <b>M Rostfreier Stahl</b><br>1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9<br>USA = 303, 410, 420F, 430, 430F  | ≤750<br>N/mm <sup>2</sup>     | Nuten     | 1xD        | 90    | 0,009                   | 0,012 | 0,019 | 0,024 | 0,033 | 0,040 | 0,055 | 0,066 | 0,088 |  |
|   |                               | Schruppen | 0,75xD     | 100   | 0,011                   | 0,014 | 0,021 | 0,029 | 0,039 | 0,045 | 0,066 | 0,077 | 0,099 |  |
| <b>M Rostfreier Stahl</b><br>1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8<br>USA = 304, 304L, 420   | 750-850<br>N/mm <sup>2</sup>  | Nuten     | 1xD        | 65    | 0,009                   | 0,011 | 0,017 | 0,022 | 0,031 | 0,037 | 0,044 | 0,066 | 0,077 |  |
|   |                               | Schruppen | 0,75xD     | 80    | 0,010                   | 0,013 | 0,019 | 0,025 | 0,035 | 0,043 | 0,055 | 0,066 | 0,088 |  |
| <b>M Rostfreier Stahl</b><br>1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10<br>USA = 310, 316, 316B, 316L, 317  | ≤850<br>N/mm <sup>2</sup>     | Nuten     | 1xD        | 55    | 0,008                   | 0,010 | 0,014 | 0,020 | 0,028 | 0,033 | 0,044 | 0,055 | 0,066 |  |
|   |                               | Schruppen | 0,60xD     | 70    | 0,009                   | 0,012 | 0,018 | 0,023 | 0,033 | 0,040 | 0,055 | 0,066 | 0,088 |  |
| <b>S Sonderlegierungen (Nickelbasis "Ni")</b><br>Nimonic, Inconel, Monel, Hastelloy   | ≤1.300<br>N/mm <sup>2</sup>   | Nuten     | 1xD        | 25    | 0,007                   | 0,009 | 0,013 | 0,018 | 0,024 | 0,029 | 0,044 | 0,044 | 0,066 |  |
|   |                               | Schruppen | 0,60xD     | 40    | 0,008                   | 0,011 | 0,015 | 0,021 | 0,029 | 0,035 | 0,044 | 0,055 | 0,077 |  |
| <b>Ti Titanlegierungen ("Ti")</b><br>3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2<br>3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5  | ≤1.300<br>N/mm <sup>2</sup>   | Nuten     | 1xD        | 50    | 0,008                   | 0,010 | 0,014 | 0,020 | 0,028 | 0,033 | 0,044 | 0,055 | 0,066 |  |
|   |                               | Schruppen | 0,60xD     | 70    | 0,009                   | 0,012 | 0,018 | 0,023 | 0,033 | 0,040 | 0,055 | 0,066 | 0,088 |  |
| <b>K Gusseisen, Grauguss, Temperguss und Kugelgraphitguss</b><br>0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20),<br>0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)   | ≤240HB                        | Nuten     | 1xD        | 120   | 0,010                   | 0,013 | 0,020 | 0,026 | 0,035 | 0,042 | 0,055 | 0,066 | 0,088 |  |
|   |                               | Schruppen | 0,75xD     | 140   | 0,011                   | 0,015 | 0,023 | 0,031 | 0,041 | 0,048 | 0,066 | 0,077 | 0,099 |  |
| <b>K Gusseisen, Grauguss, Temperguss und Kugelgraphitguss</b><br>0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35),<br>0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)   | ≥240HB                        | Nuten     | 1xD        | 105   | 0,009                   | 0,012 | 0,019 | 0,024 | 0,033 | 0,040 | 0,055 | 0,066 | 0,088 |  |
|   |                               | Schruppen | 0,75xD     | 130   | 0,011                   | 0,014 | 0,021 | 0,029 | 0,039 | 0,045 | 0,066 | 0,077 | 0,099 |  |
| <b>N Aluminum, Alu-Knetlegierungen, Alulegierungen</b><br>3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1<br>3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5  | ≤7 % Si                       | Nuten     | 1xD        | 375   | 0,012                   | 0,015 | 0,023 | 0,031 | 0,041 | 0,048 | 0,066 | 0,077 | 0,099 |  |
|   |                               | Schruppen | 0,75xD     | 440   | 0,013                   | 0,018 | 0,026 | 0,035 | 0,047 | 0,056 | 0,077 | 0,099 | 0,121 |  |
| <b>N Aluminum-Gusslegierungen</b><br>3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9<br>3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, -G-AlSi12CuNiMg  | ≥7 % Si                       | Nuten     | 1xD        | 180   | 0,011                   | 0,014 | 0,021 | 0,029 | 0,039 | 0,046 | 0,066 | 0,077 | 0,099 |  |
|   |                               | Schruppen | 0,75xD     | 210   | 0,012                   | 0,017 | 0,024 | 0,032 | 0,044 | 0,053 | 0,066 | 0,088 | 0,110 |  |
| <b>N Magnesium-Legierungen</b><br>MgMn2, G-MgAl8Zn1, G-MgAl6Zn3   |                               | Nuten     | 1xD        | 140   | 0,011                   | 0,014 | 0,021 | 0,029 | 0,039 | 0,046 | 0,066 | 0,077 | 0,099 |  |
|   |                               | Schruppen | 0,75xD     | 170   | 0,012                   | 0,017 | 0,024 | 0,032 | 0,044 | 0,053 | 0,066 | 0,088 | 0,110 |  |
| <b>N NE-Metalle (Kupfer, Messing oder Messing je kurz- und langspanend)</b><br>2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb, 2.0380 CuZn39Pb2,<br>2.0401 CuZn39Pb3, 2.0410 ... 2.0250 CuZn20, 2.0280 CuZn33,<br>2.0332 CuZn37Pb0,5, 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 ...<br>2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10                            | ≤850<br>N/mm <sup>2</sup>     | Nuten     | 1xD        | 200   | 0,011                   | 0,014 | 0,021 | 0,029 | 0,039 | 0,046 | 0,066 | 0,077 | 0,099 |  |
|   |                               | Schruppen | 0,75xD     | 230   | 0,012                   | 0,017 | 0,024 | 0,032 | 0,044 | 0,053 | 0,066 | 0,088 | 0,110 |  |

# SuperF-UT Z



## Nuten

| Werkstoff | Zerspanbarkeit | a <sub>p</sub> max. | a <sub>e</sub> max. | max. Eingriffswinkel | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |       |  |
|-----------|----------------|---------------------|---------------------|----------------------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--|
|           |                |                     |                     |                      |                | 3                         | 4     | 5     | 6     | 8     | 10    | 12    | 16    | 20    |  |
| P1/P2     | leicht/mittel  | 0,80xD              | 1,00xD              | 180°                 | 160            | 0,014                     | 0,018 | 0,023 | 0,027 | 0,044 | 0,055 | 0,066 | 0,088 | 0,110 |  |
| P3        | schwer         | 0,80xD              | 1,00xD              | 180°                 | 125            | 0,014                     | 0,018 | 0,023 | 0,027 | 0,040 | 0,050 | 0,060 | 0,080 | 0,100 |  |
| M1        | leicht/mittel  | 0,80xD              | 1,00xD              | 180°                 | 85             | 0,011                     | 0,014 | 0,018 | 0,021 | 0,028 | 0,035 | 0,042 | 0,056 | 0,070 |  |
| M2        | schwer         | 0,80xD              | 1,00xD              | 180°                 | 55             | 0,011                     | 0,014 | 0,018 | 0,021 | 0,028 | 0,035 | 0,042 | 0,056 | 0,070 |  |
| S         | mittel/schwer  | 0,80xD              | 1,00xD              | 180°                 | 45             | 0,011                     | 0,014 | 0,018 | 0,021 | 0,028 | 0,035 | 0,042 | 0,056 | 0,070 |  |
|           | sehr schwer    | 0,80xD              | 1,00xD              | 180°                 | 30             | 0,009                     | 0,012 | 0,015 | 0,018 | 0,024 | 0,030 | 0,036 | 0,048 | 0,060 |  |

## HPC Schruppen

| Werkstoff | Zerspanbarkeit | a <sub>p</sub> max. | a <sub>e</sub> max. | max. Eingriffswinkel | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |       |  |
|-----------|----------------|---------------------|---------------------|----------------------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--|
|           |                |                     |                     |                      |                | 3                         | 4     | 5     | 6     | 8     | 10    | 12    | 16    | 20    |  |
| P1/P2     | leicht/mittel  | L2                  | 0,20xD              | 53°                  | 270            | 0,022                     | 0,029 | 0,036 | 0,043 | 0,070 | 0,088 | 0,106 | 0,141 | 0,176 |  |
| P3        | schwer         | L2                  | 0,20xD              | 53°                  | 210            | 0,022                     | 0,029 | 0,036 | 0,043 | 0,064 | 0,080 | 0,096 | 0,128 | 0,160 |  |
| M1        | leicht/mittel  | L2                  | 0,15xD              | 46°                  | 150            | 0,020                     | 0,027 | 0,033 | 0,040 | 0,053 | 0,067 | 0,080 | 0,106 | 0,133 |  |
| M2        | schwer         | L2                  | 0,10xD              | 37°                  | 100            | 0,024                     | 0,032 | 0,040 | 0,048 | 0,064 | 0,081 | 0,097 | 0,129 | 0,161 |  |
| S         | mittel/schwer  | L2                  | 0,08xD              | 31°                  | 90             | 0,026                     | 0,035 | 0,044 | 0,053 | 0,070 | 0,088 | 0,105 | 0,140 | 0,175 |  |
|           | sehr schwer    | L2                  | 0,08xD              | 31°                  | 60             | 0,023                     | 0,030 | 0,038 | 0,045 | 0,060 | 0,075 | 0,090 | 0,120 | 0,150 |  |

## HSC Schruppen

| Werkstoff | Zerspanbarkeit | a <sub>p</sub> max. | a <sub>e</sub> max. | max. Eingriffswinkel | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |       |  |
|-----------|----------------|---------------------|---------------------|----------------------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--|
|           |                |                     |                     |                      |                | 3                         | 4     | 5     | 6     | 8     | 10    | 12    | 16    | 20    |  |
| P1/P2     | leicht/mittel  | L2                  | 0,15xD              | 46°                  | 290            | 0,026                     | 0,034 | 0,043 | 0,051 | 0,084 | 0,105 | 0,125 | 0,167 | 0,209 |  |
| P3        | schwer         | L2                  | 0,15xD              | 46°                  | 230            | 0,026                     | 0,034 | 0,043 | 0,051 | 0,076 | 0,095 | 0,114 | 0,152 | 0,190 |  |
| M1        | leicht/mittel  | L2                  | 0,10xD              | 37°                  | 170            | 0,024                     | 0,032 | 0,040 | 0,048 | 0,064 | 0,081 | 0,097 | 0,129 | 0,161 |  |
| M2        | schwer         | L2                  | 0,08xD              | 31°                  | 110            | 0,026                     | 0,035 | 0,044 | 0,053 | 0,070 | 0,088 | 0,105 | 0,140 | 0,175 |  |
| S         | mittel/schwer  | L2                  | 0,05xD              | 26°                  | 100            | 0,026                     | 0,035 | 0,044 | 0,053 | 0,070 | 0,088 | 0,105 | 0,140 | 0,175 |  |
|           | sehr schwer    | L2                  | 0,05xD              | 26°                  | 70             | 0,023                     | 0,030 | 0,038 | 0,045 | 0,060 | 0,075 | 0,090 | 0,120 | 0,150 |  |

## Schichten

| Werkstoff | Zerspanbarkeit | a <sub>p</sub> max. | a <sub>e</sub> max. | max. Eingriffswinkel | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |       |  |
|-----------|----------------|---------------------|---------------------|----------------------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--|
|           |                |                     |                     |                      |                | 3                         | 4     | 5     | 6     | 8     | 10    | 12    | 16    | 20    |  |
| P1/P2     | leicht/mittel  | L2                  | 0,02xD              | 18°                  | 320            | 0,019                     | 0,025 | 0,032 | 0,038 | 0,062 | 0,077 | 0,092 | 0,123 | 0,154 |  |
| P3        | schwer         | L2                  | 0,02xD              | 18°                  | 250            | 0,019                     | 0,025 | 0,032 | 0,038 | 0,056 | 0,070 | 0,084 | 0,112 | 0,140 |  |
| M1        | leicht/mittel  | L2                  | 0,02xD              | 18°                  | 170            | 0,015                     | 0,020 | 0,025 | 0,029 | 0,039 | 0,049 | 0,059 | 0,078 | 0,098 |  |
| M2        | schwer         | L2                  | 0,01xD              | 11°                  | 120            | 0,019                     | 0,025 | 0,032 | 0,038 | 0,050 | 0,063 | 0,076 | 0,101 | 0,126 |  |
| S         | mittel/schwer  | L2                  | 0,01xD              | 11°                  | 100            | 0,019                     | 0,025 | 0,032 | 0,038 | 0,050 | 0,063 | 0,076 | 0,101 | 0,126 |  |
|           | sehr schwer    | L2                  | 0,01xD              | 11°                  | 70             | 0,016                     | 0,022 | 0,027 | 0,032 | 0,043 | 0,054 | 0,065 | 0,086 | 0,108 |  |

|    |   |  |
|----|---|--|
| P1 | <b>P</b> Bau- und Automatenstähle, unlegierte Vergütungs- und Einsatzstähle | 1.0345 P235GH, 1.0050, 1.0503 C45, 1.2076 102Cr6                 |
| P2 | <b>P</b> Automatenstähle, unlegierte Einsatzstähle, Nitrierstähle           | 1.1221 C60E, 1.7043 38Cr4, 1.7131 16MnCr5, 1.8550 34CrAlNi7      |
| P3 | <b>P</b> Legierte Vergütungsstähle, Werkzeug- und Schnellarbeitsstähle      | 1.7003 38Cr2, 1.5710 36NiCr6, 1.7225 42CrMo4, 1.2419 105WCr6     |
| M1 | <b>M</b> Rostfreier Stahl (leicht bearbeitbar/geschwefelt)                  | 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9         |
| M2 | <b>M</b> Rostfreier Stahl (mittelschwer bearbeitbar)                        | 1.4301X5CrNi18-10, 1.4571 X6CrNiTi18-10, 1.4404 X2CrNiMo17-12-2  |
| Ti | <b>T</b> Titan-Legierungen  | 3.7114 TiAl5Sn2,5, 3.7124 TiCu2, 3.7154 TiAl6Zr5, 3.7164 TiAl6V4 |



## SuperF-UT Z SuperF-UT ZS

- Hochleistungs-Schruppen auch bei hohen Schnitttiefen
- hohe Laufruhe und große Zeitspanvolumen
- HPC-Fräsen in zähen, niedrig- und hochlegierten Stählen und schwer zu bearbeitenden Sonderwerkstoffen

# SuperF-UT ZS



## HPC Schruppen

| Werkstoff | Zerspanbarkeit | a <sub>p</sub> max. | a <sub>e</sub> max. | max. Eingriffswinkel | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |       |
|-----------|----------------|---------------------|---------------------|----------------------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
|           |                |                     |                     |                      |                | 3                         | 4     | 5     | 6     | 8     | 10    | 12    | 16    | 20    |
| P1/P2     | leicht/mittel  | L2                  | 0,15xD              | 46°                  | 280            | 0,026                     | 0,034 | 0,043 | 0,051 | 0,084 | 0,105 | 0,125 | 0,167 | 0,209 |
| P3        | schwer         | L2                  | 0,15xD              | 46°                  | 220            | 0,026                     | 0,034 | 0,043 | 0,051 | 0,076 | 0,095 | 0,114 | 0,152 | 0,190 |
| M1        | leicht/mittel  | L2                  | 0,10xD              | 37°                  | 160            | 0,024                     | 0,032 | 0,040 | 0,048 | 0,064 | 0,081 | 0,097 | 0,129 | 0,161 |
| M2        | schwer         | L2                  | 0,10xD              | 37°                  | 100            | 0,024                     | 0,032 | 0,040 | 0,048 | 0,064 | 0,081 | 0,097 | 0,129 | 0,161 |
| S         | mittel/schwer  | L2                  | 0,08xD              | 31°                  | 90             | 0,026                     | 0,035 | 0,044 | 0,053 | 0,070 | 0,088 | 0,105 | 0,140 | 0,175 |
|           | sehr schwer    | L2                  | 0,08xD              | 31°                  | 60             | 0,023                     | 0,030 | 0,038 | 0,045 | 0,060 | 0,075 | 0,090 | 0,120 | 0,150 |

## HSC Schruppen

| Werkstoff | Zerspanbarkeit | a <sub>p</sub> max. | a <sub>e</sub> max. | max. Eingriffswinkel | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |       |
|-----------|----------------|---------------------|---------------------|----------------------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
|           |                |                     |                     |                      |                | 3                         | 4     | 5     | 6     | 8     | 10    | 12    | 16    | 20    |
| P1/P2     | leicht/mittel  | L2                  | 0,10xD              | 37°                  | 310            | 0,031                     | 0,041 | 0,052 | 0,062 | 0,101 | 0,127 | 0,152 | 0,202 | 0,253 |
| P3        | schwer         | L2                  | 0,10xD              | 37°                  | 240            | 0,031                     | 0,041 | 0,052 | 0,062 | 0,092 | 0,115 | 0,138 | 0,184 | 0,230 |
| M1        | leicht/mittel  | L2                  | 0,08xD              | 31°                  | 170            | 0,026                     | 0,035 | 0,044 | 0,053 | 0,070 | 0,088 | 0,105 | 0,140 | 0,175 |
| M2        | schwer         | L2                  | 0,08xD              | 31°                  | 110            | 0,026                     | 0,035 | 0,044 | 0,053 | 0,070 | 0,088 | 0,105 | 0,140 | 0,175 |
| S         | mittel/schwer  | L2                  | 0,05xD              | 26°                  | 100            | 0,026                     | 0,035 | 0,044 | 0,053 | 0,070 | 0,088 | 0,105 | 0,140 | 0,175 |
|           | sehr schwer    | L2                  | 0,05xD              | 26°                  | 70             | 0,023                     | 0,030 | 0,038 | 0,045 | 0,060 | 0,075 | 0,090 | 0,120 | 0,150 |

## Schlichten

| Werkstoff | Zerspanbarkeit | a <sub>p</sub> max. | a <sub>e</sub> max. | max. Eingriffswinkel | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |       |
|-----------|----------------|---------------------|---------------------|----------------------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
|           |                |                     |                     |                      |                | 3                         | 4     | 5     | 6     | 8     | 10    | 12    | 16    | 20    |
| P1/P2     | leicht/mittel  | L2                  | 0,01xD              | 11°                  | 340            | 0,024                     | 0,032 | 0,041 | 0,049 | 0,079 | 0,099 | 0,119 | 0,158 | 0,198 |
| P3        | schwer         | L2                  | 0,01xD              | 11°                  | 270            | 0,024                     | 0,032 | 0,041 | 0,049 | 0,072 | 0,090 | 0,108 | 0,144 | 0,180 |
| M1        | leicht/mittel  | L2                  | 0,01xD              | 11°                  | 180            | 0,019                     | 0,025 | 0,032 | 0,038 | 0,050 | 0,063 | 0,076 | 0,101 | 0,126 |
| M2        | schwer         | L2                  | 0,01xD              | 11°                  | 120            | 0,019                     | 0,025 | 0,032 | 0,038 | 0,050 | 0,063 | 0,076 | 0,101 | 0,126 |
| S         | mittel/schwer  | L2                  | 0,01xD              | 11°                  | 100            | 0,019                     | 0,025 | 0,032 | 0,038 | 0,050 | 0,063 | 0,076 | 0,101 | 0,126 |
|           | sehr schwer    | L2                  | 0,01xD              | 11°                  | 70             | 0,016                     | 0,022 | 0,027 | 0,032 | 0,043 | 0,054 | 0,065 | 0,086 | 0,108 |

|    |   |  |
|----|---|--|
| P1 | <b>P</b> Bau- und Automatenstähle, unlegierte Vergütungs- und Einsatzstähle | 1.0345 P235GH, 1.0050, 1.0503 C45, 1.2076 102Cr6                 |
| P2 | <b>P</b> Automatenstähle, unlegierte Einsatzstähle, Nitrierstähle           | 1.1221 C60E, 1.7043 38Cr4, 1.7131 16MnCr5, 1.8550 34CrAlNi7      |
| P3 | <b>P</b> Legierte Vergütungsstähle, Werkzeug- und Schnellarbeitsstähle      | 1.7003 38Cr2, 1.5710 36NiCr6, 1.7225 42CrMo4, 1.2419 105WCr6     |
| M1 | <b>M</b> Rostfreier Stahl (leicht bearbeitbar/geschwefelt)                  | 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9         |
| M2 | <b>M</b> Rostfreier Stahl (mittelschwer bearbeitbar)                        | 1.4301X5CrNi18-10, 1.4571 X6CrNiTi18-10, 1.4404 X2CrNiMo17-12-2  |
| Ti | <b>T</b> Titan-Legierungen  | 3.7114 TiAl5Sn2,5, 3.7124 TiCu2, 3.7154 TiAl6Zr5, 3.7164 TiAl6V4 |



## SuperF-UT ZS-r SuperF-UT ZS-7

- höchste Zerspanleistung bei Trochoidalfräsanwendungen (TC)
- 5 oder 7 Schneiden mit niedrigem Drallwinkel für reduzierte Kontaktpunkte
- bei limitierten Schnittgeschwindigkeiten hohe Vorschübe für herausragendes Zeitspanvolumen

# SuperF-UT NX Micro



Katalog-Nr. 54594

## offene Nuten und Helix

|          | Material/ISO-Werkstoff                              | a <sub>e</sub><br>max. | a <sub>p</sub><br>max. | v <sub>c</sub> | f <sub>z</sub> / Ø |        |        | v <sub>c</sub> | f <sub>z</sub> / Ø |        |              | v <sub>c</sub> | f <sub>z</sub> / Ø |        |            |        |        |
|----------|---|------------------------|------------------------|----------------|--------------------|--------|--------|----------------|--------------------|--------|--------------|----------------|--------------------|--------|------------|--------|--------|
|          |   |                        |                        |                | 0,8                | 1,0    | 1,2    |                | 1,5                | 1,8    | 2,0          |                | 2,2                | 2,5    | 2,8        | 3,0    |        |
| <b>P</b> | Unlegierter Stahl                                   | 1,00xD                 | 1,00xD                 | <b>140</b>     | 0,0072             | 0,0090 | 0,0108 | <b>168</b>     | 0,0135             | 0,0162 | <b>182</b>   | 0,0180         | 0,0198             | 0,0225 | <b>196</b> | 0,0252 | 0,0270 |
|          | Niedriglegierter Stahl                              | 1,00xD                 | 1,00xD                 | <b>140</b>     | 0,0064             | 0,0080 | 0,0096 | <b>168</b>     | 0,0120             | 0,0144 | <b>182</b>   | 0,0160         | 0,0176             | 0,0200 | <b>196</b> | 0,0224 | 0,0240 |
|          | Hochlegierter Stahl und Werkzeugstahl               | 1,00xD                 | 0,75xD                 | <b>140</b>     | 0,0048             | 0,0060 | 0,0072 | <b>168</b>     | 0,0090             | 0,0108 | <b>182</b>   | 0,0120         | 0,0132             | 0,0150 | <b>196</b> | 0,0168 | 0,0180 |
| <b>M</b> | Nichtrostender Stahl, ferritisch/martensitisch      | 1,00xD                 | 1,00xD                 | <b>140</b>     | 0,0064             | 0,0080 | 0,0096 | <b>168</b>     | 0,0120             | 0,0144 | <b>182</b>   | 0,0160         | 0,0176             | 0,0200 | <b>196</b> | 0,0224 | 0,0240 |
|          | Nichtrostender Stahl, austenitisch                  | 1,00xD                 | 1,00xD                 | <b>120</b>     | 0,0056             | 0,0070 | 0,0084 | <b>144</b>     | 0,0105             | 0,0126 | <b>156</b>   | 0,0140         | 0,0154             | 0,0175 | <b>168</b> | 0,0196 | 0,0210 |
|          | Duplexstahl, hochfeste nichtrostende Stähle         | 1,00xD                 | 0,75xD                 | <b>90</b>      | 0,0049             | 0,0061 | 0,0073 | <b>108</b>     | 0,0092             | 0,0110 | <b>117</b>   | 0,0122         | 0,0135             | 0,0153 | <b>126</b> | 0,0171 | 0,0184 |
| <b>K</b> | Grauguss  | 1,00xD                 | 1,00xD                 | <b>120</b>     | 0,0056             | 0,0070 | 0,0084 | <b>144</b>     | 0,0105             | 0,0126 | <b>156</b>   | 0,0140         | 0,0154             | 0,0175 | <b>168</b> | 0,0196 | 0,0210 |
|          | Gusseisen mit Kugelgraphit                          | 1,00xD                 | 1,00xD                 | <b>100</b>     | 0,0050             | 0,0062 | 0,0075 | <b>120</b>     | 0,0093             | 0,0112 | <b>130</b>   | 0,0124         | 0,0137             | 0,0156 | <b>140</b> | 0,0174 | 0,0187 |
|          | Temperguss<br>GJV & ADI                             | 1,00xD                 | 1,00xD                 | <b>100</b>     | 0,0050             | 0,0062 | 0,0075 | <b>120</b>     | 0,0093             | 0,0112 | <b>130</b>   | 0,0124         | 0,0137             | 0,0156 | <b>140</b> | 0,0174 | 0,0187 |
| <b>N</b> | Aluminium-Knetlegierungen                           | 1,00xD                 | 1,00xD                 | <b>170</b>     | 0,0096             | 0,0120 | 0,0144 | <b>204</b>     | 0,0180             | 0,0216 | <b>221</b>   | 0,0240         | 0,0264             | 0,0300 | <b>238</b> | 0,0336 | 0,0360 |
|          | Aluminium-Gusslegierungen                           | 1,00xD                 | 1,00xD                 | <b>125</b>     | 0,0088             | 0,0110 | 0,0133 | <b>150</b>     | 0,0166             | 0,0199 | <b>162,5</b> | 0,0221         | 0,0243             | 0,0276 | <b>175</b> | 0,0309 | 0,0331 |
|          | Kupfer und Kupferlegierungen                        | 1,00xD                 | 1,00xD                 | <b>125</b>     | 0,0088             | 0,0110 | 0,0133 | <b>150</b>     | 0,0166             | 0,0199 | <b>162,5</b> | 0,0221         | 0,0243             | 0,0276 | <b>175</b> | 0,0309 | 0,0331 |
| <b>S</b> | Warmfeste Legierungen, Fe-Basis                     | 1,00xD                 | 0,50xD                 | <b>100</b>     | 0,0036             | 0,0045 | 0,0054 | <b>120</b>     | 0,0068             | 0,0081 | <b>130</b>   | 0,0090         | 0,0099             | 0,0113 | <b>140</b> | 0,0126 | 0,0135 |
|          | Warmfeste Legierungen, Ni-Basis, CO-Basis           | 1,00xD                 | 0,50xD                 | <b>60</b>      | 0,0029             | 0,0037 | 0,0044 | <b>72</b>      | 0,0055             | 0,0066 | <b>78</b>    | 0,0073         | 0,0080             | 0,0091 | <b>84</b>  | 0,0102 | 0,0110 |
|          | Titanlegierungen & Reintitan                        | 1,00xD                 | 0,75xD                 | <b>100</b>     | 0,0060             | 0,0075 | 0,0090 | <b>120</b>     | 0,0113             | 0,0135 | <b>130</b>   | 0,0150         | 0,0165             | 0,0188 | <b>140</b> | 0,0210 | 0,0225 |
| <b>H</b> | Gehärteter Stahl, gehärtet und angelassen, < 55 HRC | 1,00xD                 | 0,25xD                 | <b>35</b>      | 0,0032             | 0,0040 | 0,0048 | <b>42</b>      | 0,0060             | 0,0072 | <b>46</b>    | 0,0080         | 0,0088             | 0,0100 | <b>49</b>  | 0,0112 | 0,0120 |

## Rampen und geschlossene Nuten

|          | Material/ISO-Werkstoff                              | a <sub>e</sub><br>max. | a <sub>p</sub><br>max. | v <sub>c</sub> | f <sub>z</sub> / Ø |        |        | v <sub>c</sub> | f <sub>z</sub> / Ø |        |            | v <sub>c</sub> | f <sub>z</sub> / Ø |        |            |        |        |
|----------|---|------------------------|------------------------|----------------|--------------------|--------|--------|----------------|--------------------|--------|------------|----------------|--------------------|--------|------------|--------|--------|
|          |   |                        |                        |                | 0,8                | 1,0    | 1,2    |                | 1,5                | 1,8    | 2,0        |                | 2,2                | 2,5    | 2,8        | 3,0    |        |
| <b>P</b> | Unlegierter Stahl                                   | 1,00xD                 | 1,00xD                 | <b>100</b>     | 0,0043             | 0,0054 | 0,0065 | <b>120</b>     | 0,0081             | 0,0097 | <b>130</b> | 0,0108         | 0,0119             | 0,0135 | <b>140</b> | 0,0151 | 0,0162 |
|          | Niedriglegierter Stahl                              | 1,00xD                 | 1,00xD                 | <b>100</b>     | 0,0038             | 0,0048 | 0,0058 | <b>120</b>     | 0,0072             | 0,0086 | <b>130</b> | 0,0096         | 0,0106             | 0,0120 | <b>140</b> | 0,0134 | 0,0144 |
|          | Hochlegierter Stahl und Werkzeugstahl               | 1,00xD                 | 0,75xD                 | <b>100</b>     | 0,0029             | 0,0036 | 0,0043 | <b>120</b>     | 0,0054             | 0,0065 | <b>130</b> | 0,0072         | 0,0079             | 0,0090 | <b>140</b> | 0,0101 | 0,0108 |
| <b>M</b> | Nichtrostender Stahl, ferritisch/martensitisch      | 1,00xD                 | 1,00xD                 | <b>100</b>     | 0,0038             | 0,0048 | 0,0058 | <b>120</b>     | 0,0072             | 0,0086 | <b>130</b> | 0,0096         | 0,0106             | 0,0120 | <b>140</b> | 0,0134 | 0,0144 |
|          | Nichtrostender Stahl, austenitisch                  | 1,00xD                 | 1,00xD                 | <b>90</b>      | 0,0034             | 0,0042 | 0,0050 | <b>108</b>     | 0,0063             | 0,0076 | <b>117</b> | 0,0084         | 0,0092             | 0,0105 | <b>126</b> | 0,0118 | 0,0126 |
|          | Duplexstahl, hochfeste nichtrostende Stähle         | 1,00xD                 | 0,75xD                 | <b>65</b>      | 0,0029             | 0,0037 | 0,0044 | <b>78</b>      | 0,0055             | 0,0066 | <b>85</b>  | 0,0073         | 0,0081             | 0,0092 | <b>91</b>  | 0,0103 | 0,0110 |
| <b>K</b> | Grauguss  | 1,00xD                 | 1,00xD                 | <b>90</b>      | 0,0034             | 0,0042 | 0,0050 | <b>108</b>     | 0,0063             | 0,0076 | <b>117</b> | 0,0084         | 0,0092             | 0,0105 | <b>126</b> | 0,0118 | 0,0126 |
|          | Gusseisen mit Kugelgraphit                          | 1,00xD                 | 1,00xD                 | <b>75</b>      | 0,0030             | 0,0037 | 0,0045 | <b>90</b>      | 0,0056             | 0,0067 | <b>98</b>  | 0,0075         | 0,0082             | 0,0093 | <b>105</b> | 0,0105 | 0,0112 |
|          | Temperguss<br>GJV & ADI                             | 1,00xD                 | 1,00xD                 | <b>75</b>      | 0,0030             | 0,0037 | 0,0045 | <b>90</b>      | 0,0056             | 0,0067 | <b>98</b>  | 0,0075         | 0,0082             | 0,0093 | <b>105</b> | 0,0105 | 0,0112 |
| <b>N</b> | Aluminium-Knetlegierungen                           | 1,00xD                 | 1,00xD                 | <b>120</b>     | 0,0058             | 0,0072 | 0,0086 | <b>144</b>     | 0,0108             | 0,0130 | <b>156</b> | 0,0144         | 0,0158             | 0,0180 | <b>168</b> | 0,0202 | 0,0216 |
|          | Aluminium-Gusslegierungen                           | 1,00xD                 | 1,00xD                 | <b>90</b>      | 0,0053             | 0,0066 | 0,0080 | <b>108</b>     | 0,0099             | 0,0119 | <b>117</b> | 0,0133         | 0,0146             | 0,0166 | <b>126</b> | 0,0186 | 0,0199 |
|          | Kupfer und Kupferlegierungen                        | 1,00xD                 | 1,00xD                 | <b>90</b>      | 0,0053             | 0,0066 | 0,0080 | <b>108</b>     | 0,0099             | 0,0119 | <b>117</b> | 0,0133         | 0,0146             | 0,0166 | <b>126</b> | 0,0186 | 0,0199 |
| <b>S</b> | Warmfeste Legierungen, Fe-Basis                     | 1,00xD                 | 0,50xD                 | <b>75</b>      | 0,0022             | 0,0027 | 0,0032 | <b>90</b>      | 0,0041             | 0,0049 | <b>98</b>  | 0,0054         | 0,0059             | 0,0068 | <b>105</b> | 0,0076 | 0,0081 |
|          | Warmfeste Legierungen, Ni-Basis, CO-Basis           | 1,00xD                 | 0,50xD                 | <b>45</b>      | 0,0018             | 0,0022 | 0,0026 | <b>54</b>      | 0,0033             | 0,0039 | <b>59</b>  | 0,0044         | 0,0048             | 0,0055 | <b>63</b>  | 0,0061 | 0,0066 |
|          | Titanlegierungen & Reintitan                        | 1,00xD                 | 0,75xD                 | <b>70</b>      | 0,0036             | 0,0045 | 0,0054 | <b>84</b>      | 0,0068             | 0,0081 | <b>91</b>  | 0,0090         | 0,0099             | 0,0113 | <b>98</b>  | 0,0126 | 0,0135 |
| <b>H</b> | Gehärteter Stahl, gehärtet und angelassen, < 55 HRC | 1,00xD                 | 0,25xD                 | <b>25</b>      | 0,0019             | 0,0024 | 0,0029 | <b>30</b>      | 0,0036             | 0,0043 | <b>33</b>  | 0,0048         | 0,0053             | 0,0060 | <b>35</b>  | 0,0067 | 0,0072 |

## Schuppen

|          | Material/ISO-Werkstoff                              | a <sub>e</sub><br>max. | a <sub>p</sub><br>max. | v <sub>c</sub> | f <sub>z</sub> / Ø |        |        | v <sub>c</sub> | f <sub>z</sub> / Ø |        |            | v <sub>c</sub> | f <sub>z</sub> / Ø |        |            |        |        |
|----------|---|------------------------|------------------------|----------------|--------------------|--------|--------|----------------|--------------------|--------|------------|----------------|--------------------|--------|------------|--------|--------|
|          |   |                        |                        |                | 0,8                | 1,0    | 1,2    |                | 1,5                | 1,8    | 2,0        |                | 2,2                | 2,5    | 2,8        | 3,0    |        |
| <b>P</b> | Unlegierter Stahl                                   | 0,25xD                 | 2,00xD                 | <b>170</b>     | 0,0113             | 0,0142 | 0,0170 | <b>204</b>     | 0,0213             | 0,0255 | <b>221</b> | 0,0284         | 0,0312             | 0,0354 | <b>238</b> | 0,0397 | 0,0425 |
|          | Niedriglegierter Stahl                              | 0,25xD                 | 2,00xD                 | <b>170</b>     | 0,0101             | 0,0126 | 0,0151 | <b>204</b>     | 0,0189             | 0,0227 | <b>221</b> | 0,0252         | 0,0277             | 0,0315 | <b>238</b> | 0,0353 | 0,0378 |
|          | Hochlegierter Stahl und Werkzeugstahl               | 0,20xD                 | 2,00xD                 | <b>170</b>     | 0,0076             | 0,0095 | 0,0113 | <b>204</b>     | 0,0142             | 0,0170 | <b>221</b> | 0,0189         | 0,0208             | 0,0236 | <b>238</b> | 0,0265 | 0,0284 |
| <b>M</b> | Nichtrostender Stahl, ferritisch/martensitisch      | 0,25xD                 | 2,00xD                 | <b>170</b>     | 0,0101             | 0,0126 | 0,0151 | <b>204</b>     | 0,0189             | 0,0227 | <b>221</b> | 0,0252         | 0,0277             | 0,0315 | <b>238</b> | 0,0353 | 0,0378 |
|          | Nichtrostender Stahl, austenitisch                  | 0,20xD                 | 2,00xD                 | <b>145</b>     | 0,0088             | 0,0110 | 0,0132 | <b>174</b>     | 0,0165             | 0,0198 | <b>189</b> | 0,0221         | 0,0243             | 0,0276 | <b>203</b> | 0,0309 | 0,0331 |
|          | Duplexstahl, hochfeste nichtrostende Stähle         | 0,20xD                 | 2,00xD                 | <b>105</b>     | 0,0077             | 0,0096 | 0,0116 | <b>126</b>     | 0,0145             | 0,0174 | <b>137</b> | 0,0193         | 0,0212             | 0,0241 | <b>147</b> | 0,0270 | 0,0289 |
| <b>K</b> | Grauguss  | 0,25xD                 | 2,00xD                 | <b>145</b>     | 0,0088             | 0,0110 | 0,0132 | <b>174</b>     | 0,0165             | 0,0198 | <b>189</b> | 0,0221         | 0,0243             | 0,0276 | <b>203</b> | 0,0309 | 0,0331 |
|          | Gusseisen mit Kugelgraphit                          | 0,25xD                 | 2,00xD                 | <b>120</b>     | 0,0078             | 0,0098 | 0,0118 | <b>144</b>     | 0,0147             | 0,0176 | <b>156</b> | 0,0196         | 0,0216             | 0,0245 | <b>168</b> | 0,0274 | 0,0294 |
|          | Temperguss<br>GJV & ADI                             | 0,25xD                 | 2,00xD                 | <b>120</b>     | 0,0078             | 0,0098 | 0,0118 | <b>144</b>     | 0,0147             | 0,0176 | <b>156</b> | 0,0196         | 0,0216             | 0,0245 | <b>168</b> | 0,0274 | 0,0294 |
| <b>N</b> | Aluminium-Knetlegierungen                           | 0,25xD                 | 2,00xD                 | <b>200</b>     | 0,0151             | 0,0189 | 0,0227 | <b>240</b>     | 0,0284             | 0,0340 | <b>260</b> | 0,0378         | 0,0416             | 0,0473 | <b>280</b> | 0,0529 | 0,0567 |
|          | Aluminium-Gusslegierungen                           | 0,25xD                 | 2,00xD                 | <b>150</b>     | 0,0139             | 0,0174 | 0,0209 | <b>180</b>     | 0,0261             | 0,0313 | <b>195</b> | 0,0348         | 0,0383             | 0,0435 | <b>210</b> | 0,0487 | 0,0522 |
|          | Kupfer und Kupferlegierungen                        | 0,25xD                 | 2,00xD                 | <b>150</b>     | 0,0139             | 0,0174 | 0,0209 | <b>180</b>     | 0,0261             | 0,0313 | <b>195</b> | 0,0348         | 0,0383             | 0,0435 | <b>210</b> | 0,0487 | 0,0522 |
| <b>S</b> | Warmfeste Legierungen, Fe-Basis                     | 0,15xD                 | 2,00xD                 | <b>120</b>     | 0,0057             | 0,0071 | 0,0085 | <b>144</b>     | 0,0106             | 0,0128 | <b>156</b> | 0,0142         | 0,0156             | 0,0177 | <b>168</b> | 0,0198 | 0,0213 |
|          | Warmfeste Legierungen, Ni-Basis, CO-Basis           | 0,15xD                 | 2,00xD                 | <b>70</b>      | 0,0046             | 0,0058 | 0,0069 | <b>84</b>      | 0,0086             | 0,0104 | <b>91</b>  | 0,0115         | 0,0127             | 0,0144 | <b>98</b>  | 0,0161 | 0,0173 |
|          | Titanlegierungen & Reintitan                        | 0,20xD                 | 2,00xD                 | <b>115</b>     | 0,0095             | 0,0118 | 0,0142 | <b>138</b>     | 0,0177             | 0,0213 | <b>150</b> | 0,0236         | 0,0260             | 0,0295 | <b>161</b> | 0,0331 | 0,0354 |
| <b>H</b> | Gehärteter Stahl, gehärtet und angelassen, < 55 HRC | 0,05xD                 | 2,00xD                 | <b>45</b>      | 0,0050             | 0,0063 | 0,0076 | <b>54</b>      | 0,0095             | 0,0113 | <b>59</b>  | 0,0126         | 0,0139             | 0,0158 | <b>63</b>  | 0,0176 | 0,0189 |

**Schlichten**

|          | Material/ISO-Werkstoff                              | a <sub>e</sub><br>max. | a <sub>p</sub><br>max. | v <sub>c</sub> | f <sub>z</sub> / Ø |        |        | f <sub>z</sub> / Ø |        |        | f <sub>z</sub> / Ø |        |        | f <sub>z</sub> / Ø |                |        |        |
|----------|---|------------------------|------------------------|----------------|--------------------|--------|--------|--------------------|--------|--------|--------------------|--------|--------|--------------------|----------------|--------|--------|
|          |   |                        |                        |                | 0,8                | 1,0    | 1,2    | v <sub>c</sub>     | 1,5    | 1,8    | v <sub>c</sub>     | 2,0    | 2,2    | 2,5                | v <sub>c</sub> | 2,8    | 3,0    |
|          | Unlegierter Stahl                                   | 0,03xD                 | 2,00xD                 | <b>180</b>     | 0,0086             | 0,0108 | 0,0130 | <b>216</b>         | 0,0162 | 0,0194 | <b>234</b>         | 0,0216 | 0,0238 | 0,0270             | <b>252</b>     | 0,0302 | 0,0324 |
| <b>P</b> | Niedriglegierter Stahl                              | 0,03xD                 | 2,00xD                 | <b>180</b>     | 0,0077             | 0,0096 | 0,0115 | <b>216</b>         | 0,0144 | 0,0173 | <b>234</b>         | 0,0192 | 0,0211 | 0,0240             | <b>252</b>     | 0,0269 | 0,0288 |
|          | Hochlegierter Stahl und Werkzeugstahl               | 0,03xD                 | 2,00xD                 | <b>180</b>     | 0,0058             | 0,0072 | 0,0086 | <b>216</b>         | 0,0108 | 0,0130 | <b>234</b>         | 0,0144 | 0,0158 | 0,0180             | <b>252</b>     | 0,0202 | 0,0216 |
|          | Nichtrostender Stahl, ferritisch/martensitisch      | 0,03xD                 | 2,00xD                 | <b>180</b>     | 0,0077             | 0,0096 | 0,0115 | <b>216</b>         | 0,0144 | 0,0173 | <b>234</b>         | 0,0192 | 0,0211 | 0,0240             | <b>252</b>     | 0,0269 | 0,0288 |
| <b>M</b> | Nichtrostender Stahl, austenitisch                  | 0,03xD                 | 2,00xD                 | <b>155</b>     | 0,0067             | 0,0084 | 0,0101 | <b>186</b>         | 0,0126 | 0,0151 | <b>202</b>         | 0,0168 | 0,0185 | 0,0210             | <b>217</b>     | 0,0235 | 0,0252 |
|          | Duplexstahl, hochfeste nichtrostende Stähle         | 0,03xD                 | 2,00xD                 | <b>115</b>     | 0,0059             | 0,0073 | 0,0088 | <b>138</b>         | 0,0110 | 0,0132 | <b>150</b>         | 0,0147 | 0,0162 | 0,0184             | <b>161</b>     | 0,0206 | 0,0220 |
|          | Grauguss  | 0,03xD                 | 2,00xD                 | <b>155</b>     | 0,0067             | 0,0084 | 0,0101 | <b>186</b>         | 0,0126 | 0,0151 | <b>202</b>         | 0,0168 | 0,0185 | 0,0210             | <b>217</b>     | 0,0235 | 0,0252 |
| <b>K</b> | Gusseisen mit Kugelgraphit                          |                        |                        |                |                    |        |        |                    |        |        |                    |        |        |                    |                |        |        |
|          | Temperguss  | 0,03xD                 | 2,00xD                 | <b>130</b>     | 0,0060             | 0,0075 | 0,0090 | <b>156</b>         | 0,0112 | 0,0134 | <b>169</b>         | 0,0149 | 0,0164 | 0,0187             | <b>182</b>     | 0,0209 | 0,0224 |
|          | GJV & ADI   |                        |                        |                |                    |        |        |                    |        |        |                    |        |        |                    |                |        |        |
|          | Aluminium-Knetlegierungen                           | 0,03xD                 | 2,00xD                 | <b>220</b>     | 0,0115             | 0,0144 | 0,0173 | <b>264</b>         | 0,0216 | 0,0259 | <b>286</b>         | 0,0288 | 0,0317 | 0,0360             | <b>308</b>     | 0,0403 | 0,0432 |
| <b>N</b> | Aluminium-Gusslegierungen                           |                        |                        |                |                    |        |        |                    |        |        |                    |        |        |                    |                |        |        |
|          | Kupfer und Kupferlegierungen                        | 0,03xD                 | 2,00xD                 | <b>160</b>     | 0,0106             | 0,0133 | 0,0159 | <b>192</b>         | 0,0199 | 0,0239 | <b>208</b>         | 0,0265 | 0,0292 | 0,0331             | <b>224</b>     | 0,0371 | 0,0398 |
|          | Warmfeste Legierungen, Fe-Basis                     | 0,03xD                 | 2,00xD                 | <b>130</b>     | 0,0043             | 0,0054 | 0,0065 | <b>156</b>         | 0,0081 | 0,0097 | <b>169</b>         | 0,0108 | 0,0119 | 0,0135             | <b>182</b>     | 0,0151 | 0,0162 |
| <b>S</b> | Warmfeste Legierungen, Ni-Basis, CO-Basis           | 0,03xD                 | 2,00xD                 | <b>75</b>      | 0,0035             | 0,0044 | 0,0053 | <b>90</b>          | 0,0066 | 0,0079 | <b>98</b>          | 0,0088 | 0,0096 | 0,0110             | <b>105</b>     | 0,0123 | 0,0132 |
|          | Titanlegierungen & Reintitan                        | 0,03xD                 | 2,00xD                 | <b>120</b>     | 0,0072             | 0,0090 | 0,0108 | <b>144</b>         | 0,0135 | 0,0162 | <b>156</b>         | 0,0180 | 0,0198 | 0,0225             | <b>168</b>     | 0,0252 | 0,0270 |
| <b>H</b> | Gehärteter Stahl, gehärtet und angelassen, < 55 HRC | 0,02xD                 | 2,00xD                 | <b>45</b>      | 0,0038             | 0,0048 | 0,0058 | <b>54</b>          | 0,0072 | 0,0086 | <b>59</b>          | 0,0096 | 0,0106 | 0,0120             | <b>63</b>      | 0,0134 | 0,0144 |

**Bohren**

|          | Material/ISO-Werkstoff                         | a <sub>p</sub><br>max. | v <sub>c</sub> | f <sub>z</sub> / Ø |        |        | f <sub>z</sub> / Ø |        |        | f <sub>z</sub> / Ø |        |        | f <sub>z</sub> / Ø |                |        |        |
|----------|--|------------------------|----------------|--------------------|--------|--------|--------------------|--------|--------|--------------------|--------|--------|--------------------|----------------|--------|--------|
|          |  |                        |                | 0,8                | 1,0    | 1,2    | v <sub>c</sub>     | 1,5    | 1,8    | v <sub>c</sub>     | 2,0    | 2,2    | 2,5                | v <sub>c</sub> | 2,8    | 3,0    |
|          | Unlegierter Stahl                              | 1,00xD                 | <b>100</b>     | 0,0014             | 0,0018 | 0,0022 | <b>120</b>         | 0,0027 | 0,0032 | <b>130</b>         | 0,0036 | 0,0040 | 0,0045             | <b>140</b>     | 0,0050 | 0,0054 |
| <b>P</b> | Niedriglegierter Stahl                         | 1,00xD                 | <b>100</b>     | 0,0013             | 0,0016 | 0,0019 | <b>120</b>         | 0,0024 | 0,0029 | <b>130</b>         | 0,0032 | 0,0035 | 0,0040             | <b>140</b>     | 0,0045 | 0,0048 |
|          | Hochlegierter Stahl und Werkzeugstahl          | 0,50xD                 | <b>90</b>      | 0,0010             | 0,0012 | 0,0014 | <b>108</b>         | 0,0018 | 0,0022 | <b>117</b>         | 0,0024 | 0,0026 | 0,0030             | <b>126</b>     | 0,0034 | 0,0036 |
|          | Nichtrostender Stahl, ferritisch/martensitisch | 0,75xD                 | <b>90</b>      | 0,0012             | 0,0015 | 0,0018 | <b>108</b>         | 0,0023 | 0,0027 | <b>117</b>         | 0,0030 | 0,0033 | 0,0038             | <b>126</b>     | 0,0042 | 0,0045 |
| <b>M</b> | Nichtrostender Stahl, austenitisch             | 0,50xD                 | <b>85</b>      | 0,0011             | 0,0014 | 0,0017 | <b>102</b>         | 0,0021 | 0,0025 | <b>111</b>         | 0,0028 | 0,0031 | 0,0035             | <b>119</b>     | 0,0039 | 0,0042 |
|          | Duplexstahl, hochfeste nichtrostende Stähle    | 0,25xD                 | <b>65</b>      | 0,0010             | 0,0012 | 0,0014 | <b>78</b>          | 0,0018 | 0,0022 | <b>85</b>          | 0,0024 | 0,0026 | 0,0030             | <b>91</b>      | 0,0034 | 0,0036 |
|          | Grauguss                                       | 1,00xD                 | <b>90</b>      | 0,0011             | 0,0014 | 0,0017 | <b>108</b>         | 0,0021 | 0,0025 | <b>117</b>         | 0,0028 | 0,0031 | 0,0035             | <b>126</b>     | 0,0039 | 0,0042 |
| <b>K</b> | Gusseisen mit Kugelgraphit                     |                        |                |                    |        |        |                    |        |        |                    |        |        |                    |                |        |        |
|          | Temperguss                                     | 1,00xD                 | <b>75</b>      | 0,0010             | 0,0012 | 0,0014 | <b>90</b>          | 0,0018 | 0,0022 | <b>98</b>          | 0,0024 | 0,0026 | 0,0030             | <b>105</b>     | 0,0034 | 0,0036 |
|          | GJV & ADI                                      |                        |                |                    |        |        |                    |        |        |                    |        |        |                    |                |        |        |
|          | Aluminium-Knetlegierungen                      | 0,50xD                 | <b>125</b>     | 0,0019             | 0,0024 | 0,0029 | <b>150</b>         | 0,0036 | 0,0043 | <b>163</b>         | 0,0048 | 0,0053 | 0,0060             | <b>175</b>     | 0,0067 | 0,0072 |
| <b>N</b> | Aluminium-Gusslegierungen                      |                        |                |                    |        |        |                    |        |        |                    |        |        |                    |                |        |        |
|          | Kupfer und Kupferlegierungen                   | 0,50xD                 | <b>90</b>      | 0,0018             | 0,0022 | 0,0026 | <b>108</b>         | 0,0033 | 0,0040 | <b>117</b>         | 0,0044 | 0,0048 | 0,0055             | <b>126</b>     | 0,0062 | 0,0066 |
|          | Warmfeste Legierungen, Fe-Basis                | 0,25xD                 | <b>75</b>      | 0,0007             | 0,0009 | 0,0011 | <b>90</b>          | 0,0014 | 0,0016 | <b>98</b>          | 0,0018 | 0,0020 | 0,0023             | <b>105</b>     | 0,0025 | 0,0027 |
| <b>S</b> | Warmfeste Legierungen, Ni-Basis, CO-Basis      | 0,25xD                 | <b>45</b>      | 0,0006             | 0,0008 | 0,0009 | <b>54</b>          | 0,0011 | 0,0014 | <b>59</b>          | 0,0015 | 0,0017 | 0,0019             | <b>63</b>      | 0,0021 | 0,0023 |
|          | Titanlegierungen & Reintitan                   | 0,25xD                 | <b>70</b>      | 0,0012             | 0,0015 | 0,0018 | <b>84</b>          | 0,0023 | 0,0027 | <b>91</b>          | 0,0030 | 0,0033 | 0,0038             | <b>98</b>      | 0,0042 | 0,0045 |

# SuperF-UT NX Micro



Katalog-Nr. 54595

## offene Nuten und Helix

|   | Material/ISO-Werkstoff                                 | a <sub>e</sub><br>max. | a <sub>p</sub><br>max. | v <sub>c</sub> | f <sub>z</sub> / Ø |        | v <sub>c</sub> | f <sub>z</sub> / Ø |     | v <sub>c</sub> | f <sub>z</sub> / Ø |     | v <sub>c</sub> | f <sub>z</sub> / Ø |  |
|---|--|------------------------|------------------------|----------------|--------------------|--------|----------------|--------------------|-----|----------------|--------------------|-----|----------------|--------------------|--|
|   |  |                        |                        |                | 1,0                | 1,2    |                | 1,5                | 2,0 |                | 2,5                | 2,8 |                | 3,0                |  |
|   |  |                        |                        |                |                    |        |                |                    |     |                |                    |     |                |                    |  |
| P | Unlegierter Stahl                                      | 1,00xD                 | 0,50xD                 | 112            | 0,0081             | 0,0097 | 134            | 0,0122             | 146 | 0,0162         | 0,0203             | 157 | 0,0227         | 0,0243             |  |
|   | Niedriglegierter Stahl                                 | 1,00xD                 | 0,50xD                 | 112            | 0,0072             | 0,0086 | 134            | 0,0108             | 146 | 0,0144         | 0,0180             | 157 | 0,0202         | 0,0216             |  |
|   | Hochlegierter Stahl und Werkzeugstahl                  | 1,00xD                 | 0,25xD                 | 112            | 0,0054             | 0,0065 | 134            | 0,0081             | 146 | 0,0108         | 0,0135             | 157 | 0,0151         | 0,0162             |  |
| M | Nichtrostender Stahl, ferritisch/martensitisch         | 1,00xD                 | 0,25xD                 | 112            | 0,0072             | 0,0086 | 134            | 0,0108             | 146 | 0,0144         | 0,0180             | 157 | 0,0202         | 0,0216             |  |
|   | Nichtrostender Stahl, austenitisch                     | 1,00xD                 | 0,25xD                 | 96             | 0,0063             | 0,0076 | 115            | 0,0095             | 125 | 0,0126         | 0,0158             | 134 | 0,0176         | 0,0189             |  |
|   | Duplexstahl, hochfeste nichtrostende Stähle            | 1,00xD                 | 0,25xD                 | 71             | 0,0055             | 0,0066 | 85             | 0,0083             | 92  | 0,0110         | 0,0138             | 99  | 0,0154         | 0,0165             |  |
| K | Grauguss   | 1,00xD                 | 0,50xD                 | 96             | 0,0063             | 0,0076 | 115            | 0,0095             | 125 | 0,0126         | 0,0158             | 134 | 0,0176         | 0,0189             |  |
|   | Gusseisen mit Kugelgraphit                             | 1,00xD                 | 0,50xD                 | 80             | 0,0056             | 0,0067 | 96             | 0,0084             | 104 | 0,0112         | 0,0140             | 112 | 0,0157         | 0,0168             |  |
|   | Temperguss<br>GJV & ADI                                | 1,00xD                 | 0,50xD                 | 80             | 0,0056             | 0,0067 | 96             | 0,0084             | 104 | 0,0112         | 0,0140             | 112 | 0,0157         | 0,0168             |  |
| N | Aluminium-Knetlegierungen                              | 1,00xD                 | 0,50xD                 | 136            | 0,0108             | 0,0130 | 163            | 0,0162             | 177 | 0,0216         | 0,0270             | 190 | 0,0302         | 0,0324             |  |
|   | Aluminium-Gusslegierungen                              | 1,00xD                 | 0,50xD                 | 100            | 0,0099             | 0,0119 | 120            | 0,0149             | 130 | 0,0199         | 0,0249             | 140 | 0,0278         | 0,0298             |  |
|   | Kupfer und Kupferlegierungen                           | 1,00xD                 | 0,50xD                 | 100            | 0,0099             | 0,0119 | 120            | 0,0149             | 130 | 0,0199         | 0,0249             | 140 | 0,0278         | 0,0298             |  |
| S | Warmfeste Legierungen, Fe-Basis                        | 1,00xD                 | 0,25xD                 | 80             | 0,0041             | 0,0049 | 96             | 0,0061             | 104 | 0,0081         | 0,0101             | 112 | 0,0113         | 0,0122             |  |
|   | Warmfeste Legierungen, Ni-Basis, CO-Basis              | 1,00xD                 | 0,25xD                 | 46             | 0,0033             | 0,0039 | 55             | 0,0049             | 60  | 0,0066         | 0,0082             | 64  | 0,0092         | 0,0099             |  |
|   | Titanlegierungen & Reintitan                           | 1,00xD                 | 0,25xD                 | 72             | 0,0068             | 0,0081 | 86             | 0,0101             | 94  | 0,0135         | 0,0169             | 101 | 0,0189         | 0,0203             |  |
| H | Gehärteter Stahl, gehärtet und angelassen,<br>< 55 HRC | 1,00xD                 | 0,10xD                 | 26             | 0,0036             | 0,0043 | 31             | 0,0054             | 34  | 0,0072         | 0,0090             | 36  | 0,0101         | 0,0108             |  |

## Rampen und geschlossene Nuten

|   | Material/ISO-Werkstoff                                 | a <sub>e</sub><br>max. | a <sub>p</sub><br>max. | v <sub>c</sub> | f <sub>z</sub> / Ø |        | v <sub>c</sub> | f <sub>z</sub> / Ø |     | v <sub>c</sub> | f <sub>z</sub> / Ø |     | v <sub>c</sub> | f <sub>z</sub> / Ø |  |
|---|--|------------------------|------------------------|----------------|--------------------|--------|----------------|--------------------|-----|----------------|--------------------|-----|----------------|--------------------|--|
|   |  |                        |                        |                | 1,0                | 1,2    |                | 1,5                | 2,0 |                | 2,5                | 2,8 |                | 3,0                |  |
|   |  |                        |                        |                |                    |        |                |                    |     |                |                    |     |                |                    |  |
| P | Unlegierter Stahl                                      | 1,00xD                 | 0,50xD                 | 78             | 0,0049             | 0,0058 | 94             | 0,0073             | 102 | 0,0097         | 0,0122             | 110 | 0,0136         | 0,0146             |  |
|   | Niedriglegierter Stahl                                 | 1,00xD                 | 0,50xD                 | 78             | 0,0043             | 0,0052 | 94             | 0,0065             | 102 | 0,0086         | 0,0108             | 110 | 0,0121         | 0,0130             |  |
|   | Hochlegierter Stahl und Werkzeugstahl                  | 1,00xD                 | 0,25xD                 | 78             | 0,0032             | 0,0039 | 94             | 0,0049             | 102 | 0,0065         | 0,0081             | 110 | 0,0091         | 0,0097             |  |
| M | Nichtrostender Stahl, ferritisch/martensitisch         | 1,00xD                 | 0,25xD                 | 78             | 0,0043             | 0,0052 | 94             | 0,0065             | 102 | 0,0086         | 0,0108             | 110 | 0,0121         | 0,0130             |  |
|   | Nichtrostender Stahl, austenitisch                     | 1,00xD                 | 0,25xD                 | 67             | 0,0038             | 0,0045 | 81             | 0,0057             | 87  | 0,0076         | 0,0095             | 94  | 0,0106         | 0,0113             |  |
|   | Duplexstahl, hochfeste nichtrostende Stähle            | 1,00xD                 | 0,25xD                 | 50             | 0,0033             | 0,0040 | 60             | 0,0050             | 65  | 0,0066         | 0,0083             | 70  | 0,0093         | 0,0099             |  |
| K | Grauguss   | 1,00xD                 | 0,50xD                 | 67             | 0,0038             | 0,0045 | 81             | 0,0057             | 87  | 0,0076         | 0,0095             | 94  | 0,0106         | 0,0113             |  |
|   | Gusseisen mit Kugelgraphit                             | 1,00xD                 | 0,50xD                 | 56             | 0,0034             | 0,0040 | 67             | 0,0050             | 73  | 0,0067         | 0,0084             | 78  | 0,0094         | 0,0101             |  |
|   | Temperguss<br>GJV & ADI                                | 1,00xD                 | 0,50xD                 | 56             | 0,0034             | 0,0040 | 67             | 0,0050             | 73  | 0,0067         | 0,0084             | 78  | 0,0094         | 0,0101             |  |
| N | Aluminium-Knetlegierungen                              | 1,00xD                 | 0,50xD                 | 95             | 0,0065             | 0,0078 | 114            | 0,0097             | 124 | 0,0130         | 0,0162             | 133 | 0,0181         | 0,0194             |  |
|   | Aluminium-Gusslegierungen                              | 1,00xD                 | 0,50xD                 | 70             | 0,0060             | 0,0072 | 84             | 0,0089             | 91  | 0,0119         | 0,0149             | 98  | 0,0167         | 0,0179             |  |
|   | Kupfer und Kupferlegierungen                           | 1,00xD                 | 0,50xD                 | 70             | 0,0060             | 0,0072 | 84             | 0,0089             | 91  | 0,0119         | 0,0149             | 98  | 0,0167         | 0,0179             |  |
| S | Warmfeste Legierungen, Fe-Basis                        | 1,00xD                 | 0,25xD                 | 56             | 0,0024             | 0,0029 | 67             | 0,0036             | 73  | 0,0049         | 0,0061             | 78  | 0,0068         | 0,0073             |  |
|   | Warmfeste Legierungen, Ni-Basis, CO-Basis              | 1,00xD                 | 0,25xD                 | 32             | 0,0020             | 0,0024 | 39             | 0,0030             | 42  | 0,0039         | 0,0049             | 45  | 0,0055         | 0,0059             |  |
|   | Titanlegierungen & Reintitan                           | 1,00xD                 | 0,25xD                 | 50             | 0,0041             | 0,0049 | 60             | 0,0061             | 66  | 0,0081         | 0,0101             | 71  | 0,0113         | 0,0122             |  |
| H | Gehärteter Stahl, gehärtet und angelassen,<br>< 55 HRC | 1,00xD                 | 0,10xD                 | 18             | 0,0022             | 0,0026 | 22             | 0,0032             | 24  | 0,0043         | 0,0054             | 25  | 0,0060         | 0,0065             |  |

## Schruppen

|   | Material/ISO-Werkstoff                                 | a <sub>e</sub><br>max. | a <sub>p</sub><br>max. | v <sub>c</sub> | f <sub>z</sub> / Ø |        | v <sub>c</sub> | f <sub>z</sub> / Ø |     | v <sub>c</sub> | f <sub>z</sub> / Ø |     | v <sub>c</sub> | f <sub>z</sub> / Ø |  |
|---|--|------------------------|------------------------|----------------|--------------------|--------|----------------|--------------------|-----|----------------|--------------------|-----|----------------|--------------------|--|
|   |  |                        |                        |                | 1,0                | 1,2    |                | 1,5                | 2,0 |                | 2,5                | 2,8 |                | 3,0                |  |
|   |  |                        |                        |                |                    |        |                |                    |     |                |                    |     |                |                    |  |
| P | Unlegierter Stahl                                      | 0,10xD                 | 5,00xD                 | 134            | 0,0128             | 0,0153 | 161            | 0,0191             | 174 | 0,0255         | 0,0319             | 188 | 0,0357         | 0,0383             |  |
|   | Niedriglegierter Stahl                                 | 0,10xD                 | 5,00xD                 | 134            | 0,0113             | 0,0136 | 161            | 0,0170             | 174 | 0,0227         | 0,0284             | 188 | 0,0318         | 0,0340             |  |
|   | Hochlegierter Stahl und Werkzeugstahl                  | 0,08xD                 | 5,00xD                 | 134            | 0,0085             | 0,0102 | 161            | 0,0128             | 174 | 0,0170         | 0,0213             | 188 | 0,0238         | 0,0255             |  |
| M | Nichtrostender Stahl, ferritisch/martensitisch         | 0,10xD                 | 5,00xD                 | 134            | 0,0113             | 0,0136 | 161            | 0,0170             | 174 | 0,0227         | 0,0284             | 188 | 0,0318         | 0,0340             |  |
|   | Nichtrostender Stahl, austenitisch                     | 0,08xD                 | 5,00xD                 | 115            | 0,0099             | 0,0119 | 138            | 0,0149             | 150 | 0,0198         | 0,0248             | 161 | 0,0278         | 0,0298             |  |
|   | Duplexstahl, hochfeste nichtrostende Stähle            | 0,05xD                 | 5,00xD                 | 86             | 0,0087             | 0,0104 | 103            | 0,0130             | 112 | 0,0174         | 0,0217             | 120 | 0,0243         | 0,0260             |  |
| K | Grauguss   | 0,10xD                 | 5,00xD                 | 115            | 0,0099             | 0,0119 | 138            | 0,0149             | 150 | 0,0198         | 0,0248             | 161 | 0,0278         | 0,0298             |  |
|   | Gusseisen mit Kugelgraphit                             | 0,10xD                 | 5,00xD                 | 96             | 0,0088             | 0,0106 | 115            | 0,0132             | 125 | 0,0176         | 0,0220             | 134 | 0,0247         | 0,0265             |  |
|   | Temperguss<br>GJV & ADI                                | 0,10xD                 | 5,00xD                 | 96             | 0,0088             | 0,0106 | 115            | 0,0132             | 125 | 0,0176         | 0,0220             | 134 | 0,0247         | 0,0265             |  |
| N | Aluminium-Knetlegierungen                              | 0,15xD                 | 5,00xD                 | 163            | 0,0170             | 0,0204 | 196            | 0,0255             | 212 | 0,0340         | 0,0425             | 228 | 0,0476         | 0,0510             |  |
|   | Aluminium-Gusslegierungen                              | 0,12xD                 | 5,00xD                 | 120            | 0,0157             | 0,0188 | 144            | 0,0235             | 156 | 0,0313         | 0,0392             | 168 | 0,0438         | 0,0470             |  |
|   | Kupfer und Kupferlegierungen                           | 0,12xD                 | 5,00xD                 | 120            | 0,0157             | 0,0188 | 144            | 0,0235             | 156 | 0,0313         | 0,0392             | 168 | 0,0438         | 0,0470             |  |
| S | Warmfeste Legierungen, Fe-Basis                        | 0,08xD                 | 5,00xD                 | 96             | 0,0064             | 0,0077 | 115            | 0,0096             | 125 | 0,0128         | 0,0159             | 134 | 0,0179         | 0,0191             |  |
|   | Warmfeste Legierungen, Ni-Basis, CO-Basis              | 0,05xD                 | 5,00xD                 | 55             | 0,0052             | 0,0062 | 66             | 0,0078             | 72  | 0,0104         | 0,0130             | 77  | 0,0145         | 0,0155             |  |
|   | Titanlegierungen & Reintitan                           | 0,08xD                 | 5,00xD                 | 86             | 0,0106             | 0,0128 | 103            | 0,0159             | 112 | 0,0213         | 0,0266             | 120 | 0,0298         | 0,0319             |  |
| H | Gehärteter Stahl, gehärtet und angelassen,<br>< 55 HRC | 0,03xD                 | 5,00xD                 | 31             | 0,0057             | 0,0068 | 37             | 0,0085             | 40  | 0,0113         | 0,0142             | 43  | 0,0159         | 0,0170             |  |

**Schlichten**

|          | Material/ISO-Werkstoff                              | a <sub>e</sub><br>max. | a <sub>p</sub><br>max. | v <sub>c</sub> | f <sub>z</sub> / Ø |        | f <sub>z</sub> / Ø |        | f <sub>z</sub> / Ø |        | f <sub>z</sub> / Ø |                |        |        |
|----------|---|------------------------|------------------------|----------------|--------------------|--------|--------------------|--------|--------------------|--------|--------------------|----------------|--------|--------|
|          |   |                        |                        |                | 1,0                | 1,2    | v <sub>c</sub>     | 1,5    | v <sub>c</sub>     | 2,0    | 2,5                | v <sub>c</sub> | 2,8    | 3,0    |
|          |   |                        |                        |                |                    |        |                    |        |                    |        |                    |                |        |        |
|          | Unlegierter Stahl                                   | 0,02xD                 | 5,00xD                 | <b>146</b>     | 0,0097             | 0,0117 | <b>175</b>         | 0,0146 | <b>190</b>         | 0,0194 | 0,0243             | <b>204</b>     | 0,0272 | 0,0292 |
| <b>P</b> | Niedriglegierter Stahl                              | 0,02xD                 | 5,00xD                 | <b>146</b>     | 0,0086             | 0,0104 | <b>175</b>         | 0,0130 | <b>190</b>         | 0,0173 | 0,0216             | <b>204</b>     | 0,0242 | 0,0259 |
|          | Hochlegierter Stahl und Werkzeugstahl               | 0,02xD                 | 5,00xD                 | <b>146</b>     | 0,0065             | 0,0078 | <b>175</b>         | 0,0097 | <b>190</b>         | 0,0130 | 0,0162             | <b>204</b>     | 0,0181 | 0,0194 |
|          | Nichtrostender Stahl, ferritisch/martensitisch      | 0,02xD                 | 5,00xD                 | <b>146</b>     | 0,0086             | 0,0104 | <b>175</b>         | 0,0130 | <b>190</b>         | 0,0173 | 0,0216             | <b>204</b>     | 0,0242 | 0,0259 |
| <b>M</b> | Nichtrostender Stahl, austenitisch                  | 0,02xD                 | 5,00xD                 | <b>125</b>     | 0,0076             | 0,0091 | <b>150</b>         | 0,0113 | <b>163</b>         | 0,0151 | 0,0189             | <b>175</b>     | 0,0212 | 0,0227 |
|          | Duplexstahl, hochfeste nichtrostende Stähle         | 0,02xD                 | 5,00xD                 | <b>93</b>      | 0,0066             | 0,0079 | <b>112</b>         | 0,0099 | <b>121</b>         | 0,0132 | 0,0165             | <b>130</b>     | 0,0185 | 0,0198 |
|          | Grauguss  | 0,02xD                 | 5,00xD                 | <b>125</b>     | 0,0076             | 0,0091 | <b>150</b>         | 0,0113 | <b>163</b>         | 0,0151 | 0,0189             | <b>175</b>     | 0,0212 | 0,0227 |
| <b>K</b> | Gusseisen mit Kugelgraphit                          |                        |                        |                |                    |        |                    |        |                    |        |                    |                |        |        |
|          | Temperguss  | 0,02xD                 | 5,00xD                 | <b>104</b>     | 0,0067             | 0,0081 | <b>125</b>         | 0,0101 | <b>135</b>         | 0,0134 | 0,0168             | <b>146</b>     | 0,0188 | 0,0202 |
|          | GJV & ADI   |                        |                        |                |                    |        |                    |        |                    |        |                    |                |        |        |
|          | Aluminium-Knetlegierungen                           | 0,02xD                 | 5,00xD                 | <b>177</b>     | 0,0130             | 0,0156 | <b>212</b>         | 0,0194 | <b>230</b>         | 0,0259 | 0,0324             | <b>248</b>     | 0,0363 | 0,0389 |
| <b>N</b> | Aluminium-Gusslegierungen                           |                        |                        |                |                    |        |                    |        |                    |        |                    |                |        |        |
|          | Kupfer und Kupferlegierungen                        | 0,02xD                 | 5,00xD                 | <b>130</b>     | 0,0119             | 0,0143 | <b>156</b>         | 0,0179 | <b>169</b>         | 0,0239 | 0,0298             | <b>182</b>     | 0,0334 | 0,0358 |
|          | Warmfeste Legierungen, Fe-Basis                     | 0,02xD                 | 5,00xD                 | <b>104</b>     | 0,0049             | 0,0058 | <b>125</b>         | 0,0073 | <b>135</b>         | 0,0097 | 0,0122             | <b>146</b>     | 0,0136 | 0,0146 |
| <b>S</b> | Warmfeste Legierungen, Ni-Basis, CO-Basis           | 0,02xD                 | 5,00xD                 | <b>60</b>      | 0,0039             | 0,0047 | <b>72</b>          | 0,0059 | <b>78</b>          | 0,0079 | 0,0099             | <b>84</b>      | 0,0111 | 0,0118 |
|          | Titanlegierungen & Reintitan                        | 0,02xD                 | 5,00xD                 | <b>94</b>      | 0,0081             | 0,0097 | <b>113</b>         | 0,0122 | <b>122</b>         | 0,0162 | 0,0203             | <b>132</b>     | 0,0227 | 0,0243 |
| <b>H</b> | Gehärteter Stahl, gehärtet und angelassen, < 55 HRC | 0,01xD                 | 5,00xD                 | <b>34</b>      | 0,0043             | 0,0052 | <b>41</b>          | 0,0065 | <b>44</b>          | 0,0086 | 0,0108             | <b>48</b>      | 0,0121 | 0,0130 |

**Bohren**

|          | Material/ISO-Werkstoff                         | a <sub>e</sub><br>max. | v <sub>c</sub> | f <sub>z</sub> / Ø |        | f <sub>z</sub> / Ø |        | f <sub>z</sub> / Ø |        | f <sub>z</sub> / Ø |                |        |        |
|----------|--|------------------------|----------------|--------------------|--------|--------------------|--------|--------------------|--------|--------------------|----------------|--------|--------|
|          |  |                        |                | 1,0                | 1,2    | v <sub>c</sub>     | 1,5    | v <sub>c</sub>     | 2,0    | 2,5                | v <sub>c</sub> | 2,8    | 3,0    |
|          |  |                        |                |                    |        |                    |        |                    |        |                    |                |        |        |
|          | Unlegierter Stahl                              | 0,50xD                 | <b>84</b>      | 0,0097             | 0,0117 | <b>175</b>         | 0,0146 | <b>190</b>         | 0,0194 | 0,0243             | <b>204</b>     | 0,0272 | 0,0292 |
| <b>P</b> | Niedriglegierter Stahl                         | 0,50xD                 | <b>84</b>      | 0,0013             | 0,0015 | <b>101</b>         | 0,0019 | <b>109</b>         | 0,0026 | 0,0032             | <b>118</b>     | 0,0036 | 0,0038 |
|          | Hochlegierter Stahl und Werkzeugstahl          | 0,25xD                 | <b>84</b>      | 0,0010             | 0,0012 | <b>101</b>         | 0,0014 | <b>109</b>         | 0,0019 | 0,0024             | <b>118</b>     | 0,0027 | 0,0029 |
|          | Nichtrostender Stahl, ferritisch/martensitisch | 0,25xD                 | <b>84</b>      | 0,0013             | 0,0015 | <b>101</b>         | 0,0019 | <b>109</b>         | 0,0026 | 0,0032             | <b>118</b>     | 0,0036 | 0,0038 |
| <b>M</b> | Nichtrostender Stahl, austenitisch             | 0,25xD                 | <b>72</b>      | 0,0011             | 0,0013 | <b>86</b>          | 0,0017 | <b>94</b>          | 0,0022 | 0,0028             | <b>101</b>     | 0,0031 | 0,0034 |
|          | Duplexstahl, hochfeste nichtrostende Stähle    | 0,25xD                 | <b>54</b>      | 0,0010             | 0,0012 | <b>65</b>          | 0,0015 | <b>70</b>          | 0,0020 | 0,0024             | <b>76</b>      | 0,0027 | 0,0029 |
|          | Grauguss                                       | 0,50xD                 | <b>72</b>      | 0,0011             | 0,0013 | <b>86</b>          | 0,0017 | <b>94</b>          | 0,0022 | 0,0028             | <b>101</b>     | 0,0031 | 0,0034 |
| <b>K</b> | Gusseisen mit Kugelgraphit                     |                        |                |                    |        |                    |        |                    |        |                    |                |        |        |
|          | Temperguss                                     | 0,50xD                 | <b>60</b>      | 0,0010             | 0,0012 | <b>72</b>          | 0,0015 | <b>78</b>          | 0,0020 | 0,0025             | <b>84</b>      | 0,0028 | 0,0030 |
|          | GJV & ADI                                      |                        |                |                    |        |                    |        |                    |        |                    |                |        |        |
|          | Aluminium-Knetlegierungen                      | 0,50xD                 | <b>102</b>     | 0,0019             | 0,0023 | <b>122</b>         | 0,0029 | <b>133</b>         | 0,0038 | 0,0048             | <b>143</b>     | 0,0054 | 0,0058 |
| <b>N</b> | Aluminium-Gusslegierungen                      |                        |                |                    |        |                    |        |                    |        |                    |                |        |        |
|          | Kupfer und Kupferlegierungen                   | 0,50xD                 | <b>75</b>      | 0,0018             | 0,0021 | <b>90</b>          | 0,0027 | <b>97,5</b>        | 0,0035 | 0,0044             | <b>105</b>     | 0,0049 | 0,0053 |
|          | Warmfeste Legierungen, Fe-Basis                | 0,25xD                 | <b>60</b>      | 0,0007             | 0,0009 | <b>72</b>          | 0,0011 | <b>78</b>          | 0,0014 | 0,0018             | <b>84</b>      | 0,0020 | 0,0022 |
| <b>S</b> | Warmfeste Legierungen, Ni-Basis, CO-Basis      | 0,25xD                 | <b>34</b>      | 0,0006             | 0,0007 | <b>41</b>          | 0,0009 | <b>44</b>          | 0,0012 | 0,0015             | <b>48</b>      | 0,0016 | 0,0018 |
|          | Titanlegierungen & Reintitan                   | 0,25xD                 | <b>54</b>      | 0,0012             | 0,0014 | <b>65</b>          | 0,0018 | <b>70</b>          | 0,0024 | 0,0030             | <b>76</b>      | 0,0034 | 0,0036 |

# SuperF-UT NX



## Nuten

| Werkstoff | Härte                      | a <sub>p</sub> max. | a <sub>e</sub> max. | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |
|-----------|----------------------------|---------------------|---------------------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
|           |                            |                     |                     |                | 4                         | 5     | 6     | 8     | 10    | 12    | 16    | 20    |
| P1        | ≤850 N/mm <sup>2</sup>     | 1xD                 | 1xD                 | 270            | 0,017                     | 0,021 | 0,025 | 0,034 | 0,050 | 0,060 | 0,080 | 0,100 |
| P2        | 850-1200 N/mm <sup>2</sup> | 1xD                 | 1xD                 | 230            | 0,017                     | 0,021 | 0,025 | 0,034 | 0,050 | 0,060 | 0,080 | 0,100 |
| P3        | 850-1400 N/mm <sup>2</sup> | 1xD                 | 1xD                 | 180            | 0,014                     | 0,018 | 0,021 | 0,028 | 0,045 | 0,054 | 0,072 | 0,090 |
| M1        | ≤750 N/mm <sup>2</sup>     | 1xD                 | 1xD                 | 120            | 0,014                     | 0,018 | 0,021 | 0,028 | 0,045 | 0,054 | 0,072 | 0,090 |
| M2        | 750-950 N/mm <sup>2</sup>  | 1xD                 | 1xD                 | 80             | 0,013                     | 0,016 | 0,019 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080 |
| K2        | ≥240 HB                    | 1xD                 | 1xD                 | 150            | 0,017                     | 0,021 | 0,025 | 0,034 | 0,050 | 0,060 | 0,080 | 0,100 |
| N1        | ≤7% Si                     | 1xD                 | 1xD                 | 500            | 0,022                     | 0,028 | 0,033 | 0,044 | 0,065 | 0,078 | 0,104 | 0,130 |
| N2        | ≥7% Si                     | 1xD                 | 1xD                 | 340            | 0,018                     | 0,023 | 0,027 | 0,036 | 0,055 | 0,066 | 0,088 | 0,110 |
| Ti        | ≤1300 N/mm <sup>2</sup>    | 1xD                 | 1xD                 | 60             | 0,013                     | 0,016 | 0,019 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080 |

## HPC Schruppen

| Werkstoff | Härte                      | a <sub>p</sub> max. | a <sub>e</sub> max. | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |
|-----------|----------------------------|---------------------|---------------------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
|           |                            |                     |                     |                | 4                         | 5     | 6     | 8     | 10    | 12    | 16    | 20    |
| P1        | ≤850 N/mm <sup>2</sup>     | 1,5xD               | 0,40xD              | 350            | 0,021                     | 0,026 | 0,032 | 0,042 | 0,063 | 0,075 | 0,100 | 0,125 |
| P2        | 850-1200 N/mm <sup>2</sup> | 1,5xD               | 0,40xD              | 290            | 0,021                     | 0,026 | 0,032 | 0,042 | 0,063 | 0,075 | 0,100 | 0,125 |
| P3        | 850-1400 N/mm <sup>2</sup> | 1,5xD               | 0,33xD              | 260            | 0,018                     | 0,023 | 0,027 | 0,036 | 0,059 | 0,070 | 0,094 | 0,117 |
| M1        | ≤750 N/mm <sup>2</sup>     | 1,5xD               | 0,33xD              | 160            | 0,018                     | 0,023 | 0,027 | 0,036 | 0,059 | 0,070 | 0,094 | 0,117 |
| M2        | 750-950 N/mm <sup>2</sup>  | 1,5xD               | 0,25xD              | 120            | 0,019                     | 0,024 | 0,029 | 0,038 | 0,060 | 0,072 | 0,096 | 0,120 |
| K2        | ≥240 HB                    | 1,5xD               | 0,40xD              | 190            | 0,021                     | 0,026 | 0,032 | 0,042 | 0,063 | 0,075 | 0,100 | 0,125 |
| N1        | ≤7% Si                     | 1,5xD               | 0,40xD              | 600            | 0,028                     | 0,034 | 0,041 | 0,055 | 0,081 | 0,098 | 0,130 | 0,163 |
| N2        | ≥7% Si                     | 1,5xD               | 0,40xD              | 440            | 0,023                     | 0,028 | 0,034 | 0,045 | 0,069 | 0,083 | 0,110 | 0,138 |
| Ti        | ≤1300 N/mm <sup>2</sup>    | 1,5xD               | 0,33xD              | 110            | 0,017                     | 0,021 | 0,025 | 0,033 | 0,052 | 0,062 | 0,083 | 0,104 |

## HSC Schlichten

| Werkstoff | Härte                      | a <sub>p</sub> max. | a <sub>e</sub> max. | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |
|-----------|----------------------------|---------------------|---------------------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
|           |                            |                     |                     |                | 4                         | 5     | 6     | 8     | 10    | 12    | 16    | 20    |
| P1        | ≤850 N/mm <sup>2</sup>     | 2xD                 | 0,02xD              | 540            | 0,018                     | 0,023 | 0,028 | 0,037 | 0,055 | 0,066 | 0,088 | 0,110 |
| P2        | 850-1200 N/mm <sup>2</sup> | 2xD                 | 0,02xD              | 460            | 0,018                     | 0,023 | 0,028 | 0,037 | 0,055 | 0,066 | 0,088 | 0,110 |
| P3        | 850-1400 N/mm <sup>2</sup> | 2xD                 | 0,02xD              | 350            | 0,015                     | 0,019 | 0,023 | 0,031 | 0,050 | 0,059 | 0,079 | 0,099 |
| M1        | ≤750 N/mm <sup>2</sup>     | 2xD                 | 0,02xD              | 220            | 0,015                     | 0,019 | 0,023 | 0,031 | 0,050 | 0,059 | 0,079 | 0,099 |
| M2        | 750-950 N/mm <sup>2</sup>  | 2xD                 | 0,02xD              | 160            | 0,014                     | 0,018 | 0,021 | 0,028 | 0,044 | 0,053 | 0,070 | 0,088 |
| K2        | ≥240 HB                    | 2xD                 | 0,02xD              | 300            | 0,018                     | 0,023 | 0,028 | 0,037 | 0,055 | 0,066 | 0,088 | 0,110 |
| N1        | ≤7% Si                     | 2xD                 | 0,02xD              | 1000           | 0,024                     | 0,030 | 0,036 | 0,048 | 0,072 | 0,086 | 0,114 | 0,143 |
| N2        | ≥7% Si                     | 2xD                 | 0,02xD              | 680            | 0,020                     | 0,025 | 0,030 | 0,040 | 0,061 | 0,073 | 0,097 | 0,121 |
| Ti        | ≤1300 N/mm <sup>2</sup>    | 2xD                 | 0,02xD              | 130            | 0,014                     | 0,018 | 0,021 | 0,028 | 0,044 | 0,053 | 0,070 | 0,088 |

## Rampen, Helix, Stechen

| Werkstoff | Härte                      | Rampftiefe (a <sub>p</sub> ) | max. Rampwinkel | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |
|-----------|----------------------------|------------------------------|-----------------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
|           |                            |                              |                 |                | 4                         | 5     | 6     | 8     | 10    | 12    | 16    | 20    |
| P1        | ≤850 N/mm <sup>2</sup>     | 1xD                          | 45°             | 270            | 0,015                     | 0,019 | 0,023 | 0,030 | 0,045 | 0,054 | 0,072 | 0,090 |
| P2        | 850-1200 N/mm <sup>2</sup> | 1xD                          | 45°             | 230            | 0,013                     | 0,017 | 0,020 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080 |
| P3        | 850-1400 N/mm <sup>2</sup> | 1xD                          | 30°             | 180            | 0,011                     | 0,014 | 0,017 | 0,022 | 0,030 | 0,036 | 0,048 | 0,060 |
| M1        | ≤750 N/mm <sup>2</sup>     | 1xD                          | 10°             | 120            | 0,009                     | 0,012 | 0,014 | 0,018 | 0,030 | 0,036 | 0,048 | 0,060 |
| M2        | 750-950 N/mm <sup>2</sup>  | 1xD                          | 5°              | 80             | 0,007                     | 0,009 | 0,011 | 0,014 | 0,025 | 0,030 | 0,040 | 0,050 |
| K2        | ≥240 HB                    | 1xD                          | 45°             | 150            | 0,015                     | 0,019 | 0,023 | 0,030 | 0,045 | 0,054 | 0,072 | 0,090 |
| N1        | ≤7% Si                     | 1xD                          | 30°             | 500            | 0,013                     | 0,017 | 0,020 | 0,026 | 0,040 | 0,048 | 0,064 | 0,080 |
| N2        | ≥7% Si                     | 1xD                          | 45°             | 340            | 0,015                     | 0,019 | 0,023 | 0,030 | 0,045 | 0,054 | 0,072 | 0,090 |
| Ti        | ≤1300 N/mm <sup>2</sup>    | 1xD                          | 10°             | 60             | 0,007                     | 0,009 | 0,011 | 0,014 | 0,025 | 0,030 | 0,040 | 0,050 |

## Bohren

| Werkstoff | Härte                      | max. Bohrtiefe ohne Entspannen | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |
|-----------|----------------------------|--------------------------------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
|           |                            |                                |                | 4                         | 5     | 6     | 8     | 10    | 12    | 16    | 20    |
| P1        | ≤850 N/mm <sup>2</sup>     | 1,5xD                          | 270            | 0,014                     | 0,018 | 0,021 | 0,028 | 0,040 | 0,048 | 0,064 | 0,080 |
| P2        | 850-1200 N/mm <sup>2</sup> | 1,5xD                          | 230            | 0,012                     | 0,015 | 0,018 | 0,024 | 0,035 | 0,042 | 0,056 | 0,070 |
| P3        | 850-1400 N/mm <sup>2</sup> | 1,0xD                          | 180            | 0,008                     | 0,010 | 0,012 | 0,016 | 0,025 | 0,030 | 0,040 | 0,050 |
| K2        | ≥240 HB                    | 1,5xD                          | 150            | 0,014                     | 0,018 | 0,021 | 0,028 | 0,040 | 0,048 | 0,064 | 0,080 |
| N1        | ≤7% Si                     | 1,0xD                          | 500            | 0,012                     | 0,015 | 0,018 | 0,024 | 0,035 | 0,042 | 0,056 | 0,070 |
| N2        | ≥7% Si                     | 1,0xD                          | 340            | 0,014                     | 0,018 | 0,021 | 0,028 | 0,040 | 0,048 | 0,064 | 0,080 |

|    |  |  |  |
|----|--|--|--|
| P1 | P Bau- und Automatenstähle, unlegierte Vergütungs- und Einsatzstähle |  | 1.0345 P235GH, 1.0050, 1.0503 C45, 1.2076 102Cr6                 |
| P2 | P Automatenstähle, unlegierte Einsatzstähle, Nitrierstähle           |  | 1.1221 C60E, 1.7043 38Cr4, 1.7131 16MnCr5, 1.8550 34CrAINi7      |
| P3 | P Legierte Vergütungsstähle, Werkzeug- und Schnellarbeitsstähle      |  | 1.7003 38Cr2, 1.5710 36NiCr6, 1.7225 42CrMo4, 1.2419 105WCr6     |
| M1 | M Rostfreier Stahl (leicht bearbeitbar/geschwefelt)                  |  | 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9         |
| M2 | M Rostfreier Stahl (mittelschwer bearbeitbar)                        |  | 1.4301X5CrNi18-10, 1.4571 X6CrNiTi18-10, 1.4404 X2CrNiMo17-12-2  |
| K2 | K Gusseisen, Grauguss, Temperguss und Kugelgraphitguss               |  | 0.6025 EN-GL250 (GG25), 0.7070 EN-GJS-700-2 (GGG70)              |
| N1 | N Aluminium, Alu-Knetlegierungen, Alulegierungen                     |  | 3.0255 Al99,5, 3.2315 AlMgSi1, 3.1325 AlCuMg1, 3.3245 AlMg3Si    |
| N2 | N Aluminium-Gusslegierungen  |  | 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9             |
| Ti | T Titan-Legierungen  |  | 3.7114 TiAl5Sn2,5, 3.7124 TiCu2, 3.7154 TiAl6Zr5, 3.7164 TiAl6V4 |



# Frässtrategien

## Eintauchen – spezielle Werkzeuge mit Tauchgeometrie

### SuperF-UT NX

- h10 Schneidentoleranz
- 36°/37°/38° Drall
- Unter- & Glattmaßdurchmesser
- gute Bohreigenschaften
- sehr gute Fräseigenschaften

Erste Wahl: Fräsen und Tauchen



### Pilotfräser Art.-Nr. 54700

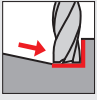
- m8 Schneidentoleranz
- 30° Drall
- sehr viele Einzelabmessungen
- sehr gute Bohreigenschaften
- ausreichende Fräseigenschaften

Erste Wahl: Bohren und Pilotieren



# Frässtrategien

## Eintauchen – spezielle Werkzeuge mit Tauchgeometrie



### Rampen

- Rampenwinkel =  $15^{\circ}$ - $45^{\circ}$  bis max.  $a_p$   $1 \times D$
- $f_z$  **100 %**



### Helix

- Zustellung =  $0,10$ - $0,30 \times D$  pro Umdrehung
- kleinster zu erzeugender Durchmesser =  $1,7 \times D$
- $f_z$  **100 %**



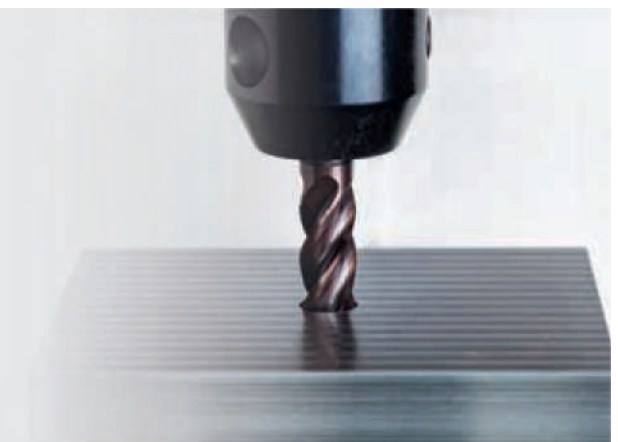
### Stechen

- Alternative bei Problemen durch zu hohe Radialkräfte
- $a_e$   $0,25 \times D$  -  $a_p$  Schneidlänge/Freischlifflänge
- $f_z$  **100 %**



### Bohren/Pilotieren

- max. Tiefenzustellung  $1 \times D$  dann entspannen
- $f_z$  **100 %**



# Frässtrategien

## Eintauchen – allgemein mit Standard-Stirngeometrien



### Rampen

- Rampenwinkel =  $2^{\circ}$ - $5^{\circ}$  bis max.  $a_p$   $1 \times D$
- gleichmäßiger Lastanstieg
- $f_z$  **75 %**



### Helix

- Zustellung =  $0,05$ - $0,15 \times D$  pro Umdrehung
- kleinster zu erzeugender Durchmesser =  $1,7 \times D$
- $f_z$  **100 %**



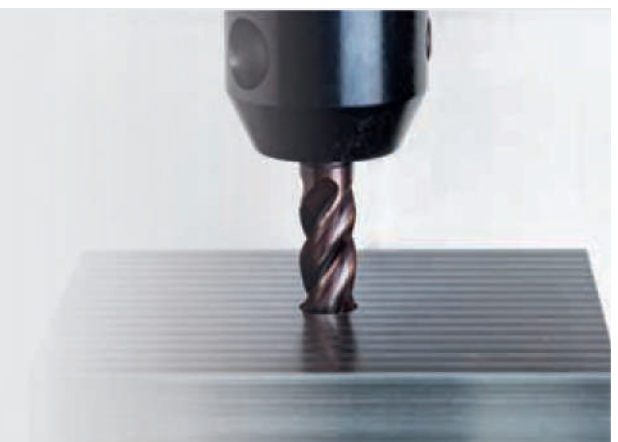
### Stechen

- Alternative bei Problemen durch zu hohe Radialkräfte
- $a_e$   $0,25 \times D$  -  $a_p$  Schneidlänge / Freischlifflänge
- $f_z$  **100 %**



### Bohren/Pilotieren

- max. Tiefenzustellung  $0,5 \times D$  dann entspannen
- $f_z$  **50 %**



Basis  $f_z = f_z$  Nuten

# Fasfräser / Vor- und Rückwärtssenker



Anfasen max.  $a_p/a_e$  0,25xD



| Werkstoff | Härte                     | $a_p$ max. | $a_e$ max. | $v_c$ | $f_z$ bei Nenn-Ø |       |       |       |       |       |       |
|-----------|---------------------------|------------|------------|-------|------------------|-------|-------|-------|-------|-------|-------|
|           |                           |            |            |       | 3                | 6     | 8     | 10    | 12    | 16    | 20    |
| P         | $\leq 850 \text{ N/mm}^2$ | 0,25xD     | 0,25xD     | 192   | 0,018            | 0,036 | 0,048 | 0,060 | 0,080 | 0,100 | 0,130 |
|           | $\geq 850 \text{ N/mm}^2$ | 0,25xD     | 0,25xD     | 140   | 0,016            | 0,032 | 0,042 | 0,060 | 0,070 | 0,090 | 0,120 |
| M         | $\leq 750 \text{ N/mm}^2$ | 0,25xD     | 0,25xD     | 120   | 0,013            | 0,025 | 0,034 | 0,050 | 0,050 | 0,070 | 0,090 |
|           | $\geq 750 \text{ N/mm}^2$ | 0,25xD     | 0,25xD     | 80    | 0,009            | 0,019 | 0,025 | 0,040 | 0,040 | 0,060 | 0,070 |
| K         | $\leq 240 \text{ HB}$     | 0,25xD     | 0,25xD     | 170   | 0,017            | 0,033 | 0,044 | 0,060 | 0,070 | 0,090 | 0,120 |
|           | $\geq 240 \text{ HB}$     | 0,25xD     | 0,25xD     | 150   | 0,014            | 0,028 | 0,037 | 0,050 | 0,060 | 0,080 | 0,100 |
| N         | $\geq 7 \% \text{ Si}$    | 0,25xD     | 0,25xD     | 250   | 0,023            | 0,047 | 0,062 | 0,080 | 0,100 | 0,130 | 0,170 |
| H         | $\leq 55 \text{ HRC}$     | 0,25xD     | 0,25xD     | 50    | 0,010            | 0,020 | 0,026 | 0,040 | 0,050 | 0,060 | 0,070 |
| S         | Ti-Basis                  | 0,25xD     | 0,25xD     | 50    | 0,010            | 0,020 | 0,027 | 0,036 | 0,043 | 0,060 | 0,070 |
|           | Ni-Basis                  | 0,25xD     | 0,25xD     | 40    | 0,005            | 0,011 | 0,014 | 0,022 | 0,026 | 0,030 | 0,040 |

Entgraten max.  $a_p/a_e$  0,05xD



| Werkstoff | Härte                     | $a_p$ max. | $a_e$ max. | $v_c$ | $f_z$ bei Nenn-Ø |       |       |       |       |       |       |
|-----------|---------------------------|------------|------------|-------|------------------|-------|-------|-------|-------|-------|-------|
|           |                           |            |            |       | 3                | 6     | 8     | 10    | 12    | 16    | 20    |
| P         | $\leq 850 \text{ N/mm}^2$ | 0,05xD     | 0,05xD     | 250   | 0,030            | 0,060 | 0,080 | 0,110 | 0,130 | 0,170 | 0,210 |
|           | $\geq 850 \text{ N/mm}^2$ | 0,05xD     | 0,05xD     | 180   | 0,026            | 0,053 | 0,070 | 0,100 | 0,120 | 0,160 | 0,200 |
| M         | $\leq 750 \text{ N/mm}^2$ | 0,05xD     | 0,05xD     | 160   | 0,021            | 0,042 | 0,056 | 0,080 | 0,090 | 0,120 | 0,150 |
|           | $\geq 750 \text{ N/mm}^2$ | 0,05xD     | 0,05xD     | 100   | 0,016            | 0,032 | 0,042 | 0,060 | 0,070 | 0,100 | 0,120 |
| K         | $\leq 240 \text{ HB}$     | 0,05xD     | 0,05xD     | 230   | 0,028            | 0,056 | 0,074 | 0,100 | 0,120 | 0,160 | 0,200 |
|           | $\geq 240 \text{ HB}$     | 0,05xD     | 0,05xD     | 190   | 0,023            | 0,047 | 0,062 | 0,080 | 0,100 | 0,130 | 0,170 |
| N         | $\geq 7 \% \text{ Si}$    | 0,05xD     | 0,05xD     | 330   | 0,039            | 0,078 | 0,104 | 0,140 | 0,170 | 0,220 | 0,280 |
| H         | $\leq 55 \text{ HRC}$     | 0,05xD     | 0,05xD     | 70    | 0,017            | 0,033 | 0,044 | 0,060 | 0,070 | 0,100 | 0,120 |
| S         | Ti-Basis                  | 0,05xD     | 0,05xD     | 80    | 0,009            | 0,018 | 0,025 | 0,033 | 0,040 | 0,050 | 0,070 |
|           | Ni-Basis                  | 0,05xD     | 0,05xD     | 50    | 0,004            | 0,008 | 0,011 | 0,017 | 0,021 | 0,029 | 0,039 |

Fasfräser mit radialem Hinterschliff zum Anfasen und Entgraten:

- besonders weicher Schnitt
- nachschleifbar
- in fast allen Werkstoffen einsetzbar
- hohe Standzeit durch verschleißfeste Beschichtung und ultra-zähes Hartmetall
- Schnittwerte am effektiven Durchmesser berechnen

# HPC & HSC Frässtrategien

Richtwerte zur Erhöhung der Schnittwerte bei Schneidnängen bis 3xD

Schruppen und Schlichten

| Werkstoff             | Anwendung          | radiale Zustellung in % des Ø | v <sub>c</sub> Faktor * | f <sub>z</sub> Faktor * | Umschlingungswinkel |
|-----------------------|--------------------|-------------------------------|-------------------------|-------------------------|---------------------|
| N<br>P<br>K<br>M<br>S | Nuten              | 100 %                         | 1                       | 1                       | 180°                |
|                       | HPC Schruppen      | 33 %                          | 1,5                     | 1,3                     | 70°                 |
|                       | HPC Schruppen      | 25 %                          | 1,6                     | 1,5                     | 60°                 |
|                       | HPC Schruppen      | 20 %                          | 1,7                     | 1,6                     | 53°                 |
|                       | HPC Schruppen      | 15 %                          | 1,8                     | 1,9                     | 46°                 |
|                       | HSC Schruppen      | 10 %                          | 1,9                     | 2,3                     | 37°                 |
|                       | HSC Schruppen      | 8 %                           | 2,0                     | 2,5                     | 31°                 |
|                       | HSC Schruppen      | 5 %                           | 2,1                     | 2,5                     | 26°                 |
|                       | HSC Schlichten     | 3 %                           | 2,0                     | 1,2                     | 20°                 |
|                       | HSC Schlichten     | 2 %                           | 2,0                     | 1,1                     | 18°                 |
| N<br>P<br>K<br>M<br>S | HSC Schlichten     | 1 %                           | 2,0                     | 1,0                     | 11°                 |
|                       | HSC Feinschlichten | 0,5 %                         | 2,2                     | 0,9                     | 8°                  |

\* Basiswerte für die Berechnung mit den v<sub>c</sub> und f<sub>z</sub> Faktoren bitte der nachstehenden Tabelle entnehmen:

Basisschnittwerte Nuten – SuperF-UT-Werkzeuge – glattschneidig

| Werkstoff    | Härte                      | Anwendung | v <sub>c</sub> | f <sub>z</sub> bei Nenn-Ø |       |       |       |       |       |       |       |       |       |
|--------------|----------------------------|-----------|----------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|              |                            |           |                | 3                         | 4     | 5     | 6     | 8     | 10    | 12    | 16    | 20    | 25    |
| P1           | ≤ 850 N/mm <sup>2</sup>    | Nuten     | 180            | 0,015                     | 0,020 | 0,025 | 0,030 | 0,040 | 0,060 | 0,072 | 0,096 | 0,120 | 0,150 |
| P2           | 850-1200 N/mm <sup>2</sup> | Nuten     | 160            | 0,014                     | 0,019 | 0,024 | 0,029 | 0,038 | 0,055 | 0,066 | 0,088 | 0,110 | 0,138 |
| P3           | 850-1400 N/mm <sup>2</sup> | Nuten     | 135            | 0,014                     | 0,018 | 0,023 | 0,027 | 0,036 | 0,050 | 0,060 | 0,080 | 0,100 | 0,125 |
| M1           | < 750 N/mm <sup>2</sup>    | Nuten     | 120            | 0,014                     | 0,018 | 0,023 | 0,027 | 0,036 | 0,050 | 0,060 | 0,080 | 0,100 | 0,125 |
| M2           | 750-850 N/mm <sup>2</sup>  | Nuten     | 80             | 0,012                     | 0,016 | 0,020 | 0,024 | 0,032 | 0,045 | 0,054 | 0,072 | 0,090 | 0,113 |
| M3           | > 850 N/mm <sup>2</sup>    | Nuten     | 70             | 0,011                     | 0,014 | 0,018 | 0,021 | 0,028 | 0,040 | 0,048 | 0,064 | 0,080 | 0,100 |
| S-Ni         | ≤ 1300 N/mm <sup>2</sup>   | Nuten     | 30             | 0,008                     | 0,011 | 0,014 | 0,017 | 0,022 | 0,032 | 0,038 | 0,051 | 0,064 | 0,080 |
| S-Ti         | ≤ 1300 N/mm <sup>2</sup>   | Nuten     | 60             | 0,012                     | 0,016 | 0,020 | 0,024 | 0,032 | 0,045 | 0,054 | 0,072 | 0,090 | 0,113 |
| K1           | ≤ 240 HB                   | Nuten     | 160            | 0,017                     | 0,022 | 0,028 | 0,033 | 0,044 | 0,065 | 0,078 | 0,104 | 0,130 | 0,163 |
| K2           | > 240 HB                   | Nuten     | 140            | 0,015                     | 0,020 | 0,025 | 0,030 | 0,040 | 0,055 | 0,066 | 0,088 | 0,110 | 0,138 |
| Alu-Knetleg. | ≤ 5 % Si                   | Nuten     | 500            | 0,020                     | 0,026 | 0,033 | 0,039 | 0,052 | 0,075 | 0,090 | 0,120 | 0,150 | 0,188 |
| Alu-Gussleg. | > 5 % Si                   | Nuten     | 230            | 0,017                     | 0,022 | 0,028 | 0,033 | 0,044 | 0,060 | 0,072 | 0,096 | 0,120 | 0,150 |
| NE-Metalle   | ≤ 850 N/mm <sup>2</sup>    | Nuten     | 250            | 0,017                     | 0,022 | 0,028 | 0,033 | 0,044 | 0,060 | 0,072 | 0,096 | 0,120 | 0,150 |

Zeitspanvolumen  $a_p$  (mm) x  $a_e$  (mm) x  $v_f$  (m/min) = Q (cm<sup>3</sup>/min)

|                        |   |
|------------------------|---|
| <b>Beispiel</b>        | HPC-Schruppen: 15 % a <sub>e</sub> ; 2xD a <sub>p</sub> ; C45   |
| <b>Werkzeug</b>        | SuperF-UT Typ N Ø 12 mm-4 Schneiden   |
| <b>Zustellung</b>      | radiale Zustellung a <sub>e</sub> 1,8 mm = 15 % von D   |
| <b>Basiswert Nuten</b> | v <sub>c</sub> Nuten = 180 m/min, f <sub>z</sub> Nuten = 0,072 mm   |
| <b>Umrechnung</b>      | v <sub>c</sub> Faktor = 1,8 → v <sub>c</sub> : 180 m/min x 1,8 = v <sub>c</sub> 324 m/min<br>f <sub>z</sub> Faktor = 1,9 → f <sub>z</sub> : 0,072 mm x 1,9 = f <sub>z</sub> 0,137 |
| <b>Erhöhte Werte</b>   | v <sub>c</sub> : 324 m/min / f <sub>z</sub> : 0,137 mm<br>n: 8594 U/min / v <sub>f</sub> : 4710 mm/min  |
| <b>Zeitspanvolumen</b> | Q = 203 cm <sup>3</sup> /min  |

# Reibwerkzeuge

## Arbeitsrichtwerte

| Vorschubreihen |              |       |       |       |       |       |       |
|----------------|--------------|-------|-------|-------|-------|-------|-------|
| Code-Buchstabe | E            | F     | G     | H     | I     | J     |       |
| Werkzeug-Ø/mm  | <b>3,15</b>  | 0,080 | 0,100 | 0,125 | 0,300 | 0,500 | 0,800 |
|                | <b>4,00</b>  | 0,100 | 0,125 | 0,160 | 0,300 | 0,500 | 1,000 |
|                | <b>5,00</b>  | 0,100 | 0,125 | 0,160 | 0,400 | 0,600 | 1,000 |
|                | <b>6,30</b>  | 0,125 | 0,160 | 0,200 | 0,400 | 0,700 | 1,200 |
|                | <b>8,00</b>  | 0,160 | 0,200 | 0,250 | 0,600 | 1,000 | 1,800 |
|                | <b>10,00</b> | 0,200 | 0,250 | 0,315 | 0,600 | 1,200 | 1,800 |
|                | <b>12,50</b> | 0,200 | 0,250 | 0,315 | 0,800 | 1,200 | 2,000 |
|                | <b>16,00</b> | 0,250 | 0,315 | 0,400 | 0,800 | 1,400 | 2,200 |
|                | <b>20,00</b> | 0,315 | 0,400 | 0,500 | 0,800 | 1,400 | 2,200 |
|                | <b>25,00</b> | 0,400 | 0,500 | 0,630 | 1,000 | 1,600 | 2,500 |
|                | <b>31,50</b> | 0,400 | 0,500 | 0,630 | 1,000 | 2,000 | 3,000 |
| <b>40,00</b>   | 0,500        | 0,630 | 0,800 | 1,200 | 2,000 | 3,000 |       |
| <b>50,00</b>   | 0,630        | 0,800 | 1,000 | 1,400 | 2,200 | 3,200 |       |

Vorschube  
f (mm/U)

Für eine optimale Kühlschmierstoffversorgung der Schneiden bei den SuperR-HS-Reibahlen Typ D für Durchgangsbohrungen empfehlen wir die Spannung im Hydrodehn- oder Schrumpffutter mit maximaler Einspanntiefe.

Werkzeuge mit fett gedruckten Vorschubreihen-Codebuchstaben sind für die entsprechende Werkstoffgruppe vorrangig einzusetzen.

| Durchmesser | Untermaße (Richtwerte) |
|-------------|------------------------|
| < 6 mm      | 0,1-0,2 mm             |
| < 10 mm     | 0,2 mm                 |
| < 16 mm     | 0,2-0,3 mm             |
| < 25 mm     | 0,3-0,4 mm             |
| > 25 mm     | 0,4 mm                 |

### Kühlmitteleinsatz:

- Schneidöl, hochaktiviert, grenzflächenaktives Schmiermittel mit wirksamen Stoffen (Additiven), die chemisch reagieren und dabei einen besonders haftenden und verschleißmindernden Schmierfilm erzeugen.
- Bohreremulsion ohne Schmiermittel
- nur Luftkühlung

| Werkstoffgruppe                   | Werkstoffbeispiele, <b>neue Bezeichnung</b> (in Klammern alte Bezeichnung)<br>Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN  | Zugfestigkeit<br>MPa (N/mm <sup>2</sup> ) | Härte                    | Kühlmittel  |
|-----------------------------------|---|---|--------------------------|---|
| Allgemeine Baustähle              | <b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2)<br><b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500) | ≤500<br>>500-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Automatenstähle                   | <b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36)<br><b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)   | ≤850<br>850-1000                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Vergütungsstähle       | <b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30)<br><b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45)<br><b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)  | ≤ 700<br>700-850<br>850-1000              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Legierte Vergütungsstähle         | <b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4<br><b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Einsatzstähle          | <b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)  | ≤750                                      |                          | <input checked="" type="checkbox"/>   |
| Legierte Einsatzstähle            | <b>1.7043</b> 38Cr4<br><b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Nitrierstähle                     | <b>1.8504</b> 34CrAl6<br><b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7  | >850-≤1000<br>≥1000-1200                  |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Werkzeugstähle                    | <b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9<br><b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4                                    | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Schnellarbeitsstähle              | <b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3   | ≥650-1000                                 |                          | <input checked="" type="checkbox"/>   |
| Federstähle                       | <b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)   |   | ≤330 HB                  | <input checked="" type="checkbox"/>   |
| Gehärtete Stähle                  | -   |   | ≤40-48 HRC<br>>48-60 HRC | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Rostfreie Stähle, geschwefelt     | <b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9  | ≤850                                      |                          | <input checked="" type="checkbox"/>   |
| austenitisch                      | <b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A)  | ≤850                                      |                          | <input checked="" type="checkbox"/>   |
| martensitisch                     | <b>1.4057</b> X20CrNi 17 2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2   | ≤850                                      |                          | <input checked="" type="checkbox"/>   |
| Gusseisen                         | <b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20)<br><b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kugelgraphit- und Tempereguss     | <b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMW-350-4(GTW35)<br><b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)  |   | ≤240 HB<br><300 HB       | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Hartguss                          | -   |   | ≤350 HB                  | <input checked="" type="checkbox"/>   |
| Neue Gusswerkstoffe GGV           | <b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35)<br><b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6   |   |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Neue Gusswerkstoffe ADI           | <b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000)<br><b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)  | 800-1000<br>1200-1400                     |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Sonderlegierungen                 | Nimonic, Inconel, Monel, Hastelloy  | ≤1200                                     |                          | <input checked="" type="checkbox"/>   |
| Titan und Titan-Legierungen       | <b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2<br><b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5,-TiAl8Mo1V1   | ≤850<br>>850-1200                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Aluminium und Al-Legierungen      | <b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1  | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Knetlegierungen                | <b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5   | ≤450                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Gusslegierungen ≤ 10 % Si      | <b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| > 10 % Si                         | <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu,-G-AlSi12CuNiMg  | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| Magnesium-Legierungen             | <b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1   | ≤450                                      |                          | <input type="checkbox"/>  |
| Kupfer, niedriglegiert            | <b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb   | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Messing, kurzspanend              | <b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| langspanend                       | <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| Bronzen, kurzspanend              | <b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn<br><b>2.0790</b> CuNi18Zn19Pb   | ≤600<br>>600-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Bronzen, langspanend              | <b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10<br><b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2   | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kunststoffe, duroplastisch        | Epoxidharz, Resopal, Pertinax, Moltopren  |   | -                        | <input type="checkbox"/>  |
| thermoplastisch                   | Plexiglas, Hostalen, Novodur, Makralon  |   | -                        | <input checked="" type="checkbox"/>   |
| Kunststoffe, aramidfaserverstärkt | Kevlar  |   | -                        | <input type="checkbox"/>  |
| glas-/kohlefaserverstärkt         | GFK/CFK   |   | -                        | <input type="checkbox"/>  |



# Kegelsenker V-NX

## Arbeitsrichtwerte

|                |       | Vorschubreihen |      |      |      |      |      |
|----------------|-------|----------------|------|------|------|------|------|
| Code-Buchstabe |       | E              | F    | G    | H    | I    | J    |
| Werkzeug-Ø mm  | 2,00  | 0,03           | 0,04 | 0,06 | 0,08 | 0,10 | 0,13 |
|                | 2,50  | 0,03           | 0,05 | 0,07 | 0,10 | 0,13 | 0,16 |
|                | 3,15  | 0,03           | 0,05 | 0,08 | 0,11 | 0,15 | 0,20 |
|                | 4,00  | 0,04           | 0,06 | 0,09 | 0,13 | 0,17 | 0,22 |
|                | 5,00  | 0,04           | 0,07 | 0,10 | 0,14 | 0,18 | 0,23 |
|                | 6,30  | 0,04           | 0,07 | 0,12 | 0,15 | 0,19 | 0,24 |
|                | 8,00  | 0,05           | 0,08 | 0,13 | 0,16 | 0,20 | 0,25 |
|                | 10,00 | 0,06           | 0,09 | 0,14 | 0,17 | 0,22 | 0,26 |
|                | 12,50 | 0,06           | 0,10 | 0,15 | 0,19 | 0,23 | 0,28 |
|                | 16,00 | 0,07           | 0,11 | 0,17 | 0,21 | 0,26 | 0,31 |
|                | 20,00 | 0,08           | 0,13 | 0,18 | 0,23 | 0,28 | 0,33 |
|                | 25,00 | 0,09           | 0,15 | 0,21 | 0,26 | 0,30 | 0,38 |
|                | 31,50 | 0,12           | 0,17 | 0,24 | 0,30 | 0,36 | 0,42 |
|                | 40,00 | 0,14           | 0,21 | 0,28 | 0,34 | 0,40 | 0,46 |

Werkzeuge mit fett gedruckten Vorschubreihen-Codebuchstaben sind für die entsprechende Werkstoffgruppe vorrangig einzusetzen.

### Kühlmitteleinsatz::

Schneidöl, hochaktiviert, grenzflächenaktives Schmiermittel mit wirksamen Stoffen (Additiven), die chemisch reagieren und dabei einen besonders haftenden und verschleißmindernden Schmierfilm erzeugen.

- Bohrölemulsion
- ohne Schmiermittel
- nur Luftkühlung

| Werkstoffgruppe  | Werkstoffbeispiele, <b>neue Bezeichnung</b> (in Klammern alte Bezeichnung)<br>Fettgedruckte Zahlen = Werkstoff-Nr. nach DIN EN  | Zugfestigkeit<br>MPa (N/mm <sup>2</sup> ) | Härte                    | Kühl-<br>mittel   |
|--|---|---|--------------------------|---|
| Allgemeine Baustähle   | <b>1.0035</b> S185(St33), <b>1.0486</b> P275N(StE285), <b>1.0345</b> P235GH(H1), <b>1.0425</b> P265GH(H2)<br><b>1.0050</b> E295 (St50-2), <b>1.0070</b> E360 (St70-2), <b>1.8937</b> P500NH (WStE500)   | ≤500<br>>500-850                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Automatenstähle  | <b>1.0718</b> 11SMnPb30 (9SMnPb28), <b>1.0736</b> 11SMn37 (9SMn36)<br><b>1.0727</b> 46S20 (45S20), <b>1.0728</b> (60S20), <b>1.0757</b> 46SPb20 (45SPb20)   | ≤850<br>850-1000                          |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Vergütungsstähle                                    | <b>1.0402</b> C22, <b>1.1178</b> C30E (Ck30)<br><b>1.0503</b> C45, <b>1.1191</b> C45E (Ck45)<br><b>1.0601</b> C60, <b>1.1221</b> C60E (Ck60)  | ≤ 700<br>700-850<br>850-1000              |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Legierte Vergütungsstähle                                      | <b>1.5131</b> 50MnSi4, <b>1.7003</b> 38Cr2, <b>1.7030</b> 28Cr4<br><b>1.5710</b> 36NiCr6, <b>1.7035</b> 41Cr4, <b>1.7225</b> 42CrMo4  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Unlegierte Einsatzstähle                                       | <b>1.0301</b> (C10), <b>1.1121</b> C10E (Ck10)  | ≤750                                      |                          | <input checked="" type="checkbox"/>   |
| Legierte Einsatzstähle   | <b>1.7043</b> 38Cr4<br><b>1.5752</b> 15NiCr13 (15NiCr13), <b>1.7131</b> 16MnCr5, <b>1.7264</b> 20CrMo5  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Nitrierstähle  | <b>1.8504</b> 34CrAl6<br><b>1.8519</b> 31CrMoV9, <b>1.8550</b> 34CrAlNi7  | >850-≤1000<br>≥1000-1200                  |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Werkzeugstähle   | <b>1.1750</b> C75W, <b>1.2067</b> 102Cr6, <b>1.2307</b> 29CrMoV9<br><b>1.2080</b> X210Cr12, <b>1.2083</b> X42Cr13, <b>1.2419</b> 105WCr6, <b>1.2767</b> X45NiCrMo4  | ≤850<br>>850-1000                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Schnellarbeitsstähle   | <b>1.3243</b> S 6-5-2-5, <b>1.3343</b> S 6-5-2, <b>1.3344</b> S 6-5-3   | ≥650-1000                                 |                          | <input checked="" type="checkbox"/>   |
| Federstähle  | <b>1.5026</b> 55Si7, <b>1.7176</b> 55Cr3, <b>1.8159</b> 51CrV4 (51CrV4)   |   | ≤330 HB                  | <input checked="" type="checkbox"/>   |
| Gehärtete Stähle   | -   |   | ≤40-48 HRC<br>>48-60 HRC | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Rostfreie Stähle, geschwefelt<br>austenitisch<br>martensitisch | <b>1.4005</b> X12CrS13, <b>1.4104</b> X14CrMoS17, <b>1.4105</b> X6CrMoS17, <b>1.4305</b> X8CrNiS18-9<br><b>1.4301</b> X5CrNi18-10 (V2A), <b>1.4541</b> X6CrNiTi18-10, <b>1.4571</b> X6CrNiMoTi 17-12-2 (V4A)<br><b>1.4057</b> X20CrNi 17 2 (X17CrNi16-2), <b>1.4122</b> X39CrMo17-1, <b>1.4521</b> X2CrMoTi18-2 | ≤850<br>≤850<br>≤850                      |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Gusseisen  | <b>0.6010</b> EN-GJL-100(GG10), <b>0.6020</b> EN-GJL-200(GG20)<br><b>0.6025</b> EN-GJL-250(GG25), <b>0.6035</b> EN-GJL-350(GG35)  | 850-≤1000<br>1000-1200                    |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Kugelgraphit- und Temperguss                                   | <b>0.7050</b> EN-GJS-500-7(GGG50), <b>0.8035</b> EN-GJMW-350-4(GTW35)<br><b>0.7070</b> EN-GJS-700-2(GGG70), <b>0.8170</b> EN-GJMB-700-2(GTS70)  |   | ≤240 HB<br><300 HB       | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Hartguss   | -   |   | ≤350 HB                  | <input checked="" type="checkbox"/>   |
| Neue Gusswerkstoffe GGV  | <b>EN-GJV250</b> (GGV25), <b>EN-GJV350</b> (GGV35)<br><b>EN-GJV400</b> (GGV40), <b>EN-GJV500</b> (GGV50), SiMo6   |   |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Neue Gusswerkstoffe ADI  | <b>EN-GJS-800-8</b> (ADI800), <b>EN-GJS-1000-5</b> (ADI1000)<br><b>EN-GJS-1200-2</b> (ADI1200), <b>EN-GJS-1400-1</b> (ADI1400)  | 800-1000<br>1200-1400                     |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Sonderlegierungen  | Nimonic, Inconel, Monel, Hastelloy  | ≤1200                                     |                          | <input checked="" type="checkbox"/>   |
| Titan und Titan-Legierungen                                    | <b>3.7024</b> Ti99,5, <b>3.7114</b> TiAl5Sn2,5, <b>3.7124</b> TiCu2<br><b>3.7154</b> TiAl6Zr5, <b>3.7165</b> TiAl6V4, <b>3.7184</b> TiAl4Mo4Sn2,5, - TiAl8Mo1V1   | ≤850<br>>850-1200                         |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/>  |
| Aluminium und Al-Legierungen                                   | <b>3.0255</b> Al99,5, <b>3.2315</b> AlMgSi1, <b>3.3515</b> AlMg1  | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Knetlegierungen   | <b>3.0615</b> AlMgSiPb, <b>3.1325</b> AlCuMg1, <b>3.3245</b> AlMg3Si, <b>3.4365</b> AlZnMgCu1,5   | ≤450                                      |                          | <input checked="" type="checkbox"/>   |
| Al-Gusslegierungen ≤ 10 % Si                                   | <b>3.2131</b> G-AlSi5Cu1, <b>3.2153</b> G-AlSi7Cu3, <b>3.2573</b> G-AlSi9   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| > 10 % Si  | <b>3.2581</b> G-AlSi12, <b>3.2583</b> G-AlSi12Cu, - G-AlSi12CuNiMg  | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| Magnesium-Legierungen  | <b>3.5200</b> MgMn2, <b>3.5812.05</b> G-MgAl8Zn1, <b>3.5612.05</b> G-MgAl6Zn1   | ≤450                                      |                          | <input type="checkbox"/>  |
| Kupfer, niedriglegiert   | <b>2.0070</b> SE-Cu, <b>2.1020</b> CuSn6, <b>2.1096</b> G-CuSn5ZnPb   | ≤400                                      |                          | <input checked="" type="checkbox"/>   |
| Messing, kurzspanend   | <b>2.0380</b> CuZn39Pb2, <b>2.0401</b> CuZn39Pb3, <b>2.0410</b> CuZn43Pb2   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| langspanend  | <b>2.0250</b> CuZn20, <b>2.0280</b> CuZn33, <b>2.0332</b> CuZn37Pb0,5   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| Bronzen, kurzspanend   | <b>2.1090</b> CuSn7ZnPb, <b>2.1170</b> CuPb5Sn5, <b>2.1176</b> CuPb10Sn   | ≤600                                      |                          | <input checked="" type="checkbox"/>   |
| langspanend  | <b>2.0790</b> CuNi18Zn19Pb<br><b>2.0916</b> CuAl5, <b>2.0960</b> CuAl9Mn, <b>2.1050</b> CuSn10<br><b>2.0980</b> CuAl11Ni, <b>2.1247</b> CuBe2   | >600-850<br>≤850<br>>850-1000             |                          | <input checked="" type="checkbox"/><br><input checked="" type="checkbox"/><br><input checked="" type="checkbox"/> |
| Kunststoffe, duroplastisch                                     | Epoxidharz, Resopal, Pertinax, Moltopren  |   | -                        | <input type="checkbox"/>  |
| thermoplastisch  | Plexiglas, Hostalen, Novodur, Makralon  |   | -                        | <input checked="" type="checkbox"/>   |
| Kunststoffe, aramidfaserverstärkt                              | Kevlar  |   | -                        | <input type="checkbox"/>  |
| glas-/kohlefaserverstärkt                                      | GFK/CFK   |   | -                        | <input type="checkbox"/>  |



|              |               |
|--------------|---------------|
| Katalog-Nr.  | <b>52348</b>  |
| Schneidstoff | <b>HSS-Co</b> |
| Oberfläche   | AlTiN         |
| DIN          | 335           |
| Kegelwinkel  | 90°           |
| Schaftform   | zylindrisch   |
| Katalogseite | 234           |

|              |               |
|--------------|---------------|
| Katalog-Nr.  | <b>52350</b>  |
| Schneidstoff | <b>HSS-Co</b> |
| Oberfläche   | AlTiN         |
| DIN          | 335           |
| Kegelwinkel  | 90°           |
| Schaftform   | 3-Flächen     |
| Katalogseite | 235           |

|              |               |
|--------------|---------------|
| Katalog-Nr.  | <b>52398</b>  |
| Schneidstoff | <b>HSS-Co</b> |
| Oberfläche   | AlTiN         |
| DIN          | 335           |
| Kegelwinkel  | 90°           |
| Schaftform   | zylindrisch   |
| Katalogseite | 236           |

|              |               |
|--------------|---------------|
| Katalog-Nr.  | <b>52399</b>  |
| Schneidstoff | <b>HSS-Co</b> |
| Oberfläche   | AlTiN         |
| DIN          | 335           |
| Kegelwinkel  | 90°           |
| Schaftform   | 3-Flächen     |
| Katalogseite | 237           |



| V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code | V <sub>c</sub><br>m/min | VR-Code |
|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|
| 41                      | G       | 41                      | G       | 41                      | G       | 41                      | G       |
| 39                      | F       | 39                      | F       | 39                      | F       | 39                      | F       |
| 41                      | G       | 41                      | G       | 41                      | G       | 41                      | G       |
| 39                      | F       | 39                      | F       | 39                      | F       | 39                      | F       |
| 41                      | G       | 41                      | G       | 41                      | G       | 41                      | G       |
| 39                      | G       | 39                      | G       | 39                      | G       | 39                      | G       |
| 25                      | F       | 25                      | F       | 25                      | F       | 25                      | F       |
| 19                      | G       | 19                      | G       | 19                      | G       | 19                      | G       |
| 15                      | F       | 15                      | F       | 15                      | F       | 15                      | F       |
| 32                      | G       | 32                      | G       | 32                      | G       | 32                      | G       |
| 19                      | G       | 19                      | G       | 19                      | G       | 19                      | G       |
| 13                      | F       | 13                      | F       | 13                      | F       | 13                      | F       |
| 19                      | F       | 19                      | F       | 19                      | F       | 19                      | F       |
| 15                      | E       | 15                      | E       | 15                      | E       | 15                      | E       |
| 22                      | F       | 22                      | F       | 22                      | F       | 22                      | F       |
| 19                      | E       | 19                      | E       | 19                      | E       | 19                      | E       |
| 19                      | E       | 19                      | E       | 19                      | E       | 19                      | E       |
| 13                      | E       | 13                      | E       | 13                      | E       | 13                      | E       |
| 20                      | F       | 20                      | F       | 20                      | F       | 20                      | F       |
| 15                      | E       | 15                      | E       | 15                      | E       | 15                      | E       |
| 18                      | E       | 18                      | E       | 18                      | E       | 18                      | E       |
| 32                      | G       | 32                      | G       | 32                      | G       | 32                      | G       |
| 20                      | G       | 20                      | G       | 20                      | G       | 20                      | G       |
| 28                      | G       | 28                      | G       | 28                      | G       | 28                      | G       |
| 25                      | G       | 25                      | G       | 25                      | G       | 25                      | G       |
| 10                      | E       | 10                      | E       | 10                      | E       | 10                      | E       |
| 28                      | G       | 28                      | G       | 28                      | G       | 28                      | G       |
| 18                      | G       | 18                      | G       | 18                      | G       | 18                      | G       |
| 10                      | E       | 10                      | E       | 10                      | E       | 10                      | E       |
| 19                      | F       | 19                      | F       | 19                      | F       | 19                      | F       |
| 13                      | E       | 13                      | E       | 13                      | E       | 13                      | E       |
| 101                     | H       | 114                     | H       | 101                     | H       | 114                     | H       |
| 89                      | H       | 89                      | H       | 89                      | H       | 89                      | H       |
| 51                      | G       | 51                      | G       | 51                      | G       | 51                      | G       |
| 39                      | G       | 39                      | G       | 39                      | G       | 39                      | G       |
| 127                     | H       | 127                     | H       | 127                     | H       | 127                     | H       |
| 76                      | H       | 76                      | H       | 76                      | H       | 76                      | H       |
| 101                     | H       | 101                     | H       | 101                     | H       | 101                     | H       |
| 64                      | H       | 64                      | H       | 64                      | H       | 64                      | H       |
| 39                      | H       | 39                      | H       | 39                      | H       | 39                      | H       |
| 33                      | H       | 33                      | H       | 33                      | H       | 33                      | H       |
| 31                      | H       | 31                      | H       | 31                      | H       | 31                      | H       |
| 25                      | H       | 25                      | H       | 25                      | H       | 25                      | H       |
| 39                      | H       | 39                      | H       | 39                      | H       | 39                      | H       |
| 51                      | H       | 51                      | H       | 51                      | H       | 51                      | H       |

| Katalog-Nr. | Seite | Norm              | Oberfläche | Bezeichnung  | Schneidstoff | Typ              |
|-------------|-------|-------------------|------------|--|--------------|------------------|
| 51146       | 81    | DIN 6537K         | AlTiN      | Spiralbohrer mit verstärktem Zylinderschaft                | VHM          | H                |
| 51290       | 80    | Werksnorm         | TiAlN nano | Spiralbohrer kurz  | VHM          | N                |
| 51670       | 31    | DIN 6537K         | AlTiN nano | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-VA        |
| 51673       | 23    | DIN 6537K         | TiAlN nano | SuperV-Bohrer ohne Innenkühlung                            | VHM          | SuperV-U         |
| 51674       | 45    | DIN 6537L         | AlTiN nano | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-VA        |
| 51676       | 29    | DIN 6537K         | TiAlN nano | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-IK-U      |
| 51681       | 43    | DIN 6537L         | TiAlN nano | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-IK-U      |
| 51687       | 27    | DIN 6537L         | TiAlN nano | SuperV-Bohrer ohne Innenkühlung                            | VHM          | SuperV-U         |
| 51718       | 39    | Werksnorm         | TiAlN nano | Pilotbohrer mit Kühlkanälen                                | VHM          | SuperV-180       |
| 51720       | 69    | Werksnorm         | AlTiN      | SuperV-M Universal-Kleinstbohrer                           | VHM          | SuperV-M         |
| 51750       | 25    | DIN 6537K         | TiAlSiN    | SuperV-Bohrer ohne Innenkühlung                            | VHM          | SuperV-S         |
| 51752       | 35    | DIN 6537K         | TiAlSiN    | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-S         |
| 51753       | 37    | DIN 6537K         | TiAlSiN    | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-S         |
| 51754       | 49    | DIN 6537L         | TiAlSiN    | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-S         |
| 51755       | 51    | DIN 6537L         | TiAlSiN    | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-S         |
| 51756       | 55    | Werksnorm         | TiAlSiN    | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-S         |
| 51764       | 58    | Werksnorm         | AlTiN      | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-T         |
| 51765       | 61    | Werksnorm         | AlTiN      | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-T         |
| 51766       | 64    | Werksnorm         | AlTiN      | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-T         |
| 51767       | 67    | Werksnorm         | AlTiN      | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-T         |
| 51768       | 68    | Werksnorm         | AlTiN      | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-T         |
| 51784       | 33    | DIN 6537K         | TiAlN nano | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-X         |
| 51786       | 47    | DIN 6537L         | TiAlN nano | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-X         |
| 51791       | 53    | Werksnorm         | TiAlN nano | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-X         |
| 51792       | 56    | Werksnorm         | TiAlN nano | SuperV-Bohrer mit Innenkühlung                             | VHM          | SuperV-X         |
| 51970       | 75    | Werksnorm         | TiSiN+     | SuperV-NX VA Hochleistungs-Kleinstbohrer ohne Innenkühlung | VHM          | SuperV-NX VA     |
| 51971       | 76    | Werksnorm         | TiSiN+     | SuperV-NX VA Hochleistungs-Kleinstbohrer mit Innenkühlung  | VHM          | SuperV-NX VA     |
| 51972       | 77    | Werksnorm         | TiSiN+     | SuperV-NX VA Hochleistungs-Kleinstbohrer mit Innenkühlung  | VHM          | SuperV-NX VA     |
| 51973       | 78    | Werksnorm         | TiSiN+     | SuperV-NX VA Hochleistungs-Kleinstbohrer mit Innenkühlung  | VHM          | SuperV-NX VA     |
| 51974       | 79    | Werksnorm         | TiSiN+     | SuperV-NX VA Hochleistungs-Kleinstbohrer mit Innenkühlung  | VHM          | SuperV-NX VA     |
| 51980       | 74    | Werksnorm         | AlTiN      | SuperV-NX U Hochleistungs-Kleinstbohrer mit Innenkühlung   | VHM          | SuperV-IK NX-U   |
| 51997       | 71    | Werksnorm         | AlTiN      | SuperV-NX Hochleistungs-Kleinstbohrer mit Innenkühlung     | VHM          | SuperV-IK-NX     |
| 51998       | 72    | Werksnorm         | AlTiN      | SuperV-NX Hochleistungs-Kleinstbohrer mit Innenkühlung     | VHM          | SuperV-IK-NX     |
| 51999       | 73    | Werksnorm         | AlTiN      | SuperV-NX Hochleistungs-Kleinstbohrer mit Innenkühlung     | VHM          | SuperV-IK-NX     |
| 52348       | 234   | DIN 335           | AlTiN      | Kegelsenker 90° V-NX                                       | HSCO         | V-NX             |
| 52350       | 235   | DIN 335           | AlTiN      | Kegelsenker 90° V-NX                                       | HSCO         | V-NX             |
| 52398       | 236   | DIN 335           | AlTiN      | Kegelsenkersätze 90° V-NX                                  | HSCO         | V-NX             |
| 52399       | 237   | DIN 335           | AlTiN      | Kegelsenkersätze 90° V-NX                                  | HSCO         | V-NX             |
| 52920       | 230   | Werksnorm         | AlTiN nano | VHM NC-Maschinen-Reibahlen                                 | VHM          |                  |
| 52930       | 232   | Werksnorm         | AlTiN nano | VHM NC-Maschinen-Reibahlen                                 | VHM          |                  |
| 53399       | 224   | Werksnorm         | TiAlZrN    | Entgratfräser 90°  | VHM          | SuperAF-90       |
| 53610       | 149   | ~DIN 371/~DIN 376 | TiCN       | Kühlkanal-Gewindeformer für Metr. ISO-Gewinde              | HSS-E-PM     | Durativ N-X      |
| 53612       | 151   | ~DIN 374          | TiCN       | Kühlkanal-Gewindeformer für Metr. ISO-Feingewinde          | HSS-E-PM     | Durativ N-X      |
| 53618       | 150   | ~DIN 371/~DIN 376 | TiCN       | Kühlkanal-Gewindeformer für Metr. ISO-Gewinde              | HSS-E-PM     | Durativ N-X      |
| 53619       | 152   | ~DIN 374          | TiCN       | Kühlkanal-Gewindeformer für Metr. ISO-Feingewinde          | HSS-E-PM     | Durativ N-X      |
| 53630       | 143   | ~DIN 371/~DIN 376 | TiCN       | Gewindeformer für Metrische ISO-Gewinde                    | HSS-E-PM     | Durativ N-X      |
| 53631       | 144   | ~DIN 371/~DIN 376 | TiCN       | Gewindeformer für Metrische ISO-Gewinde                    | HSS-E-PM     | Durativ N-X      |
| 53632       | 145   | ~DIN 374          | TiCN       | Gewindeformer für Metrische ISO-Feingewinde                | HSS-E-PM     | Durativ N-X      |
| 53633       | 146   | ~DIN 371/~DIN 376 | TiCN       | Gewindeformer für UNC-Gewinde                              | HSS-E-PM     | Durativ N-X      |
| 53634       | 147   | ~DIN 371/~DIN 374 | TiCN       | Gewindeformer für UNF-Gewinde                              | HSS-E-PM     | Durativ N-X      |
| 53635       | 148   | DIN 2189          | TiCN       | Gewindeformer für Whitworth-Rohrgewinde                    | HSS-E-PM     | Durativ N-X      |
| 53640       | 118   | DIN 371/DIN 376   | TiCN       | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E-PM     | Produktiv H      |
| 53642       | 117   | DIN 371/DIN 376   | TiCN       | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | Produktiv H      |
| 53646       | 115   | DIN 376           | TiCN       | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | H                |
| 53647       | 116   | ~DIN 376          | TiCN       | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | H                |
| 53661       | 121   | DIN 371/DIN 376   | TiCN       | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | Intensiv H       |
| 53664       | 122   | DIN 371/DIN 376   | TiAlN      | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E-PM     | Intensiv H       |
| 53676       | 123   | DIN 371/DIN 376   | TiCN       | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E-PM     | H                |
| 53733       | 99    | ~DIN 371/~DIN 376 | AlTiZrN    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | Produktiv N-X    |
| 53734       | 100   | DIN 371/DIN 376   | AlTiZrN    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | Produktiv N-X LH |
| 53735       | 101   | DIN 371/DIN 376   | AlTiZrN    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E-PM     | Produktiv N-X    |
| 53736       | 102   | DIN 371/DIN 376   | AlTiZrN    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E-PM     | Produktiv N-X    |
| 53737       | 103   | DIN 371/DIN 376   | AlTiZrN    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | Produktiv N-X    |
| 53738       | 104   | DIN 371/DIN 376   | AlTiZrN    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | Produktiv N-X    |
| 53739       | 105   | Werksnorm         | AlTiZrN    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | Produktiv N-X    |
| 53746       | 106   | ~DIN 371/~DIN 376 | TiAlN-H    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | Intensiv N-X     |
| 53747       | 107   | DIN 371/DIN 376   | TiAlN-H    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | Intensiv N-X LH  |
| 53748       | 108   | DIN 371/DIN 376   | TiAlN-H    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E-PM     | Intensiv N-X     |
| 53749       | 109   | DIN 371/DIN 376   | TiAlN-H    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E-PM     | Intensiv N-X     |
| 53750       | 111   | DIN 371/DIN 376   | TiAlN-H    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | Intensiv N-X     |
| 53751       | 112   | DIN 371/DIN 376   | TiAlN-H    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | Intensiv N-X     |
| 53752       | 113   | Werksnorm         | TiAlN-H    | Gewindebohrer für Metrische ISO-Gewinde                    | HSS-E        | Intensiv N-X     |

| Katalog-Nr. | Seite | Norm              | Oberfläche      | Bezeichnung   | Schneidstoff | Typ             |
|-------------|-------|-------------------|-----------------|---|--------------|-----------------|
| 53760       | 110   | DIN 371/DIN 376   | TiAIN-H         | Gewindebohrer für Metrische ISO-Gewinde               | HSS-E        | Intensiv N-X    |
| 53770       | 131   | DIN 374           | TiAIN-H         | Gewindebohrer für Metrische ISO-Feingewinde           | HSS-E        | Intensiv N-X    |
| 53775       | 142   | DIN 5156          | TiAIN-H         | Gewindebohrer für Whitworth-Rohrgewinde               | HSS-E        | Intensiv N-X    |
| 53778       | 124   | DIN 374           | AlTiZrN         | Gewindebohrer für Metrische ISO-Feingewinde           | HSS-E        | Produktiv N-X   |
| 53779       | 127   | DIN 374           | AlTiZrN         | Gewindebohrer für Metrische ISO-Feingewinde           | HSS-E        | Produktiv N-X   |
| 53780       | 128   | DIN 374           | TiAIN-H         | Gewindebohrer für Metrische ISO-Feingewinde           | HSS-E        | Intensiv N-X    |
| 53781       | 132   | DIN 374           | TiAIN-H         | Gewindebohrer für Metrische ISO-Feingewinde           | HSS-E        | Intensiv N-X    |
| 53782       | 134   | DIN 371/DIN 376   | AlTiZrN         | Gewindebohrer für UNC-Gewinde                         | HSS-E        | Produktiv N-X   |
| 53783       | 135   | DIN 371/DIN 376   | TiAIN-H         | Gewindebohrer für UNC-Gewinde                         | HSS-E        | Intensiv N-X    |
| 53784       | 136   | ~DIN 371/~DIN 374 | AlTiZrN         | Gewindebohrer für UNF-Gewinde                         | HSS-E        | Produktiv N-X   |
| 53785       | 137   | ~DIN 371/~DIN 374 | TiAIN-H         | Gewindebohrer für UNF-Gewinde                         | HSS-E        | Intensiv N-X    |
| 53789       | 125   | DIN 374           | AlTiZrN         | Gewindebohrer für Metrische ISO-Feingewinde           | HSS-E-PM     | Produktiv N-X   |
| 53790       | 126   | DIN 374           | AlTiZrN         | Gewindebohrer für Metrische ISO-Feingewinde           | HSS-E-PM     | Produktiv N-X   |
| 53791       | 129   | DIN 374           | TiAIN-H         | Gewindebohrer für Metrische ISO-Feingewinde           | HSS-E-PM     | Intensiv N-X    |
| 53792       | 130   | DIN 374           | TiAIN-H         | Gewindebohrer für Metrische ISO-Feingewinde           | HSS-E-PM     | Intensiv N-X    |
| 53793       | 138   | ~DIN 371          | AlTiZrN         | Gewindebohrer für BSW-Gewinde                         | HSS-E        | Produktiv N-X   |
| 53794       | 139   | ~DIN 371          | TiAIN-H         | Gewindebohrer für BSW-Gewinde                         | HSS-E        | Intensiv N-X    |
| 53795       | 140   | DIN 5156          | AlTiZrN         | Gewindebohrer für Whitworth-Rohrgewinde               | HSS-E        | Produktiv N-X   |
| 53796       | 141   | DIN 5156          | TiAIN-H         | Gewindebohrer für Whitworth-Rohrgewinde               | HSS-E        | Intensiv N-X    |
| 53831       | 159   | Werksnorm         | AlTiZrN         | Gewindefräser ohne Senkfase für Whitworth-Rohrgewinde | VHM          | TM SP           |
| 53832       | 160   | Werksnorm         | AlTiZrN         | Mehrbereichsgewindefräser für Whitworth-Rohrgewinde   | VHM          | TMU SP          |
| 53840       | 162   | Werksnorm         | AlTiZrN         | Mikrogewindefräser für Metrische ISO-Gewinde          | VHM          | TM SP           |
| 53841       | 164   | Werksnorm         | AlTiZrN         | Mikrogewindefräser für Whitworth-Rohrgewinde          | VHM          | TM SP           |
| 53850       | 163   | Werksnorm         | TiSiN+          | Mikrogewindefräser für Metrische ISO-Gewinde          | VHM          | TM SP           |
| 53860       | 157   | Werksnorm         | AlTiZrN         | Gewindefräser ohne Senkfase für Metr. ISO-Gewinde     | VHM          | TM SP           |
| 53890       | 156   | Werksnorm         | AlCrN           | Gewindefräser mit Senkfase für Metrische ISO-Gewinde  | VHM          | TMC-NX SP       |
| 53892       | 161   | Werksnorm         | AlTiZrN         | Mikrogewindefräser für Metrische ISO-Gewinde          | VHM          | MTM-NX SP       |
| 53948       | 153   | Werksnorm         | TiSiN+          | Bohrgewindefräser für Metrische ISO-Gewinde           | VHM          | TMD-NX          |
| 53949       | 154   | Werksnorm         | TiSiN+          | Bohrgewindefräser für UNC-/UNF-Gewinde                | VHM          | TMD-NX          |
| 53950       | 155   | Werksnorm         | TiSiN+          | Bohrgewindefräser für Rohrgewinde                     | VHM          | TMD-NX          |
| 54302       | 223   | Werksnorm         | TiAlSiN         | Kopierfräser mit Torusanschiff                        | VHM          | NH              |
| 54304       | 221   | Werksnorm         | TiAlSiN         | Kopierfräser mit Torusanschiff                        | VHM          | H               |
| 54305       | 222   | Werksnorm         | TiAlSiN         | Kopierfräser mit Torusanschiff                        | VHM          | H               |
| 54325       | 204   | Werksnorm         | TiSiN+/ TiAlSiN | Kopierfräser mit Vollradius H B2                      | VHM          | H B2            |
| 54326       | 205   | Werksnorm         | TiSiN+/ TiAlSiN | Kopierfräser mit Vollradius H B2                      | VHM          | H B2            |
| 54340       | 180   | DIN 6527L         | TiAlSiN         | SuperF-UT-Fräser H-X                                  | VHM          | SuperF-UT H-X   |
| 54341       | 181   | DIN 6527L         | TiAlSiN         | SuperF-UT-Fräser H-X                                  | VHM          | SuperF-UT H-X   |
| 54345       | 206   | Werksnorm         | TiSiN+/ TiAlSiN | Kopierfräser mit Vollradius H B4                      | VHM          | H B4            |
| 54346       | 207   | Werksnorm         | TiSiN+/ TiAlSiN | Kopierfräser mit Vollradius H B4                      | VHM          | H B4            |
| 54347       | 212   | Werksnorm         | TiSiN+          | Kopierfräser mit Torusanschiff H T4                   | VHM          | H T4            |
| 54348       | 213   | Werksnorm         | TiSiN+          | Kopierfräser mit Torusanschiff H T4                   | VHM          | H T4            |
| 54360       | 218   | Werksnorm         | TiAlSiN         | Hartfräser, mehrschneidig H FS6                       | VHM          | H FS6           |
| 54361       | 219   | Werksnorm         | TiAlSiN         | Hartfräser, mehrschneidig H FS6                       | VHM          | H FS6           |
| 54362       | 220   | Werksnorm         | TiAlSiN         | Hartfräser, mehrschneidig H FS6                       | VHM          | H FS6           |
| 54425       | 208   | Werksnorm         | TiSiN+/ TiAlSiN | Kopierfräser mit Vollradius S B2                      | VHM          | S B2            |
| 54426       | 209   | Werksnorm         | TiSiN+/ TiAlSiN | Kopierfräser mit Vollradius S B2                      | VHM          | S B2            |
| 54427       | 214   | Werksnorm         | TiSiN+/ TiAlSiN | Kopierfräser mit Torusanschiff S T2                   | VHM          | S T2            |
| 54428       | 215   | Werksnorm         | TiSiN+/ TiAlSiN | Kopierfräser mit Torusanschiff S T2                   | VHM          | S T2            |
| 54445       | 210   | Werksnorm         | TiSiN+/ TiAlSiN | Kopierfräser mit Vollradius S B4                      | VHM          | S B4            |
| 54446       | 211   | Werksnorm         | TiSiN+/ TiAlSiN | Kopierfräser mit Vollradius S B4                      | VHM          | S B4            |
| 54447       | 216   | Werksnorm         | TiSiN+/ TiAlSiN | Kopierfräser mit Torusanschiff S T4                   | VHM          | S T4            |
| 54448       | 217   | Werksnorm         | TiSiN+/ TiAlSiN | Kopierfräser mit Torusanschiff S T4                   | VHM          | S T4            |
| 54500       | 187   | Werksnorm         | AlCrN           | SuperF-UT-Fräser U                                    | VHM          | SuperF-UT U     |
| 54501       | 188   | Werksnorm         | AlCrN           | SuperF-UT-Fräser U                                    | VHM          | SuperF-UT U     |
| 54502       | 189   | Werksnorm         | AlCrN           | SuperF-UT-Fräser UL                                   | VHM          | SuperF-UT UL    |
| 54503       | 190   | Werksnorm         | AlCrN           | SuperF-UT-Fräser UL                                   | VHM          | SuperF-UT UL    |
| 54542       | 192   | DIN 6527L         | TiAlSiN         | SuperF-UT-Fräser VA-r                                 | VHM          | SuperF-UT VA-r  |
| 54550       | 185   | DIN 6527L         | AlCrN           | SuperF-UT-Fräser N-r                                  | VHM          | SuperF-UT N-r   |
| 54553       | 184   | Werksnorm         | TiAIN           | SuperF-UT-Fräser NL                                   | VHM          | SuperF-UT NL    |
| 54555       | 167   | Werksnorm         | AlTiN+          | SuperF-UT-Fräser ZS-r                                 | VHM          | SuperF-UT ZS-r  |
| 54556       | 182   | DIN 6527L         | AlTiN nano      | SuperF-UT-Fräser S                                    | VHM          | SuperF-UT S     |
| 54560       | 178   | DIN 6527L         | ZrN             | SuperF-UT-Fräser Ti                                   | VHM          | SuperF-UT Ti    |
| 54561       | 179   | DIN 6527L         | ZrN             | SuperF-UT-Fräser Ti                                   | VHM          | SuperF-UT Ti    |
| 54577       | 165   | Werksnorm         | AlTiN+          | SuperF-UT-Fräser Z                                    | VHM          | SuperF-UT Z     |
| 54578       | 166   | Werksnorm         | AlTiN+          | SuperF-UT-Fräser ZS                                   | VHM          | SuperF-UT ZS    |
| 54581       | 168   | Werksnorm         | AlTiN+          | SuperF-UT-Fräser ZS-7                                 | VHM          | SuperF-UT ZS-7  |
| 54583       | 169   | Werksnorm         | TiAIN           | SuperF-UT-Fräser N-5                                  | VHM          | SuperF-UT N-5   |
| 54584       | 170   | Werksnorm         | TiAIN           | SuperF-UT-Fräser N-5                                  | VHM          | SuperF-UT N-5   |
| 54585       | 175   | DIN 6527L         | TiAlSiN         | SuperF-UT-Fräser NX-1K                                | VHM          | SuperF-UT NX-1K |
| 54586       | 172   | Werksnorm         | TiAlSiN         | SuperF-UT-Fräser NX-3                                 | VHM          | SuperF-UT NX-3  |
| 54587       | 173   | Werksnorm         | TiAlSiN         | SuperF-UT-Fräser NX-3                                 | VHM          | SuperF-UT NX-3  |
| 54589       | 174   | DIN 6527K         | TiAlSiN         | SuperF-UT-Fräser NX                                   | VHM          | SuperF-UT NX    |

| Katalog-Nr. | Seite | Norm            | Oberfläche     | Bezeichnung  | Schneidstoff | Typ                         |
|-------------|-------|-----------------|----------------|--|--------------|-----------------------------|
| 54592       | 201   | Werksnorm       | DLC            | SuperF-UT-Fräser Al-X                                    | VHM          | SuperF-UT Al-X              |
| 54593       | 200   | Werksnorm       | DLC            | SuperF-UT-Fräser N                                       | VHM          | SuperF-UT Al-X              |
| 54594       | 176   | Werksnorm       | TiSiN+         | SuperF-UT-Fräser NX Micro                                | VHM          | SuperF-UT NX Micro          |
| 54595       | 177   | Werksnorm       | TiSiN+         | SuperF-UT-Fräser NX Micro                                | VHM          | SuperF-UT NX Micro          |
| 61131       | 87    | DIN 1897        | AlTiZrN        | Spiralbohrer extra kurz                                  | HSS-Co       | V18                         |
| 61232       | 89    | DIN 338         | AlTiZrN        | Spiralbohrer kurz  | HSS-Co       | V18                         |
| 63033       | 114   | DIN 371/DIN 376 | TiN            | Gewindebohrer für Metrische ISO-Gewinde                  | HSS-E        | Produktiv N                 |
| 63399       | 225   | Werksnorm       | TiAlZrN        | Entgratfräser 90°, spiralisiert                          | VHM          | Super AFX-90                |
| 64552       | 183   | DIN 6527L       | TiAlZrN        | SuperF-UT-Fräser N <sup>2</sup>                          | VHM          | SuperF-UT N <sup>2</sup>    |
| 64553       | 191   | DIN 6527L       | TiAlZrN        | SuperF-UT-Fräser VA-X <sup>2</sup>                       | VHM          | SuperF-UT VA-X <sup>2</sup> |
| 64560       | 171   | Werksnorm       | TiAlZrN        | SuperF-UT-Fräser FS <sup>2</sup>                         | VHM          | SuperF-UT FS <sup>2</sup>   |
| 65030       | 82    | Werksnorm       | TiN            | Einlippenbohrer SuperT-NXL                               | HM           | SuperT-NXL                  |
| 65031       | 83    | Werksnorm       | TiN            | Einlippenbohrer SuperT-NXL                               | HM           | SuperT-NXL                  |
| 65032       | 84    | Werksnorm       | TiN            | Einlippenbohrer SuperT-NXL                               | HM           | SuperT-NXL                  |
| 65033       | 85    | Werksnorm       | TiN            | Einlippenbohrer SuperT-NXL                               | HM           | SuperT-NXL                  |
| 71018       | 91    | DIN 338         | Bronze-VAP     | V16-Spiralbohrer   | M42          | V16                         |
| 71019       | 93    | DIN 338         | Bronze-VAP     | V16-Spiralbohrer-Sätze                                   | M42          | V16                         |
| 71020       | 94    | Werksnorm       |                | V16-Pocket-Satz (Spiralbohrer, Gewindebohrer und Senker) |              | N                           |
| 71140       | 95    | NAS 907         | blank          | Stangenbohrer, Länge 6 inches                            | HSS          | N                           |
| 71141       | 97    | NAS 907         | blank          | Stangenbohrer, Länge 12 inches                           | HSS          | N                           |
| 71142       | 96    | NAS 907         | nitriert       | Stangenbohrer, Länge 6 inches                            | HSS          | N                           |
| 71143       | 98    | NAS 907         | nitriert       | Stangenbohrer, Länge 12 inches                           | HSS          | N                           |
| 71660       | 86    | Werksnorm       | dampfbehandelt | Karosseriebohrer   | HSS          | N                           |
| 71764       | 59    | Werksnorm       | blank          | SuperV-Bohrer mit Innenkühlung                           | VHM          | SuperV-T-Al                 |
| 71765       | 62    | Werksnorm       | blank          | SuperV-Bohrer mit Innenkühlung                           | VHM          | SuperV-T-Al                 |
| 71766       | 65    | Werksnorm       | blank          | SuperV-Bohrer mit Innenkühlung                           | VHM          | SuperV-T-Al                 |
| 71791       | 41    | DIN 6537L       | blank          | SuperV-Bohrer mit Innenkühlung                           | VHM          | SuperV-Al                   |
| 72874       | 226   | Werksnorm       | AlTiN nano     | VHM-Hochleistungs-Kopfreibahnen                          | VHM          | SuperR-HS-KS                |
| 72875       | 227   | Werksnorm       | AlTiN nano     | VHM-Hochleistungs-Kopfreibahnen                          | VHM          | SuperR-HS-KD                |
| 72876       | 228   | Werksnorm       | DLC            | VHM-Hochleistungs-Reibahnen                              | VHM          | SuperR-HS-S                 |
| 72877       | 229   | Werksnorm       | DLC            | VHM-Hochleistungs-Reibahnen                              | VHM          | SuperR-HS-D                 |
| 73647       | 133   | DIN 374         | nitriert       | Gewindebohrer für Metrische ISO-Feingewinde              | HSS-E        | Intensiv H                  |
| 73661       | 119   | DIN 371         | nitriert       | Gewindebohrer für Metrische ISO-Gewinde                  | HSS-E        | Intensiv H                  |
| 73664       | 120   | DIN 376         | nitriert       | Gewindebohrer für Metrische ISO-Gewinde                  | HSS-E        | Intensiv H                  |
| 73830       | 158   | Werksnorm       | AlTiZrN        | Gewindefräser ohne Senkfase für Metr. ISO-Gewinde        | VHM          | TMU SP                      |
| 74556       | 195   | Werksnorm       | blank          | SuperF-UT-Fräser Al-L                                    | VHM          | SuperF-UT Al-L              |
| 74557       | 194   | Werksnorm       | blank          | SuperF-UT-Fräser Al                                      | VHM          | SuperF-UT Al-L              |
| 74558       | 197   | Werksnorm       | blank          | SuperF-UT-Fräser Al-XL                                   | VHM          | SuperF-UT Al-XL             |
| 74559       | 196   | Werksnorm       | blank          | SuperF-UT-Fräser Al                                      | VHM          | SuperF-UT Al-XL             |
| 74562       | 199   | Werksnorm       | blank          | SuperF-UT-Fräser Al-r                                    | VHM          | SuperF-UT Al-r              |
| 74563       | 198   | Werksnorm       | blank          | SuperF-UT-Fräser N                                       | VHM          | SuperF-UT Al-r              |
| 78719       | 233   | Werksnorm       | blank          | Schrumpferlängerungen                                    |              |                             |
| 78882       | 202   | Werksnorm       | AlTiN+         | SuperF-UT-Fräser Z, Sätze                                | VHM          | SuperF-UT Z                 |
| 78883       | 203   | DIN 6527L       | TiAlZrN        | SuperF-UT-Fräser N <sup>2</sup> , Sätze                  | VHM          | SuperF-UT N <sup>2</sup>    |



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ADD-ON zum  
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