



**BORDO**<sup>®</sup>  
INDUSTRIAL TOOLS



# HIGH PERFORMANCE

DRILLS, TAPS, SPADE DRILLS, SLOT DRILLS,  
ENDMILLS AND HOLDERS



**BUYER'S GUIDE 05/2026**



HIGH  
PERFORMANCE



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# DRILLS



## STUB DRILL - POWDERED METAL

High performance drill with no pecking  
 HSSE-PM increases strength and durability  
 Suitable for materials up to 1500N/mm<sup>2</sup>  
 TiN Coated


**GROUP**
**HPDR**


Powdered Metal



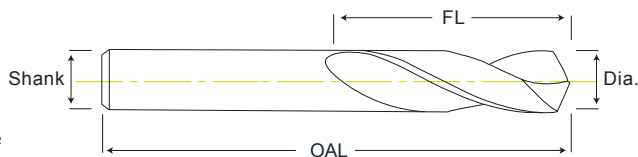
Coating



30° Helix



135°


 < 1500N/mm<sup>2</sup>


| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 3.0     | 16    | 48     | 3.0      | 6590-3.00   |
| 3.1     | 18    | 50     | 4.0      | 6590-3.10   |
| 3.2     | 18    | 50     | 4.0      | 6590-3.20   |
| 3.3     | 18    | 50     | 4.0      | 6590-3.30   |
| 3.4     | 20    | 52     | 4.0      | 6590-3.40   |
| 3.5     | 20    | 52     | 4.0      | 6590-3.50   |
| 3.6     | 20    | 52     | 4.0      | 6590-3.60   |
| 3.7     | 20    | 52     | 4.0      | 6590-3.70   |
| 3.8     | 22    | 54     | 4.0      | 6590-3.80   |
| 3.9     | 22    | 54     | 4.0      | 6590-3.90   |
| 4.0     | 22    | 54     | 4.0      | 6590-4.00   |
| 4.1     | 22    | 66     | 6.0      | 6590-4.10   |
| 4.2     | 22    | 66     | 6.0      | 6590-4.20   |
| 4.3     | 24    | 68     | 6.0      | 6590-4.30   |
| 4.4     | 24    | 68     | 6.0      | 6590-4.40   |
| 4.5     | 24    | 68     | 6.0      | 6590-4.50   |
| 4.6     | 24    | 68     | 6.0      | 6590-4.60   |
| 4.7     | 24    | 68     | 6.0      | 6590-4.70   |
| 4.8     | 26    | 70     | 6.0      | 6590-4.80   |
| 4.9     | 26    | 70     | 6.0      | 6590-4.90   |
| 5.0     | 26    | 70     | 6.0      | 6590-5.00   |
| 5.1     | 26    | 70     | 6.0      | 6590-5.10   |
| 5.2     | 26    | 70     | 6.0      | 6590-5.20   |
| 5.3     | 26    | 70     | 6.0      | 6590-5.30   |
| 5.4     | 28    | 72     | 6.0      | 6590-5.40   |
| 5.5     | 28    | 72     | 6.0      | 6590-5.50   |
| 5.6     | 28    | 72     | 6.0      | 6590-5.60   |
| 5.7     | 28    | 72     | 6.0      | 6590-5.70   |
| 5.8     | 28    | 72     | 6.0      | 6590-5.80   |
| 5.9     | 28    | 72     | 6.0      | 6590-5.90   |
| 6.0     | 28    | 72     | 6.0      | 6590-6.00   |
| 6.1     | 31    | 75     | 8.0      | 6590-6.10   |
| 6.2     | 31    | 75     | 8.0      | 6590-6.20   |
| 6.3     | 31    | 75     | 8.0      | 6590-6.30   |
| 6.4     | 31    | 75     | 8.0      | 6590-6.40   |
| 6.5     | 31    | 75     | 8.0      | 6590-6.50   |
| 6.6     | 31    | 75     | 8.0      | 6590-6.60   |
| 6.7     | 31    | 75     | 8.0      | 6590-6.70   |
| 6.8     | 34    | 78     | 8.0      | 6590-6.80   |
| 6.9     | 34    | 78     | 8.0      | 6590-6.90   |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 7.0     | 34    | 78     | 8.0      | 6590-7.00   |
| 7.1     | 34    | 78     | 8.0      | 6590-7.10   |
| 7.2     | 34    | 78     | 8.0      | 6590-7.20   |
| 7.3     | 34    | 78     | 8.0      | 6590-7.30   |
| 7.4     | 34    | 78     | 8.0      | 6590-7.40   |
| 7.5     | 34    | 78     | 8.0      | 6590-7.50   |
| 7.6     | 37    | 81     | 8.0      | 6590-7.60   |
| 7.7     | 37    | 81     | 8.0      | 6590-7.70   |
| 7.8     | 37    | 81     | 8.0      | 6590-7.80   |
| 7.9     | 37    | 81     | 8.0      | 6590-7.90   |
| 8.0     | 37    | 81     | 8.0      | 6590-8.00   |
| 8.1     | 37    | 87     | 10.0     | 6590-8.10   |
| 8.2     | 37    | 87     | 10.0     | 6590-8.20   |
| 8.3     | 37    | 87     | 10.0     | 6590-8.30   |
| 8.4     | 37    | 87     | 10.0     | 6590-8.40   |
| 8.5     | 37    | 87     | 10.0     | 6590-8.50   |
| 8.6     | 40    | 90     | 10.0     | 6590-8.60   |
| 8.7     | 40    | 90     | 10.0     | 6590-8.70   |
| 8.8     | 40    | 90     | 10.0     | 6590-8.80   |
| 8.9     | 40    | 90     | 10.0     | 6590-8.90   |
| 9.0     | 40    | 90     | 10.0     | 6590-9.00   |
| 9.1     | 40    | 90     | 10.0     | 6590-9.10   |
| 9.2     | 40    | 90     | 10.0     | 6590-9.20   |
| 9.3     | 40    | 90     | 10.0     | 6590-9.30   |
| 9.4     | 40    | 90     | 10.0     | 6590-9.40   |
| 9.5     | 40    | 90     | 10.0     | 6590-9.50   |
| 9.6     | 43    | 93     | 10.0     | 6590-9.60   |
| 9.7     | 43    | 93     | 10.0     | 6590-9.70   |
| 9.8     | 43    | 93     | 10.0     | 6590-9.80   |
| 9.9     | 43    | 93     | 10.0     | 6590-9.90   |
| 10.0    | 43    | 93     | 10.0     | 6590-10.00  |
| 10.1    | 43    | 100    | 12.0     | 6590-10.10  |
| 10.2    | 43    | 100    | 12.0     | 6590-10.20  |
| 10.3    | 43    | 100    | 12.0     | 6590-10.30  |
| 10.4    | 43    | 100    | 12.0     | 6590-10.40  |
| 10.5    | 43    | 100    | 12.0     | 6590-10.50  |
| 10.6    | 43    | 100    | 12.0     | 6590-10.60  |
| 10.7    | 47    | 104    | 12.0     | 6590-10.70  |
| 10.8    | 47    | 104    | 12.0     | 6590-10.80  |
| 10.9    | 47    | 104    | 12.0     | 6590-10.90  |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 11.0    | 47    | 104    | 12.0     | 6590-11.00  |
| 11.1    | 47    | 104    | 12.0     | 6590-11.10  |
| 11.2    | 47    | 104    | 12.0     | 6590-11.20  |
| 11.3    | 47    | 104    | 12.0     | 6590-11.30  |
| 11.4    | 47    | 104    | 12.0     | 6590-11.40  |
| 11.5    | 47    | 104    | 12.0     | 6590-11.50  |
| 11.6    | 47    | 104    | 12.0     | 6590-11.60  |
| 11.7    | 47    | 104    | 12.0     | 6590-11.70  |
| 11.8    | 47    | 104    | 12.0     | 6590-11.80  |
| 11.9    | 51    | 108    | 12.0     | 6590-11.90  |
| 12.0    | 51    | 108    | 12.0     | 6590-12.00  |
| 12.1    | 51    | 108    | 14.0     | 6590-12.10  |
| 12.2    | 51    | 108    | 14.0     | 6590-12.20  |
| 12.3    | 51    | 108    | 14.0     | 6590-12.30  |
| 12.4    | 51    | 108    | 14.0     | 6590-12.40  |
| 12.5    | 51    | 108    | 14.0     | 6590-12.50  |
| 12.6    | 51    | 108    | 14.0     | 6590-12.60  |
| 12.7    | 51    | 108    | 14.0     | 6590-12.70  |
| 12.8    | 51    | 108    | 14.0     | 6590-12.80  |
| 12.9    | 51    | 108    | 14.0     | 6590-12.90  |
| 13.0    | 51    | 108    | 14.0     | 6590-13.00  |

| DIA. | 2    | 3    | 4    | 5    | 6    | 8    | 10   | 12   |
|------|------|------|------|------|------|------|------|------|
| A    | 0.10 | 0.14 | 0.18 | 0.21 | 0.24 | 0.31 | 0.37 | 0.42 |
| B    | 0.08 | 0.11 | 0.14 | 0.17 | 0.19 | 0.25 | 0.30 | 0.34 |
| C    | 0.06 | 0.09 | 0.12 | 0.14 | 0.16 | 0.20 | 0.24 | 0.28 |
| D    | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.16 | 0.19 | 0.23 |
| E    | 0.04 | 0.06 | 0.08 | 0.09 | 0.10 | 0.13 | 0.16 | 0.18 |
| F    | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 |

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED            | 50 C ●       | 35 C ●          | 12 E ●           | 12 E ●     | 15 D ●          | 44 D ●    | 55 D ●          | 40 D ●         | 40 E ●        | 8 E ○        | 9 E ○           | 10 E ○         |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

**JOBBER DRILL - InoxPro™**

Economical solution for stainless steel drilling  
HSS, TiAIN Coated



**GROUP**

**HPID**



**High Speed  
Steel**



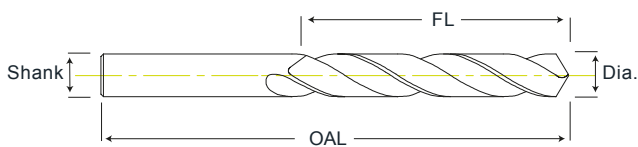
**Coating**



**40° Helix**



**130°**



| DIA.<br>MM | FL<br>MM | OAL<br>MM | SHANK<br>MM | PART<br>NUMBER |
|------------|----------|-----------|-------------|----------------|
| 1.0        | 8        | 34        | 1.0         | 6591-1.00S     |
| 1.5        | 11       | 40        | 1.5         | 6591-1.50S     |
| 2.0        | 14       | 49        | 2.0         | 6591-2.00S     |
| 2.5        | 16       | 57        | 2.5         | 6591-2.50S     |
| 3.0        | 18       | 61        | 3.0         | 6591-3.00S     |
| 3.3        | 20       | 65        | 3.3         | 6591-3.30S     |
| 3.5        | 22       | 70        | 3.5         | 6591-3.50S     |
| 4.0        | 25       | 75        | 4.0         | 6591-4.00S     |
| 4.2        | 25       | 75        | 4.2         | 6591-4.20S     |
| 4.5        | 28       | 80        | 4.5         | 6591-4.50S     |
| 5.0        | 32       | 86        | 5.0         | 6591-5.00S     |
| 5.5        | 36       | 93        | 5.5         | 6591-5.50S     |
| 6.0        | 36       | 93        | 6.0         | 6591-6.00S     |
| 6.5        | 40       | 101       | 6.5         | 6591-6.50S     |
| 6.8        | 45       | 109       | 6.8         | 6591-6.80S     |
| 7.0        | 45       | 109       | 7.0         | 6591-7.00S     |
| 7.5        | 45       | 109       | 7.5         | 6591-7.50S     |
| 8.0        | 51       | 117       | 8.0         | 6591-8.00S     |
| 8.5        | 51       | 117       | 8.5         | 6591-8.50S     |
| 9.0        | 57       | 125       | 9.0         | 6591-9.00S     |
| 9.5        | 57       | 125       | 9.5         | 6591-9.50S     |
| 10.0       | 63       | 133       | 10.0        | 6591-10.00S    |
| 10.2       | 63       | 133       | 10.2        | 6591-10.20S    |
| 10.5       | 63       | 133       | 10.5        | 6591-10.50S    |
| 11.0       | 71       | 142       | 11.0        | 6591-11.00S    |
| 11.5       | 71       | 142       | 11.5        | 6591-11.50S    |
| 12.0       | 78       | 151       | 12.0        | 6591-12.00S    |
| 12.5       | 78       | 151       | 12.5        | 6591-12.50S    |
| 13.0       | 78       | 151       | 13.0        | 6591-13.00S    |



| SET DESCRIPTION           | SET CONTENTS  | DRILLS | PART NUMBER |
|---------------------------|---|--------|-------------|
| M2 InoxPro Set – ABS CASE | 1.0 - 10.0 x 0.5mm  | 19     | 6591-M2     |
| M3 InoxPro Set – ABS CASE | 1.0 - 13.0 x 0.5mm  | 25     | 6591-M3     |
| M5 InoxPro Set – ABS CASE | 1.0 - 6.5 x 0.5mm<br>7.0 - 13.0 x 1.0mm                           | 19     | 6591-M5     |
| M6 InoxPro Set – ABS CASE | 1.0 - 10.0 x 0.5mm<br>10.0 - 13.0 x 1.0mm<br>plus 3.3, 4.2, 6.8mm | 25     | 6591-M6     |

| FEED TABLE (MM/REV) |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|------|
| DIA.                | 2    | 3    | 4    | 5    | 6    | 8    | 10   | 12   |
| A                   | 0.10 | 0.14 | 0.18 | 0.21 | 0.24 | 0.31 | 0.37 | 0.42 |
| B                   | 0.08 | 0.11 | 0.14 | 0.17 | 0.19 | 0.25 | 0.30 | 0.34 |
| C                   | 0.06 | 0.09 | 0.12 | 0.14 | 0.16 | 0.20 | 0.24 | 0.28 |
| D                   | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.16 | 0.19 | 0.23 |
| E                   | 0.04 | 0.06 | 0.08 | 0.09 | 0.10 | 0.13 | 0.16 | 0.18 |
| F                   | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 |

| APPLICATION TABLE OF PROCESSED MATERIALS |              |                 |                  |            |                 |           |                 |                |               |              |                 |                |
|--|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED                                  | 20 E ●       | 12 E ●          |                  |            | 12 E ●          |           | 50 C ●          | 30 D ●         | 50 D ○        |              |                 |                |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

# JOBBER DRILL – PARABOLIC FLUTE - COBALT

High performance drill with no pecking  
 Suitable for materials up to  
 1200N/mm<sup>2</sup>  
 TiAIN Coated



GROUP

HPDR



Cobalt



Coating



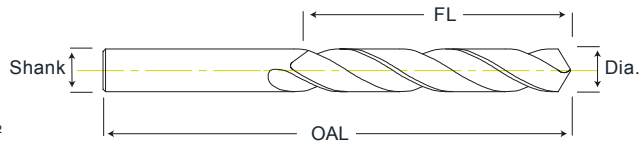
Parabolic Flute



135°



< 1200N/mm<sup>2</sup>



| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 1.0     | 12    | 34     | 1.0      | 6592-1.00   |
| 1.1     | 14    | 36     | 1.1      | 6592-1.10   |
| 1.2     | 16    | 38     | 1.2      | 6592-1.20   |
| 1.3     | 16    | 38     | 1.3      | 6592-1.30   |
| 1.4     | 18    | 40     | 1.4      | 6592-1.40   |
| 1.5     | 18    | 40     | 1.5      | 6592-1.50   |
| 1.6     | 20    | 43     | 1.6      | 6592-1.60   |
| 1.7     | 20    | 43     | 1.7      | 6592-1.70   |
| 1.8     | 22    | 46     | 1.8      | 6592-1.80   |
| 1.9     | 22    | 46     | 1.9      | 6592-1.90   |
| 2.0     | 24    | 49     | 2.0      | 6592-2.00   |
| 2.1     | 24    | 49     | 2.1      | 6592-2.10   |
| 2.2     | 27    | 53     | 2.2      | 6592-2.20   |
| 2.3     | 27    | 53     | 2.3      | 6592-2.30   |
| 2.4     | 30    | 57     | 2.4      | 6592-2.40   |
| 2.5     | 30    | 57     | 2.5      | 6592-2.50   |
| 2.6     | 30    | 57     | 2.6      | 6592-2.60   |
| 2.7     | 33    | 61     | 2.7      | 6592-2.70   |
| 2.8     | 33    | 61     | 2.8      | 6592-2.80   |
| 2.9     | 33    | 61     | 2.9      | 6592-2.90   |
| 3.0     | 33    | 61     | 3.0      | 6592-3.00   |
| 3.1     | 36    | 65     | 3.1      | 6592-3.10   |
| 3.2     | 36    | 65     | 3.2      | 6592-3.20   |
| 3.3     | 36    | 65     | 3.3      | 6592-3.30   |
| 3.4     | 39    | 70     | 3.4      | 6592-3.40   |
| 3.5     | 39    | 70     | 3.5      | 6592-3.50   |
| 3.6     | 39    | 70     | 3.6      | 6592-3.60   |
| 3.7     | 39    | 70     | 3.7      | 6592-3.70   |
| 3.8     | 43    | 75     | 3.8      | 6592-3.80   |
| 3.9     | 43    | 75     | 3.9      | 6592-3.90   |
| 4.0     | 43    | 75     | 4.0      | 6592-4.00   |
| 4.1     | 43    | 75     | 4.1      | 6592-4.10   |
| 4.2     | 43    | 75     | 4.2      | 6592-4.20   |
| 4.3     | 47    | 80     | 4.3      | 6592-4.30   |
| 4.4     | 47    | 80     | 4.4      | 6592-4.40   |
| 4.5     | 47    | 80     | 4.5      | 6592-4.50   |
| 4.6     | 47    | 80     | 4.6      | 6592-4.60   |
| 4.7     | 47    | 80     | 4.7      | 6592-4.70   |
| 4.8     | 52    | 86     | 4.8      | 6592-4.80   |
| 4.9     | 52    | 86     | 4.9      | 6592-4.90   |
| 5.0     | 52    | 86     | 5.0      | 6592-5.00   |
| 5.1     | 52    | 86     | 5.1      | 6592-5.10   |
| 5.2     | 52    | 86     | 5.2      | 6592-5.20   |
| 5.3     | 52    | 86     | 5.3      | 6592-5.30   |
| 5.4     | 57    | 93     | 5.4      | 6592-5.40   |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 5.5     | 57    | 93     | 5.5      | 6592-5.50   |
| 5.6     | 57    | 93     | 5.6      | 6592-5.60   |
| 5.7     | 57    | 93     | 5.7      | 6592-5.70   |
| 5.8     | 57    | 93     | 5.8      | 6592-5.80   |
| 5.9     | 57    | 93     | 5.9      | 6592-5.90   |
| 6.0     | 57    | 93     | 6.0      | 6592-6.00   |
| 6.1     | 63    | 101    | 6.1      | 6592-6.10   |
| 6.2     | 63    | 101    | 6.2      | 6592-6.20   |
| 6.3     | 63    | 101    | 6.3      | 6592-6.30   |
| 6.4     | 63    | 101    | 6.4      | 6592-6.40   |
| 6.5     | 63    | 101    | 6.5      | 6592-6.50   |
| 6.6     | 63    | 101    | 6.6      | 6592-6.60   |
| 6.7     | 63    | 101    | 6.7      | 6592-6.70   |
| 6.8     | 69    | 109    | 6.8      | 6592-6.80   |
| 6.9     | 69    | 109    | 6.9      | 6592-6.90   |
| 7.0     | 69    | 109    | 7.0      | 6592-7.00   |
| 7.1     | 69    | 109    | 7.1      | 6592-7.10   |
| 7.2     | 69    | 109    | 7.2      | 6592-7.20   |
| 7.3     | 69    | 109    | 7.3      | 6592-7.30   |
| 7.4     | 69    | 109    | 7.4      | 6592-7.40   |
| 7.5     | 69    | 109    | 7.5      | 6592-7.50   |
| 7.6     | 75    | 117    | 7.6      | 6592-7.60   |
| 7.7     | 75    | 117    | 7.7      | 6592-7.70   |
| 7.8     | 75    | 117    | 7.8      | 6592-7.80   |
| 7.9     | 75    | 117    | 7.9      | 6592-7.90   |
| 8.0     | 75    | 117    | 8.0      | 6592-8.00   |
| 8.1     | 75    | 117    | 8.1      | 6592-8.10   |
| 8.2     | 75    | 117    | 8.2      | 6592-8.20   |
| 8.3     | 75    | 117    | 8.3      | 6592-8.30   |
| 8.4     | 75    | 117    | 8.4      | 6592-8.40   |
| 8.5     | 75    | 117    | 8.5      | 6592-8.50   |
| 8.6     | 81    | 125    | 8.6      | 6592-8.60   |
| 8.7     | 81    | 125    | 8.7      | 6592-8.70   |
| 8.8     | 81    | 125    | 8.8      | 6592-8.80   |
| 8.9     | 81    | 125    | 8.9      | 6592-8.90   |
| 9.0     | 81    | 125    | 9.0      | 6592-9.00   |
| 9.1     | 81    | 125    | 9.1      | 6592-9.10   |
| 9.2     | 81    | 125    | 9.2      | 6592-9.20   |
| 9.3     | 81    | 125    | 9.3      | 6592-9.30   |
| 9.4     | 81    | 125    | 9.4      | 6592-9.40   |
| 9.5     | 81    | 125    | 9.5      | 6592-9.50   |
| 9.6     | 87    | 133    | 9.6      | 6592-9.60   |
| 9.7     | 87    | 133    | 9.7      | 6592-9.70   |
| 9.8     | 87    | 133    | 9.8      | 6592-9.80   |
| 9.9     | 87    | 133    | 9.9      | 6592-9.90   |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 10.0    | 87    | 133    | 10.0     | 6592-10.00  |
| 10.1    | 87    | 133    | 10.1     | 6592-10.10  |
| 10.2    | 87    | 133    | 10.2     | 6592-10.20  |
| 10.3    | 87    | 133    | 10.3     | 6592-10.30  |
| 10.4    | 87    | 133    | 10.4     | 6592-10.40  |
| 10.5    | 87    | 133    | 10.5     | 6592-10.50  |
| 10.6    | 87    | 133    | 10.6     | 6592-10.60  |
| 10.7    | 94    | 142    | 10.7     | 6592-10.70  |
| 10.8    | 94    | 142    | 10.8     | 6592-10.80  |
| 10.9    | 94    | 142    | 10.9     | 6592-10.90  |
| 11.0    | 94    | 142    | 11.0     | 6592-11.00  |
| 11.1    | 94    | 142    | 11.1     | 6592-11.10  |
| 11.2    | 94    | 142    | 11.2     | 6592-11.20  |
| 11.3    | 94    | 142    | 11.3     | 6592-11.30  |
| 11.4    | 94    | 142    | 11.4     | 6592-11.40  |
| 11.5    | 94    | 142    | 11.5     | 6592-11.50  |
| 11.6    | 94    | 142    | 11.6     | 6592-11.60  |
| 11.7    | 94    | 142    | 11.7     | 6592-11.70  |
| 11.8    | 94    | 142    | 11.8     | 6592-11.80  |
| 11.9    | 101   | 151    | 11.9     | 6592-11.90  |
| 12.0    | 101   | 151    | 12.0     | 6592-12.00  |
| 12.1    | 101   | 151    | 12.1     | 6592-12.10  |
| 12.2    | 101   | 151    | 12.2     | 6592-12.20  |
| 12.3    | 101   | 151    | 12.3     | 6592-12.30  |
| 12.4    | 101   | 151    | 12.4     | 6592-12.40  |
| 12.5    | 101   | 151    | 12.5     | 6592-12.50  |
| 12.6    | 101   | 151    | 12.6     | 6592-12.60  |
| 12.7    | 101   | 151    | 12.7     | 6592-12.70  |
| 12.8    | 101   | 151    | 12.8     | 6592-12.80  |
| 12.9    | 101   | 151    | 12.9     | 6592-12.90  |
| 13.0    | 101   | 151    | 13.0     | 6592-13.00  |

| DIA. | 2    | 3    | 4    | 5    | 6    | 8    | 10   | 12   |
|------|------|------|------|------|------|------|------|------|
| A    | 0.10 | 0.14 | 0.18 | 0.21 | 0.24 | 0.31 | 0.37 | 0.42 |
| B    | 0.08 | 0.11 | 0.14 | 0.17 | 0.19 | 0.25 | 0.30 | 0.34 |
| C    | 0.06 | 0.09 | 0.12 | 0.14 | 0.16 | 0.20 | 0.24 | 0.28 |
| D    | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.16 | 0.19 | 0.23 |
| E    | 0.04 | 0.06 | 0.08 | 0.09 | 0.10 | 0.13 | 0.16 | 0.18 |
| F    | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 |

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED            | 24 D ●       | 20 D ●          | 12 E ●           | 10 E ●     | 12 E ○          | 24 C ●    | 32 D ●          | 25 C ●         | 32 D ○        |              |                 |                |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

# JOBBER DRILL – **InoxMaster™**

High performance drill for stainless steel  
Reduces work hardening  
HSS Co  
TiAIN Coated



**GROUP**

**HPDR**



**Cobalt**



**Coating**



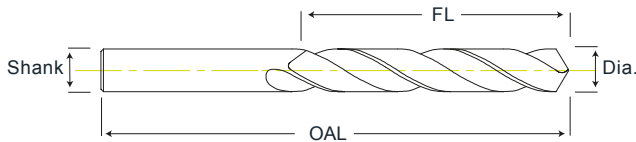
**40° Helix**



**130°**



**< 1200N/mm²**



| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 1.0     | 12    | 34     | 1.0      | 6593-1.00   |
| 1.1     | 14    | 36     | 1.1      | 6593-1.10   |
| 1.2     | 16    | 38     | 1.2      | 6593-1.20   |
| 1.3     | 16    | 38     | 1.3      | 6593-1.30   |
| 1.4     | 18    | 40     | 1.4      | 6593-1.40   |
| 1.5     | 18    | 40     | 1.5      | 6593-1.50   |
| 1.6     | 20    | 43     | 1.6      | 6593-1.60   |
| 1.7     | 20    | 43     | 1.7      | 6593-1.70   |
| 1.8     | 22    | 46     | 1.8      | 6593-1.80   |
| 1.9     | 22    | 46     | 1.9      | 6593-1.90   |
| 2.0     | 24    | 49     | 2.0      | 6593-2.00   |
| 2.1     | 24    | 49     | 2.1      | 6593-2.10   |
| 2.2     | 27    | 53     | 2.2      | 6593-2.20   |
| 2.3     | 27    | 53     | 2.3      | 6593-2.30   |
| 2.4     | 30    | 57     | 2.4      | 6593-2.40   |
| 2.5     | 30    | 57     | 2.5      | 6593-2.50   |
| 2.6     | 30    | 57     | 2.6      | 6593-2.60   |
| 2.7     | 33    | 61     | 2.7      | 6593-2.70   |
| 2.8     | 33    | 61     | 2.8      | 6593-2.80   |
| 2.9     | 33    | 61     | 2.9      | 6593-2.90   |
| 3.0     | 33    | 61     | 3.0      | 6593-3.00   |
| 3.1     | 36    | 65     | 3.1      | 6593-3.10   |
| 3.2     | 36    | 65     | 3.2      | 6593-3.20   |
| 3.3     | 36    | 65     | 3.3      | 6593-3.30   |
| 3.4     | 39    | 70     | 3.4      | 6593-3.40   |
| 3.5     | 39    | 70     | 3.5      | 6593-3.50   |
| 3.6     | 39    | 70     | 3.6      | 6593-3.60   |
| 3.7     | 39    | 70     | 3.7      | 6593-3.70   |
| 3.8     | 43    | 75     | 3.8      | 6593-3.80   |
| 3.9     | 43    | 75     | 3.9      | 6593-3.90   |
| 4.0     | 43    | 75     | 4.0      | 6593-4.00   |
| 4.1     | 43    | 75     | 4.1      | 6593-4.10   |
| 4.2     | 43    | 75     | 4.2      | 6593-4.20   |
| 4.3     | 47    | 80     | 4.3      | 6593-4.30   |
| 4.4     | 47    | 80     | 4.4      | 6593-4.40   |
| 4.5     | 47    | 80     | 4.5      | 6593-4.50   |
| 4.6     | 47    | 80     | 4.6      | 6593-4.60   |
| 4.7     | 47    | 80     | 4.7      | 6593-4.70   |
| 4.8     | 52    | 86     | 4.8      | 6593-4.80   |
| 4.9     | 52    | 86     | 4.9      | 6593-4.90   |
| 5.0     | 52    | 86     | 5.0      | 6593-5.00   |
| 5.1     | 52    | 86     | 5.1      | 6593-5.10   |
| 5.2     | 52    | 86     | 5.2      | 6593-5.20   |
| 5.3     | 52    | 86     | 5.3      | 6593-5.30   |
| 5.4     | 57    | 93     | 5.4      | 6593-5.40   |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 5.5     | 57    | 93     | 5.5      | 6593-5.50   |
| 5.6     | 57    | 93     | 5.6      | 6593-5.60   |
| 5.7     | 57    | 93     | 5.7      | 6593-5.70   |
| 5.8     | 57    | 93     | 5.8      | 6593-5.80   |
| 5.9     | 57    | 93     | 5.9      | 6593-5.90   |
| 6.0     | 57    | 93     | 6.0      | 6593-6.00   |
| 6.1     | 63    | 101    | 6.1      | 6593-6.10   |
| 6.2     | 63    | 101    | 6.2      | 6593-6.20   |
| 6.3     | 63    | 101    | 6.3      | 6593-6.30   |
| 6.4     | 63    | 101    | 6.4      | 6593-6.40   |
| 6.5     | 63    | 101    | 6.5      | 6593-6.50   |
| 6.6     | 63    | 101    | 6.6      | 6593-6.60   |
| 6.7     | 63    | 101    | 6.7      | 6593-6.70   |
| 6.8     | 69    | 109    | 6.8      | 6593-6.80   |
| 6.9     | 69    | 109    | 6.9      | 6593-6.90   |
| 7.0     | 69    | 109    | 7.0      | 6593-7.00   |
| 7.1     | 69    | 109    | 7.1      | 6593-7.10   |
| 7.2     | 69    | 109    | 7.2      | 6593-7.20   |
| 7.3     | 69    | 109    | 7.3      | 6593-7.30   |
| 7.4     | 69    | 109    | 7.4      | 6593-7.40   |
| 7.5     | 69    | 109    | 7.5      | 6593-7.50   |
| 7.6     | 75    | 117    | 7.6      | 6593-7.60   |
| 7.7     | 75    | 117    | 7.7      | 6593-7.70   |
| 7.8     | 75    | 117    | 7.8      | 6593-7.80   |
| 7.9     | 75    | 117    | 7.9      | 6593-7.90   |
| 8.0     | 75    | 117    | 8.0      | 6593-8.00   |
| 8.1     | 75    | 117    | 8.1      | 6593-8.10   |
| 8.2     | 75    | 117    | 8.2      | 6593-8.20   |
| 8.3     | 75    | 117    | 8.3      | 6593-8.30   |
| 8.4     | 75    | 117    | 8.4      | 6593-8.40   |
| 8.5     | 75    | 117    | 8.5      | 6593-8.50   |
| 8.6     | 81    | 125    | 8.6      | 6593-8.60   |
| 8.7     | 81    | 125    | 8.7      | 6593-8.70   |
| 8.8     | 81    | 125    | 8.8      | 6593-8.80   |
| 8.9     | 81    | 125    | 8.9      | 6593-8.90   |
| 9.0     | 81    | 125    | 9.0      | 6593-9.00   |
| 9.1     | 81    | 125    | 9.1      | 6593-9.10   |
| 9.2     | 81    | 125    | 9.2      | 6593-9.20   |
| 9.3     | 81    | 125    | 9.3      | 6593-9.30   |
| 9.4     | 81    | 125    | 9.4      | 6593-9.40   |
| 9.5     | 81    | 125    | 9.5      | 6593-9.50   |
| 9.6     | 87    | 133    | 9.6      | 6593-9.60   |
| 9.7     | 87    | 133    | 9.7      | 6593-9.70   |
| 9.8     | 87    | 133    | 9.8      | 6593-9.80   |
| 9.9     | 87    | 133    | 9.9      | 6593-9.90   |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 10.0    | 87    | 133    | 10.0     | 6593-10.00  |
| 10.1    | 87    | 133    | 10.1     | 6593-10.10  |
| 10.2    | 87    | 133    | 10.2     | 6593-10.20  |
| 10.3    | 87    | 133    | 10.3     | 6593-10.30  |
| 10.4    | 87    | 133    | 10.4     | 6593-10.40  |
| 10.5    | 87    | 133    | 10.5     | 6593-10.50  |
| 10.6    | 87    | 133    | 10.6     | 6593-10.60  |
| 10.7    | 94    | 142    | 10.7     | 6593-10.70  |
| 10.8    | 94    | 142    | 10.8     | 6593-10.80  |
| 10.9    | 94    | 142    | 10.9     | 6593-10.90  |
| 11.0    | 94    | 142    | 11.0     | 6593-11.00  |
| 11.1    | 94    | 142    | 11.1     | 6593-11.10  |
| 11.2    | 94    | 142    | 11.2     | 6593-11.20  |
| 11.3    | 94    | 142    | 11.3     | 6593-11.30  |
| 11.4    | 94    | 142    | 11.4     | 6593-11.40  |
| 11.5    | 94    | 142    | 11.5     | 6593-11.50  |
| 11.6    | 94    | 142    | 11.6     | 6593-11.60  |
| 11.7    | 94    | 142    | 11.7     | 6593-11.70  |
| 11.8    | 94    | 142    | 11.8     | 6593-11.80  |
| 11.9    | 101   | 151    | 11.9     | 6593-11.90  |
| 12.0    | 101   | 151    | 12.0     | 6593-12.00  |
| 12.1    | 101   | 151    | 12.1     | 6593-12.10  |
| 12.2    | 101   | 151    | 12.2     | 6593-12.20  |
| 12.3    | 101   | 151    | 12.3     | 6593-12.30  |
| 12.4    | 101   | 151    | 12.4     | 6593-12.40  |
| 12.5    | 101   | 151    | 12.5     | 6593-12.50  |
| 12.6    | 101   | 151    | 12.6     | 6593-12.60  |
| 12.7    | 101   | 151    | 12.7     | 6593-12.70  |
| 12.8    | 101   | 151    | 12.8     | 6593-12.80  |
| 12.9    | 101   | 151    | 12.9     | 6593-12.90  |
| 13.0    | 101   | 151    | 13.0     | 6593-13.00  |

| DIA. | 2    | 3    | 4    | 5    | 6    | 8    | 10   | 12   |
|------|------|------|------|------|------|------|------|------|
| A    | 0.10 | 0.14 | 0.18 | 0.21 | 0.24 | 0.31 | 0.37 | 0.42 |
| B    | 0.08 | 0.11 | 0.14 | 0.17 | 0.19 | 0.25 | 0.30 | 0.34 |
| C    | 0.06 | 0.09 | 0.12 | 0.14 | 0.16 | 0.20 | 0.24 | 0.28 |
| D    | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.16 | 0.19 | 0.23 |
| E    | 0.04 | 0.06 | 0.08 | 0.09 | 0.10 | 0.13 | 0.16 | 0.18 |
| F    | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 |

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED            | 50 C ●       | 30 D ○          |                  |            | 25 D ●          |           | 70 C ○          |                | 40 D ○        |              | 8 F ○           |                |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

## JOBBER DRILL - **HDX Ultra**™ for drilling Hardox®

Ideal for wear-resistant sheet metal like Hardox® and Bisalloy®

8% Cobalt  
TiAIN Coated


**GROUP**
**HPDR**

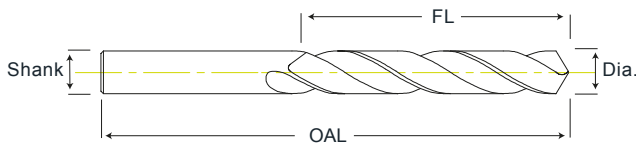

8% Cobalt



Coating


 24-30°  
Helix


135°



| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 1.0     | 6     | 34     | 1.0      | 6594-1.00S  |
| 1.5     | 9     | 40     | 1.5      | 6594-1.50S  |
| 2.0     | 12    | 49     | 2.0      | 6594-2.00S  |
| 2.5     | 14    | 57     | 2.5      | 6594-2.50S  |
| 3.0     | 16    | 61     | 3.0      | 6594-3.00S  |
| 3.5     | 20    | 70     | 3.5      | 6594-3.50S  |
| 4.0     | 22    | 75     | 4.0      | 6594-4.00S  |
| 4.5     | 24    | 80     | 4.5      | 6594-4.50S  |
| 5.0     | 26    | 86     | 5.0      | 6594-5.00S  |
| 5.5     | 28    | 93     | 5.5      | 6594-5.50S  |
| 6.0     | 28    | 93     | 6.0      | 6594-6.00S  |
| 6.5     | 31    | 101    | 6.5      | 6594-6.50S  |
| 7.0     | 34    | 109    | 7.0      | 6594-7.00S  |
| 7.5     | 34    | 109    | 7.5      | 6594-7.50S  |
| 8.0     | 37    | 117    | 8.0      | 6594-8.00S  |
| 8.5     | 37    | 117    | 8.5      | 6594-8.50S  |
| 9.0     | 40    | 125    | 9.0      | 6594-9.00S  |
| 9.5     | 40    | 125    | 9.5      | 6594-9.50S  |
| 10.0    | 43    | 133    | 10.0     | 6594-10.00S |
| 10.5    | 43    | 133    | 10.5     | 6594-10.50S |
| 11.0    | 47    | 142    | 11.0     | 6594-11.00S |
| 11.5    | 47    | 142    | 11.5     | 6594-11.50S |
| 12.0    | 51    | 151    | 12.0     | 6594-12.00S |
| 12.5    | 51    | 151    | 12.5     | 6594-12.50S |
| 13.0    | 51    | 151    | 13.0     | 6594-13.00S |

| SET DESCRIPTION             | SET CONTENTS                            | DRILLS | PART NUMBER |
|-----------------------------|---|--------|-------------|
| M2 HDX Ultra Set – ABS CASE | 1.0 - 10.0 x 0.5mm                      | 19     | 6594-M2     |
| M3 HDX Ultra Set – ABS CASE | 1.0 - 13.0 x 0.5mm                      | 25     | 6594-M3     |
| M5 HDX Ultra Set – ABS CASE | 1.0 - 6.5 x 0.5mm<br>7.0 - 13.0 x 1.0mm | 19     | 6594-M5     |

**FEED TABLE (MM/REV)**

| DIA. | 2    | 3    | 4    | 5    | 6    | 8    | 10   | 12   |
|------|------|------|------|------|------|------|------|------|
| A    | 0.10 | 0.14 | 0.18 | 0.21 | 0.24 | 0.31 | 0.37 | 0.42 |
| B    | 0.08 | 0.11 | 0.14 | 0.17 | 0.19 | 0.25 | 0.30 | 0.34 |
| C    | 0.06 | 0.09 | 0.12 | 0.14 | 0.16 | 0.20 | 0.24 | 0.28 |
| D    | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.16 | 0.19 | 0.23 |
| E    | 0.04 | 0.06 | 0.08 | 0.09 | 0.10 | 0.13 | 0.16 | 0.18 |
| F    | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 |

**APPLICATION TABLE OF PROCESSED MATERIALS**

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <HRC55         |
| Vc/FEED            | 35 C ●       | 22 D ●          | 15 E ●           | 15 E ●     | 18 E ○          | 35 B ●    |                 |                | 60 D ○        | 10 F ●       | 13 F ●          | 4 F ○          |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

# JOBBER DRILL – POWDERED METAL

High performance drill with no pecking  
HSSE-PM increases strength and durability  
Suitable for materials up to 1500N/mm<sup>2</sup>  
TiCN Coated



GROUP

HPDR



Powdered  
Metal



Coating



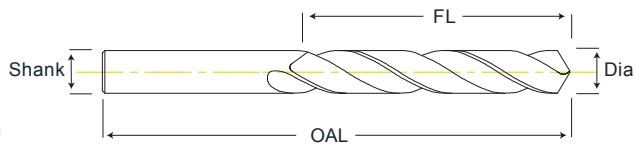
38° Helix



135°



< 1500N/mm<sup>2</sup>



| DIA.<br>MM | FL<br>MM | OAL<br>MM | SHANK<br>MM | PART<br>NUMBER |
|------------|----------|-----------|-------------|----------------|
| 3.0        | 33       | 61        | 3.0         | 6595-3.00      |
| 3.1        | 36       | 65        | 3.1         | 6595-3.10      |
| 3.2        | 36       | 65        | 3.2         | 6595-3.20      |
| 3.3        | 36       | 65        | 3.3         | 6595-3.30      |
| 3.4        | 39       | 70        | 3.4         | 6595-3.40      |
| 3.5        | 39       | 70        | 3.5         | 6595-3.50      |
| 3.6        | 39       | 70        | 3.6         | 6595-3.60      |
| 3.7        | 39       | 70        | 3.7         | 6595-3.70      |
| 3.8        | 43       | 75        | 3.8         | 6595-3.80      |
| 3.9        | 43       | 75        | 3.9         | 6595-3.90      |
| 4.0        | 43       | 75        | 4.0         | 6595-4.00      |
| 4.1        | 43       | 75        | 4.1         | 6595-4.10      |
| 4.2        | 43       | 75        | 4.2         | 6595-4.20      |
| 4.3        | 47       | 80        | 4.3         | 6595-4.30      |
| 4.4        | 47       | 80        | 4.4         | 6595-4.40      |
| 4.5        | 47       | 80        | 4.5         | 6595-4.50      |
| 4.6        | 47       | 80        | 4.6         | 6595-4.60      |
| 4.7        | 47       | 80        | 4.7         | 6595-4.70      |
| 4.8        | 52       | 86        | 4.8         | 6595-4.80      |
| 4.9        | 52       | 86        | 4.9         | 6595-4.90      |
| 5.0        | 52       | 86        | 5.0         | 6595-5.00      |
| 5.1        | 52       | 86        | 5.1         | 6595-5.10      |
| 5.2        | 52       | 86        | 5.2         | 6595-5.20      |
| 5.3        | 52       | 86        | 5.3         | 6595-5.30      |
| 5.4        | 57       | 93        | 5.4         | 6595-5.40      |
| 5.5        | 57       | 93        | 5.5         | 6595-5.50      |
| 5.6        | 57       | 93        | 5.6         | 6595-5.60      |
| 5.7        | 57       | 93        | 5.7         | 6595-5.70      |
| 5.8        | 57       | 93        | 5.8         | 6595-5.80      |
| 5.9        | 57       | 93        | 5.9         | 6595-5.90      |
| 6.0        | 57       | 93        | 6.0         | 6595-6.00      |
| 6.1        | 63       | 101       | 6.1         | 6595-6.10      |
| 6.2        | 63       | 101       | 6.2         | 6595-6.20      |
| 6.3        | 63       | 101       | 6.3         | 6595-6.30      |
| 6.4        | 63       | 101       | 6.4         | 6595-6.40      |
| 6.5        | 63       | 101       | 6.5         | 6595-6.50      |
| 6.6        | 63       | 101       | 6.6         | 6595-6.60      |
| 6.7        | 63       | 101       | 6.7         | 6595-6.70      |
| 6.8        | 69       | 109       | 6.8         | 6595-6.80      |
| 6.9        | 69       | 109       | 6.9         | 6595-6.90      |

| DIA.<br>MM | FL<br>MM | OAL<br>MM | SHANK<br>MM | PART<br>NUMBER |
|------------|----------|-----------|-------------|----------------|
| 7.0        | 69       | 109       | 7.0         | 6595-7.00      |
| 7.1        | 69       | 109       | 7.1         | 6595-7.10      |
| 7.2        | 69       | 109       | 7.2         | 6595-7.20      |
| 7.3        | 69       | 109       | 7.3         | 6595-7.30      |
| 7.4        | 69       | 109       | 7.4         | 6595-7.40      |
| 7.5        | 69       | 109       | 7.5         | 6595-7.50      |
| 7.6        | 75       | 117       | 7.6         | 6595-7.60      |
| 7.7        | 75       | 117       | 7.7         | 6595-7.70      |
| 7.8        | 75       | 117       | 7.8         | 6595-7.80      |
| 7.9        | 75       | 117       | 7.9         | 6595-7.90      |
| 8.0        | 75       | 117       | 8.0         | 6595-8.00      |
| 8.1        | 75       | 117       | 8.1         | 6595-8.10      |
| 8.2        | 75       | 117       | 8.2         | 6595-8.20      |
| 8.3        | 75       | 117       | 8.3         | 6595-8.30      |
| 8.4        | 75       | 117       | 8.4         | 6595-8.40      |
| 8.5        | 75       | 117       | 8.5         | 6595-8.50      |
| 8.6        | 81       | 125       | 8.6         | 6595-8.60      |
| 8.7        | 81       | 125       | 8.7         | 6595-8.70      |
| 8.8        | 81       | 125       | 8.8         | 6595-8.80      |
| 8.9        | 81       | 125       | 8.9         | 6595-8.90      |
| 9.0        | 81       | 125       | 9.0         | 6595-9.00      |
| 9.1        | 81       | 125       | 9.1         | 6595-9.10      |
| 9.2        | 81       | 125       | 9.2         | 6595-9.20      |
| 9.3        | 81       | 125       | 9.3         | 6595-9.30      |
| 9.4        | 81       | 125       | 9.4         | 6595-9.40      |
| 9.5        | 81       | 125       | 9.5         | 6595-9.50      |
| 9.6        | 87       | 133       | 9.6         | 6595-9.60      |
| 9.7        | 87       | 133       | 9.7         | 6595-9.70      |
| 9.8        | 87       | 133       | 9.8         | 6595-9.80      |
| 9.9        | 87       | 133       | 9.9         | 6595-9.90      |
| 10.0       | 87       | 133       | 10.0        | 6595-10.00     |
| 10.1       | 87       | 133       | 10.1        | 6595-10.10     |
| 10.2       | 87       | 133       | 10.2        | 6595-10.20     |
| 10.3       | 87       | 133       | 10.3        | 6595-10.30     |
| 10.4       | 87       | 133       | 10.4        | 6595-10.40     |
| 10.5       | 87       | 133       | 10.5        | 6595-10.50     |
| 10.6       | 87       | 133       | 10.6        | 6595-10.60     |
| 10.7       | 94       | 142       | 10.7        | 6595-10.70     |
| 10.8       | 94       | 142       | 10.8        | 6595-10.80     |
| 10.9       | 94       | 142       | 10.9        | 6595-10.90     |

| DIA.<br>MM | FL<br>MM | OAL<br>MM | SHANK<br>MM | PART<br>NUMBER |
|------------|----------|-----------|-------------|----------------|
| 11.0       | 94       | 142       | 11.0        | 6595-11.00     |
| 11.1       | 94       | 142       | 11.1        | 6595-11.10     |
| 11.2       | 94       | 142       | 11.2        | 6595-11.20     |
| 11.3       | 94       | 142       | 11.3        | 6595-11.30     |
| 11.4       | 94       | 142       | 11.4        | 6595-11.40     |
| 11.5       | 94       | 142       | 11.5        | 6595-11.50     |
| 11.6       | 94       | 142       | 11.6        | 6595-11.60     |
| 11.7       | 94       | 142       | 11.7        | 6595-11.70     |
| 11.8       | 94       | 142       | 11.8        | 6595-11.80     |
| 11.9       | 101      | 151       | 11.9        | 6595-11.90     |
| 12.0       | 101      | 151       | 12.0        | 6595-12.00     |
| 12.1       | 101      | 151       | 12.1        | 6595-12.10     |
| 12.2       | 101      | 151       | 12.2        | 6595-12.20     |
| 12.3       | 101      | 151       | 12.3        | 6595-12.30     |
| 12.4       | 101      | 151       | 12.4        | 6595-12.40     |
| 12.5       | 101      | 151       | 12.5        | 6595-12.50     |
| 12.6       | 101      | 151       | 12.6        | 6595-12.60     |
| 12.7       | 101      | 151       | 12.7        | 6595-12.70     |
| 12.8       | 101      | 151       | 12.8        | 6595-12.80     |
| 12.9       | 101      | 151       | 12.9        | 6595-12.90     |
| 13.0       | 101      | 151       | 13.0        | 6595-13.00     |

| FEED TABLE (MM/REV) |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|------|
| DIA.                | 2    | 3    | 4    | 5    | 6    | 8    | 10   | 12   |
| A                   | 0.10 | 0.14 | 0.18 | 0.21 | 0.24 | 0.31 | 0.37 | 0.42 |
| B                   | 0.08 | 0.11 | 0.14 | 0.17 | 0.19 | 0.25 | 0.30 | 0.34 |
| C                   | 0.06 | 0.09 | 0.12 | 0.14 | 0.16 | 0.20 | 0.24 | 0.28 |
| D                   | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.16 | 0.19 | 0.23 |
| E                   | 0.04 | 0.06 | 0.08 | 0.09 | 0.10 | 0.13 | 0.16 | 0.18 |
| F                   | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 |

| APPLICATION TABLE OF PROCESSED MATERIALS |              |                 |                  |            |                 |           |                 |                |               |              |                 |                |
|--|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED                                  | 45 B ●       | 30 B ●          | 12 C ●           | 12 C ●     | 10 E ●          | 40 C ●    | 48 D ●          | 30 C ●         | 35 E ●        | 8 E ○        | 9 E ○           | 8 E ○          |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

## CARBIDE DRILLS 3xD

Suitable for materials up to 1400N/mm<sup>2</sup>  
Edge preparation enhances tool life and improves cutting performance  
TiAlSiN-S Coated



GROUP

HPXD



Tungsten Carbide



Coating



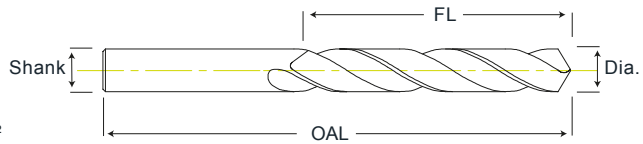
30° Helix



140°



< 1400N/mm<sup>2</sup>



| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 1.0     | 12    | 62     | 4.0      | 6572-1.00   |
| 1.1     | 12    | 62     | 4.0      | 6572-1.10   |
| 1.2     | 12    | 62     | 4.0      | 6572-1.20   |
| 1.3     | 12    | 62     | 4.0      | 6572-1.30   |
| 1.4     | 12    | 62     | 4.0      | 6572-1.40   |
| 1.5     | 12    | 62     | 4.0      | 6572-1.50   |
| 1.6     | 12    | 62     | 4.0      | 6572-1.60   |
| 1.7     | 12    | 62     | 4.0      | 6572-1.70   |
| 1.8     | 12    | 62     | 4.0      | 6572-1.80   |
| 1.9     | 12    | 62     | 4.0      | 6572-1.90   |
| 2.0     | 16    | 62     | 4.0      | 6572-2.00   |
| 2.1     | 16    | 62     | 4.0      | 6572-2.10   |
| 2.2     | 16    | 62     | 4.0      | 6572-2.20   |
| 2.3     | 16    | 62     | 4.0      | 6572-2.30   |
| 2.4     | 16    | 62     | 4.0      | 6572-2.40   |
| 2.5     | 16    | 62     | 4.0      | 6572-2.50   |
| 2.6     | 16    | 62     | 4.0      | 6572-2.60   |
| 2.7     | 16    | 62     | 4.0      | 6572-2.70   |
| 2.8     | 16    | 62     | 4.0      | 6572-2.80   |
| 2.9     | 16    | 62     | 4.0      | 6572-2.90   |
| 3.0     | 20    | 62     | 4.0      | 6572-3.00   |
| 3.1     | 20    | 62     | 4.0      | 6572-3.10   |
| 3.2     | 20    | 62     | 4.0      | 6572-3.20   |
| 3.3     | 20    | 62     | 4.0      | 6572-3.30   |
| 3.4     | 20    | 62     | 4.0      | 6572-3.40   |
| 3.5     | 20    | 62     | 4.0      | 6572-3.50   |
| 3.6     | 20    | 62     | 4.0      | 6572-3.60   |
| 3.7     | 20    | 62     | 4.0      | 6572-3.70   |
| 3.8     | 24    | 66     | 4.0      | 6572-3.80   |
| 3.9     | 24    | 66     | 4.0      | 6572-3.90   |
| 4.0     | 24    | 66     | 4.0      | 6572-4.00   |
| 4.1     | 24    | 66     | 6.0      | 6572-4.10   |
| 4.2     | 24    | 66     | 6.0      | 6572-4.20   |
| 4.3     | 24    | 66     | 6.0      | 6572-4.30   |
| 4.4     | 24    | 66     | 6.0      | 6572-4.40   |
| 4.5     | 24    | 66     | 6.0      | 6572-4.50   |
| 4.6     | 24    | 66     | 6.0      | 6572-4.60   |
| 4.7     | 24    | 66     | 6.0      | 6572-4.70   |
| 4.8     | 28    | 66     | 6.0      | 6572-4.80   |
| 4.9     | 28    | 66     | 6.0      | 6572-4.90   |
| 5.0     | 28    | 66     | 6.0      | 6572-5.00   |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 5.1     | 28    | 66     | 6.0      | 6572-5.10   |
| 5.2     | 28    | 66     | 6.0      | 6572-5.20   |
| 5.3     | 28    | 66     | 6.0      | 6572-5.30   |
| 5.4     | 28    | 66     | 6.0      | 6572-5.40   |
| 5.5     | 28    | 66     | 6.0      | 6572-5.50   |
| 5.6     | 28    | 66     | 6.0      | 6572-5.60   |
| 5.7     | 28    | 66     | 6.0      | 6572-5.70   |
| 5.8     | 28    | 66     | 6.0      | 6572-5.80   |
| 5.9     | 28    | 66     | 6.0      | 6572-5.90   |
| 6.0     | 28    | 66     | 6.0      | 6572-6.00   |
| 6.1     | 34    | 79     | 8.0      | 6572-6.10   |
| 6.2     | 34    | 79     | 8.0      | 6572-6.20   |
| 6.3     | 34    | 79     | 8.0      | 6572-6.30   |
| 6.4     | 34    | 79     | 8.0      | 6572-6.40   |
| 6.5     | 34    | 79     | 8.0      | 6572-6.50   |
| 6.6     | 34    | 79     | 8.0      | 6572-6.60   |
| 6.7     | 34    | 79     | 8.0      | 6572-6.70   |
| 6.8     | 34    | 79     | 8.0      | 6572-6.80   |
| 6.9     | 34    | 79     | 8.0      | 6572-6.90   |
| 7.0     | 34    | 79     | 8.0      | 6572-7.00   |
| 7.1     | 41    | 79     | 8.0      | 6572-7.10   |
| 7.2     | 41    | 79     | 8.0      | 6572-7.20   |
| 7.3     | 41    | 79     | 8.0      | 6572-7.30   |
| 7.4     | 41    | 79     | 8.0      | 6572-7.40   |
| 7.5     | 41    | 79     | 8.0      | 6572-7.50   |
| 7.6     | 41    | 79     | 8.0      | 6572-7.60   |
| 7.7     | 41    | 79     | 8.0      | 6572-7.70   |
| 7.8     | 41    | 79     | 8.0      | 6572-7.80   |
| 7.9     | 41    | 79     | 8.0      | 6572-7.90   |
| 8.0     | 41    | 79     | 8.0      | 6572-8.00   |
| 8.1     | 47    | 89     | 10.0     | 6572-8.10   |
| 8.2     | 47    | 89     | 10.0     | 6572-8.20   |
| 8.3     | 47    | 89     | 10.0     | 6572-8.30   |
| 8.4     | 47    | 89     | 10.0     | 6572-8.40   |
| 8.5     | 47    | 89     | 10.0     | 6572-8.50   |
| 8.6     | 47    | 89     | 10.0     | 6572-8.60   |
| 8.7     | 47    | 89     | 10.0     | 6572-8.70   |
| 8.8     | 47    | 89     | 10.0     | 6572-8.80   |
| 8.9     | 47    | 89     | 10.0     | 6572-8.90   |
| 9.0     | 47    | 89     | 10.0     | 6572-9.00   |
| 9.1     | 47    | 89     | 10.0     | 6572-9.10   |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 9.2     | 47    | 89     | 10.0     | 6572-9.20   |
| 9.3     | 47    | 89     | 10.0     | 6572-9.30   |
| 9.4     | 47    | 89     | 10.0     | 6572-9.40   |
| 9.5     | 47    | 89     | 10.0     | 6572-9.50   |
| 9.6     | 47    | 89     | 10.0     | 6572-9.60   |
| 9.7     | 47    | 89     | 10.0     | 6572-9.70   |
| 9.8     | 47    | 89     | 10.0     | 6572-9.80   |
| 9.9     | 47    | 89     | 10.0     | 6572-9.90   |
| 10.0    | 47    | 89     | 10.0     | 6572-10.00  |
| 10.1    | 55    | 102    | 12.0     | 6572-10.10  |
| 10.2    | 55    | 102    | 12.0     | 6572-10.20  |
| 10.3    | 55    | 102    | 12.0     | 6572-10.30  |
| 10.4    | 55    | 102    | 12.0     | 6572-10.40  |
| 10.5    | 55    | 102    | 12.0     | 6572-10.50  |
| 10.6    | 55    | 102    | 12.0     | 6572-10.60  |
| 10.7    | 55    | 102    | 12.0     | 6572-10.70  |
| 10.8    | 55    | 102    | 12.0     | 6572-10.80  |
| 10.9    | 55    | 102    | 12.0     | 6572-10.90  |
| 11.0    | 55    | 102    | 12.0     | 6572-11.00  |
| 11.1    | 55    | 102    | 12.0     | 6572-11.10  |
| 11.2    | 55    | 102    | 12.0     | 6572-11.20  |
| 11.3    | 55    | 102    | 12.0     | 6572-11.30  |
| 11.4    | 55    | 102    | 12.0     | 6572-11.40  |
| 11.5    | 55    | 102    | 12.0     | 6572-11.50  |
| 11.6    | 55    | 102    | 12.0     | 6572-11.60  |
| 11.7    | 55    | 102    | 12.0     | 6572-11.70  |
| 11.8    | 55    | 102    | 12.0     | 6572-11.80  |
| 11.9    | 55    | 102    | 12.0     | 6572-11.90  |
| 12.0    | 55    | 102    | 12.0     | 6572-12.00  |
| 12.1    | 60    | 107    | 14.0     | 6572-12.10  |
| 12.2    | 60    | 107    | 14.0     | 6572-12.20  |
| 12.3    | 60    | 107    | 14.0     | 6572-12.30  |
| 12.4    | 60    | 107    | 14.0     | 6572-12.40  |
| 12.5    | 60    | 107    | 14.0     | 6572-12.50  |
| 12.6    | 60    | 107    | 14.0     | 6572-12.60  |
| 12.7    | 60    | 107    | 14.0     | 6572-12.70  |
| 12.8    | 60    | 107    | 14.0     | 6572-12.80  |
| 12.9    | 60    | 107    | 14.0     | 6572-12.90  |
| 13.0    | 60    | 107    | 14.0     | 6572-13.00  |
| 13.1    | 60    | 107    | 14.0     | 6572-13.10  |
| 13.2    | 60    | 107    | 14.0     | 6572-13.20  |

### APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED            | 90 A ●       | 80 B ●          | 75 D ●           | 40 D ●     | 35 D ○          | 75 C ●    | 200 A ○         | 140 B ○        | 80 B ○        | 20 E ○       | 15 E ○          | 20 E ○         |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

# CARBIDE DRILLS 3xD

Suitable for materials up to 1400N/mm<sup>2</sup>  
Edge preparation enhances tool life and  
improves cutting performance  
TiAISIN-S Coated



GROUP

HPXD



Tungsten  
Carbide



Coating



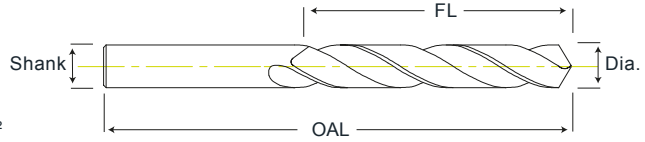
30° Helix



140°



< 1400N/mm<sup>2</sup>



| DIA.<br>MM | FL<br>MM | OAL<br>MM | SHANK<br>MM | PART<br>NUMBER |
|------------|----------|-----------|-------------|----------------|
| 13.3       | 60       | 107       | 14.0        | 6572-13.30     |
| 13.4       | 60       | 107       | 14.0        | 6572-13.40     |
| 13.5       | 60       | 107       | 14.0        | 6572-13.50     |
| 13.6       | 60       | 107       | 14.0        | 6572-13.60     |
| 13.7       | 60       | 107       | 14.0        | 6572-13.70     |
| 13.8       | 60       | 107       | 14.0        | 6572-13.80     |
| 13.9       | 60       | 107       | 14.0        | 6572-13.90     |
| 14.0       | 60       | 107       | 14.0        | 6572-14.00     |
| 14.1       | 65       | 115       | 16.0        | 6572-14.10     |
| 14.2       | 65       | 115       | 16.0        | 6572-14.20     |
| 14.3       | 65       | 115       | 16.0        | 6572-14.30     |
| 14.4       | 65       | 115       | 16.0        | 6572-14.40     |
| 14.5       | 65       | 115       | 16.0        | 6572-14.50     |
| 14.6       | 65       | 115       | 16.0        | 6572-14.60     |
| 14.7       | 65       | 115       | 16.0        | 6572-14.70     |
| 14.8       | 65       | 115       | 16.0        | 6572-14.80     |
| 14.9       | 65       | 115       | 16.0        | 6572-14.90     |
| 15.0       | 65       | 115       | 16.0        | 6572-15.00     |
| 15.1       | 65       | 115       | 16.0        | 6572-15.10     |
| 15.2       | 65       | 115       | 16.0        | 6572-15.20     |
| 15.3       | 65       | 115       | 16.0        | 6572-15.30     |
| 15.4       | 65       | 115       | 16.0        | 6572-15.40     |
| 15.5       | 65       | 115       | 16.0        | 6572-15.50     |
| 15.6       | 65       | 115       | 16.0        | 6572-15.60     |
| 15.7       | 65       | 115       | 16.0        | 6572-15.70     |
| 15.8       | 65       | 115       | 16.0        | 6572-15.80     |
| 15.9       | 65       | 115       | 16.0        | 6572-15.90     |
| 16.0       | 65       | 115       | 16.0        | 6572-16.00     |
| 16.1       | 73       | 123       | 18.0        | 6572-16.10     |
| 16.2       | 73       | 123       | 18.0        | 6572-16.20     |
| 16.3       | 73       | 123       | 18.0        | 6572-16.30     |
| 16.4       | 73       | 123       | 18.0        | 6572-16.40     |
| 16.5       | 73       | 123       | 18.0        | 6572-16.50     |
| 16.6       | 73       | 123       | 18.0        | 6572-16.60     |
| 16.7       | 73       | 123       | 18.0        | 6572-16.70     |
| 16.8       | 73       | 123       | 18.0        | 6572-16.80     |
| 16.9       | 73       | 123       | 18.0        | 6572-16.90     |
| 17.0       | 73       | 123       | 18.0        | 6572-17.00     |
| 17.1       | 73       | 123       | 18.0        | 6572-17.10     |
| 17.2       | 73       | 123       | 18.0        | 6572-17.20     |
| 17.3       | 73       | 123       | 18.0        | 6572-17.30     |

| DIA.<br>MM | FL<br>MM | OAL<br>MM | SHANK<br>MM | PART<br>NUMBER |
|------------|----------|-----------|-------------|----------------|
| 17.4       | 73       | 123       | 18.0        | 6572-17.40     |
| 17.5       | 73       | 123       | 18.0        | 6572-17.50     |
| 17.6       | 73       | 123       | 18.0        | 6572-17.60     |
| 17.7       | 73       | 123       | 18.0        | 6572-17.70     |
| 17.8       | 73       | 123       | 18.0        | 6572-17.80     |
| 17.9       | 73       | 123       | 18.0        | 6572-17.90     |
| 18.0       | 73       | 123       | 18.0        | 6572-18.00     |
| 18.1       | 79       | 131       | 20.0        | 6572-18.10     |
| 18.2       | 79       | 131       | 20.0        | 6572-18.20     |
| 18.3       | 79       | 131       | 20.0        | 6572-18.30     |
| 18.4       | 79       | 131       | 20.0        | 6572-18.40     |
| 18.5       | 79       | 131       | 20.0        | 6572-18.50     |
| 18.6       | 79       | 131       | 20.0        | 6572-18.60     |
| 18.7       | 79       | 131       | 20.0        | 6572-18.70     |
| 18.8       | 79       | 131       | 20.0        | 6572-18.80     |
| 18.9       | 79       | 131       | 20.0        | 6572-18.90     |
| 19.0       | 79       | 131       | 20.0        | 6572-19.00     |
| 19.1       | 79       | 131       | 20.0        | 6572-19.10     |
| 19.2       | 79       | 131       | 20.0        | 6572-19.20     |
| 19.3       | 79       | 131       | 20.0        | 6572-19.30     |
| 19.4       | 79       | 131       | 20.0        | 6572-19.40     |
| 19.5       | 79       | 131       | 20.0        | 6572-19.50     |
| 19.6       | 79       | 131       | 20.0        | 6572-19.60     |
| 19.7       | 79       | 131       | 20.0        | 6572-19.70     |
| 19.8       | 79       | 131       | 20.0        | 6572-19.80     |
| 19.9       | 79       | 131       | 20.0        | 6572-19.90     |
| 20.0       | 79       | 131       | 20.0        | 6572-20.00     |

| FEED TABLE (MM/REV) |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|------|
| DIA.                | 2    | 3    | 4    | 5    | 6    | 8    | 10   | 12   |
| A                   | 0.10 | 0.14 | 0.18 | 0.21 | 0.24 | 0.31 | 0.37 | 0.42 |
| B                   | 0.08 | 0.11 | 0.14 | 0.17 | 0.19 | 0.25 | 0.30 | 0.34 |
| C                   | 0.06 | 0.09 | 0.12 | 0.14 | 0.16 | 0.20 | 0.24 | 0.28 |
| D                   | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.16 | 0.19 | 0.23 |
| E                   | 0.04 | 0.06 | 0.08 | 0.09 | 0.10 | 0.13 | 0.16 | 0.18 |
| F                   | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 |

### APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED            | 90 A ●       | 80 B ●          | 75 D ●           | 40 D ●     | 35 D ○          | 75 C ●    | 200 A ○         | 140 B ○        | 80 B ○        | 20 E ○       | 15 E ○          | 20 E ○         |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

## CARBIDE DRILLS 3xD –THRU COOLANT

Suitable for materials up to 1400N/mm<sup>2</sup>  
Edge preparation enhances tool life  
and improves cutting performance  
TiAlSiN-S Coated



GROUP

HPXD



Tungsten Carbide



Coating



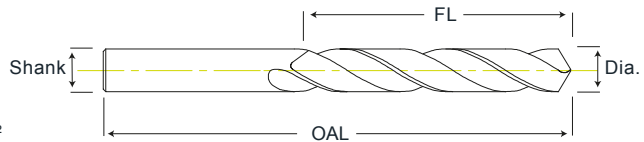
30° Helix



140°



< 1400N/mm<sup>2</sup>



| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 3.0     | 20    | 62     | 4.0      | 6573-3.00   |
| 3.1     | 20    | 62     | 4.0      | 6573-3.10   |
| 3.2     | 20    | 62     | 4.0      | 6573-3.20   |
| 3.3     | 20    | 62     | 4.0      | 6573-3.30   |
| 3.4     | 20    | 62     | 4.0      | 6573-3.40   |
| 3.5     | 20    | 62     | 4.0      | 6573-3.50   |
| 3.6     | 20    | 62     | 4.0      | 6573-3.60   |
| 3.7     | 20    | 62     | 4.0      | 6573-3.70   |
| 3.8     | 24    | 66     | 4.0      | 6573-3.80   |
| 3.9     | 24    | 66     | 4.0      | 6573-3.90   |
| 4.0     | 24    | 66     | 4.0      | 6573-4.00   |
| 4.1     | 24    | 66     | 6.0      | 6573-4.10   |
| 4.2     | 24    | 66     | 6.0      | 6573-4.20   |
| 4.3     | 24    | 66     | 6.0      | 6573-4.30   |
| 4.4     | 24    | 66     | 6.0      | 6573-4.40   |
| 4.5     | 24    | 66     | 6.0      | 6573-4.50   |
| 4.6     | 24    | 66     | 6.0      | 6573-4.60   |
| 4.7     | 24    | 66     | 6.0      | 6573-4.70   |
| 4.8     | 28    | 66     | 6.0      | 6573-4.80   |
| 4.9     | 28    | 66     | 6.0      | 6573-4.90   |
| 5.0     | 28    | 66     | 6.0      | 6573-5.00   |
| 5.1     | 28    | 66     | 6.0      | 6573-5.10   |
| 5.2     | 28    | 66     | 6.0      | 6573-5.20   |
| 5.3     | 28    | 66     | 6.0      | 6573-5.30   |
| 5.4     | 28    | 66     | 6.0      | 6573-5.40   |
| 5.5     | 28    | 66     | 6.0      | 6573-5.50   |
| 5.6     | 28    | 66     | 6.0      | 6573-5.60   |
| 5.7     | 28    | 66     | 6.0      | 6573-5.70   |
| 5.8     | 28    | 66     | 6.0      | 6573-5.80   |
| 5.9     | 28    | 66     | 6.0      | 6573-5.90   |
| 6.0     | 28    | 66     | 6.0      | 6573-6.00   |
| 6.1     | 34    | 79     | 8.0      | 6573-6.10   |
| 6.2     | 34    | 79     | 8.0      | 6573-6.20   |
| 6.3     | 34    | 79     | 8.0      | 6573-6.30   |
| 6.4     | 34    | 79     | 8.0      | 6573-6.40   |
| 6.5     | 34    | 79     | 8.0      | 6573-6.50   |
| 6.6     | 34    | 79     | 8.0      | 6573-6.60   |
| 6.7     | 34    | 79     | 8.0      | 6573-6.70   |
| 6.8     | 34    | 79     | 8.0      | 6573-6.80   |
| 6.9     | 34    | 79     | 8.0      | 6573-6.90   |
| 7.0     | 34    | 79     | 8.0      | 6573-7.00   |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 7.1     | 41    | 79     | 8.0      | 6573-7.10   |
| 7.2     | 41    | 79     | 8.0      | 6573-7.20   |
| 7.3     | 41    | 79     | 8.0      | 6573-7.30   |
| 7.4     | 41    | 79     | 8.0      | 6573-7.40   |
| 7.5     | 41    | 79     | 8.0      | 6573-7.50   |
| 7.6     | 41    | 79     | 8.0      | 6573-7.60   |
| 7.7     | 41    | 79     | 8.0      | 6573-7.70   |
| 7.8     | 41    | 79     | 8.0      | 6573-7.80   |
| 7.9     | 41    | 79     | 8.0      | 6573-7.90   |
| 8.0     | 41    | 79     | 8.0      | 6573-8.00   |
| 8.1     | 47    | 89     | 10.0     | 6573-8.10   |
| 8.2     | 47    | 89     | 10.0     | 6573-8.20   |
| 8.3     | 47    | 89     | 10.0     | 6573-8.30   |
| 8.4     | 47    | 89     | 10.0     | 6573-8.40   |
| 8.5     | 47    | 89     | 10.0     | 6573-8.50   |
| 8.6     | 47    | 89     | 10.0     | 6573-8.60   |
| 8.7     | 47    | 89     | 10.0     | 6573-8.70   |
| 8.8     | 47    | 89     | 10.0     | 6573-8.80   |
| 8.9     | 47    | 89     | 10.0     | 6573-8.90   |
| 9.0     | 47    | 89     | 10.0     | 6573-9.00   |
| 9.1     | 47    | 89     | 10.0     | 6573-9.10   |
| 9.2     | 47    | 89     | 10.0     | 6573-9.20   |
| 9.3     | 47    | 89     | 10.0     | 6573-9.30   |
| 9.4     | 47    | 89     | 10.0     | 6573-9.40   |
| 9.5     | 47    | 89     | 10.0     | 6573-9.50   |
| 9.6     | 47    | 89     | 10.0     | 6573-9.60   |
| 9.7     | 47    | 89     | 10.0     | 6573-9.70   |
| 9.8     | 47    | 89     | 10.0     | 6573-9.80   |
| 9.9     | 47    | 89     | 10.0     | 6573-9.90   |
| 10.0    | 47    | 89     | 10.0     | 6573-10.00  |
| 10.1    | 55    | 102    | 12.0     | 6573-10.10  |
| 10.2    | 55    | 102    | 12.0     | 6573-10.20  |
| 10.3    | 55    | 102    | 12.0     | 6573-10.30  |
| 10.4    | 55    | 102    | 12.0     | 6573-10.40  |
| 10.5    | 55    | 102    | 12.0     | 6573-10.50  |
| 10.6    | 55    | 102    | 12.0     | 6573-10.60  |
| 10.7    | 55    | 102    | 12.0     | 6573-10.70  |
| 10.8    | 55    | 102    | 12.0     | 6573-10.80  |
| 10.9    | 55    | 102    | 12.0     | 6573-10.90  |
| 11.0    | 55    | 102    | 12.0     | 6573-11.00  |
| 11.1    | 55    | 102    | 12.0     | 6573-11.10  |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 11.2    | 55    | 102    | 12.0     | 6573-11.20  |
| 11.3    | 55    | 102    | 12.0     | 6573-11.30  |
| 11.4    | 55    | 102    | 12.0     | 6573-11.40  |
| 11.5    | 55    | 102    | 12.0     | 6573-11.50  |
| 11.6    | 55    | 102    | 12.0     | 6573-11.60  |
| 11.7    | 55    | 102    | 12.0     | 6573-11.70  |
| 11.8    | 55    | 102    | 12.0     | 6573-11.80  |
| 11.9    | 55    | 102    | 12.0     | 6573-11.90  |
| 12.0    | 55    | 102    | 12.0     | 6573-12.00  |
| 12.1    | 60    | 107    | 14.0     | 6573-12.10  |
| 12.2    | 60    | 107    | 14.0     | 6573-12.20  |
| 12.3    | 60    | 107    | 14.0     | 6573-12.30  |
| 12.4    | 60    | 107    | 14.0     | 6573-12.40  |
| 12.5    | 60    | 107    | 14.0     | 6573-12.50  |
| 12.6    | 60    | 107    | 14.0     | 6573-12.60  |
| 12.7    | 60    | 107    | 14.0     | 6573-12.70  |
| 12.8    | 60    | 107    | 14.0     | 6573-12.80  |
| 12.9    | 60    | 107    | 14.0     | 6573-12.90  |
| 13.0    | 60    | 107    | 14.0     | 6573-13.00  |
| 13.1    | 60    | 107    | 14.0     | 6573-13.10  |
| 13.2    | 60    | 107    | 14.0     | 6573-13.20  |
| 13.3    | 60    | 107    | 14.0     | 6573-13.30  |
| 13.4    | 60    | 107    | 14.0     | 6573-13.40  |
| 13.5    | 60    | 107    | 14.0     | 6573-13.50  |
| 13.6    | 60    | 107    | 14.0     | 6573-13.60  |
| 13.7    | 60    | 107    | 14.0     | 6573-13.70  |
| 13.8    | 60    | 107    | 14.0     | 6573-13.80  |
| 13.9    | 60    | 107    | 14.0     | 6573-13.90  |
| 14.0    | 60    | 107    | 14.0     | 6573-14.00  |
| 14.1    | 65    | 115    | 16.0     | 6573-14.10  |
| 14.2    | 65    | 115    | 16.0     | 6573-14.20  |
| 14.3    | 65    | 115    | 16.0     | 6573-14.30  |
| 14.4    | 65    | 115    | 16.0     | 6573-14.40  |
| 14.5    | 65    | 115    | 16.0     | 6573-14.50  |
| 14.6    | 65    | 115    | 16.0     | 6573-14.60  |
| 14.7    | 65    | 115    | 16.0     | 6573-14.70  |
| 14.8    | 65    | 115    | 16.0     | 6573-14.80  |
| 14.9    | 65    | 115    | 16.0     | 6573-14.90  |
| 15.0    | 65    | 115    | 16.0     | 6573-15.00  |
| 15.1    | 65    | 115    | 16.0     | 6573-15.10  |
| 15.2    | 65    | 115    | 16.0     | 6573-15.20  |

### APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED            | 90 A ●       | 80 B ●          | 75 D ●           | 40 D ●     | 35 D ○          | 75 C ●    | 200 A ○         | 140 B ○        | 80 B ○        | 20 E ○       | 15 E ○          | 20 E ○         |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

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Suitable for materials up to 1400N/mm<sup>2</sup>  
Edge preparation enhances tool life  
and improves cutting performance  
TiAlSiN-S Coated



GROUP

HPXD



Tungsten Carbide



Coating



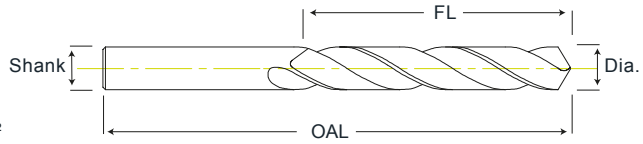
30° Helix



140°



< 1400N/mm<sup>2</sup>



| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 15.3    | 65    | 115    | 16.0     | 6573-15.30  |
| 15.4    | 65    | 115    | 16.0     | 6573-15.40  |
| 15.5    | 65    | 115    | 16.0     | 6573-15.50  |
| 15.6    | 65    | 115    | 16.0     | 6573-15.60  |
| 15.7    | 65    | 115    | 16.0     | 6573-15.70  |
| 15.8    | 65    | 115    | 16.0     | 6573-15.80  |
| 15.9    | 65    | 115    | 16.0     | 6573-15.90  |
| 16.0    | 65    | 115    | 16.0     | 6573-16.00  |
| 16.1    | 73    | 123    | 18.0     | 6573-16.10  |
| 16.2    | 73    | 123    | 18.0     | 6573-16.20  |
| 16.3    | 73    | 123    | 18.0     | 6573-16.30  |
| 16.4    | 73    | 123    | 18.0     | 6573-16.40  |
| 16.5    | 73    | 123    | 18.0     | 6573-16.50  |
| 16.6    | 73    | 123    | 18.0     | 6573-16.60  |
| 16.7    | 73    | 123    | 18.0     | 6573-16.70  |
| 16.8    | 73    | 123    | 18.0     | 6573-16.80  |
| 16.9    | 73    | 123    | 18.0     | 6573-16.90  |
| 17.0    | 73    | 123    | 18.0     | 6573-17.00  |
| 17.1    | 73    | 123    | 18.0     | 6573-17.10  |
| 17.2    | 73    | 123    | 18.0     | 6573-17.20  |
| 17.3    | 73    | 123    | 18.0     | 6573-17.30  |
| 17.4    | 73    | 123    | 18.0     | 6573-17.40  |
| 17.5    | 73    | 123    | 18.0     | 6573-17.50  |
| 17.6    | 73    | 123    | 18.0     | 6573-17.60  |
| 17.7    | 73    | 123    | 18.0     | 6573-17.70  |
| 17.8    | 73    | 123    | 18.0     | 6573-17.80  |
| 17.9    | 73    | 123    | 18.0     | 6573-17.90  |
| 18.0    | 73    | 123    | 18.0     | 6573-18.00  |
| 18.1    | 79    | 131    | 20.0     | 6573-18.10  |
| 18.2    | 79    | 131    | 20.0     | 6573-18.20  |
| 18.3    | 79    | 131    | 20.0     | 6573-18.30  |
| 18.4    | 79    | 131    | 20.0     | 6573-18.40  |
| 18.5    | 79    | 131    | 20.0     | 6573-18.50  |
| 18.6    | 79    | 131    | 20.0     | 6573-18.60  |
| 18.7    | 79    | 131    | 20.0     | 6573-18.70  |
| 18.8    | 79    | 131    | 20.0     | 6573-18.80  |
| 18.9    | 79    | 131    | 20.0     | 6573-18.90  |
| 19.0    | 79    | 131    | 20.0     | 6573-19.00  |
| 19.1    | 79    | 131    | 20.0     | 6573-19.10  |
| 19.2    | 79    | 131    | 20.0     | 6573-19.20  |
| 19.3    | 79    | 131    | 20.0     | 6573-19.30  |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 19.4    | 79    | 131    | 20.0     | 6573-19.40  |
| 19.5    | 79    | 131    | 20.0     | 6573-19.50  |
| 19.6    | 79    | 131    | 20.0     | 6573-19.60  |
| 19.7    | 79    | 131    | 20.0     | 6573-19.70  |
| 19.8    | 79    | 131    | 20.0     | 6573-19.80  |
| 19.9    | 79    | 131    | 20.0     | 6573-19.90  |
| 20.0    | 79    | 131    | 20.0     | 6573-20.00  |

| FEED TABLE (MM/REV) |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|------|
| DIA.                | 2    | 3    | 4    | 5    | 6    | 8    | 10   | 12   |
| A                   | 0.10 | 0.14 | 0.18 | 0.21 | 0.24 | 0.31 | 0.37 | 0.42 |
| B                   | 0.08 | 0.11 | 0.14 | 0.17 | 0.19 | 0.25 | 0.30 | 0.34 |
| C                   | 0.06 | 0.09 | 0.12 | 0.14 | 0.16 | 0.20 | 0.24 | 0.28 |
| D                   | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.16 | 0.19 | 0.23 |
| E                   | 0.04 | 0.06 | 0.08 | 0.09 | 0.10 | 0.13 | 0.16 | 0.18 |
| F                   | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 |

| APPLICATION TABLE OF PROCESSED MATERIALS |              |                 |                  |            |                 |           |                 |                |               |              |                 |                |
|--|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED                                  | 90 A ●       | 80 B ●          | 75 D ●           | 40 D ●     | 35 D ○          | 75 C ●    | 200 A ○         | 140 B ○        | 80 B ○        | 20 E ○       | 15 E ○          | 20 E ○         |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

## CARBIDE DRILLS 5xD

Suitable for materials up to 1400N/mm<sup>2</sup>  
Edge preparation enhances tool life  
and improves cutting performance  
TiAISIN-S Coated



GROUP

HPXD



Tungsten Carbide



Coating



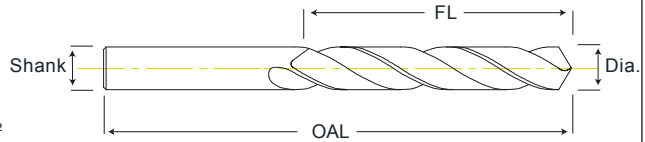
30° Helix



140°



< 1400N/mm<sup>2</sup>



| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 1.0     | 20    | 66     | 4.0      | 6574-1.00   |
| 1.1     | 20    | 66     | 4.0      | 6574-1.10   |
| 1.2     | 20    | 66     | 4.0      | 6574-1.20   |
| 1.3     | 20    | 66     | 4.0      | 6574-1.30   |
| 1.4     | 20    | 66     | 4.0      | 6574-1.40   |
| 1.5     | 20    | 66     | 4.0      | 6574-1.50   |
| 1.6     | 20    | 66     | 4.0      | 6574-1.60   |
| 1.7     | 20    | 66     | 4.0      | 6574-1.70   |
| 1.8     | 20    | 66     | 4.0      | 6574-1.80   |
| 1.9     | 20    | 66     | 4.0      | 6574-1.90   |
| 2.0     | 24    | 66     | 4.0      | 6574-2.00   |
| 2.1     | 24    | 66     | 4.0      | 6574-2.10   |
| 2.2     | 24    | 66     | 4.0      | 6574-2.20   |
| 2.3     | 24    | 66     | 4.0      | 6574-2.30   |
| 2.4     | 24    | 66     | 4.0      | 6574-2.40   |
| 2.5     | 24    | 66     | 4.0      | 6574-2.50   |
| 2.6     | 24    | 66     | 4.0      | 6574-2.60   |
| 2.7     | 24    | 66     | 4.0      | 6574-2.70   |
| 2.8     | 24    | 66     | 4.0      | 6574-2.80   |
| 2.9     | 24    | 66     | 4.0      | 6574-2.90   |
| 3.0     | 28    | 66     | 4.0      | 6574-3.00   |
| 3.1     | 28    | 66     | 4.0      | 6574-3.10   |
| 3.2     | 28    | 66     | 4.0      | 6574-3.20   |
| 3.3     | 28    | 66     | 4.0      | 6574-3.30   |
| 3.4     | 28    | 66     | 4.0      | 6574-3.40   |
| 3.5     | 28    | 66     | 4.0      | 6574-3.50   |
| 3.6     | 28    | 66     | 4.0      | 6574-3.60   |
| 3.7     | 28    | 66     | 4.0      | 6574-3.70   |
| 3.8     | 36    | 74     | 4.0      | 6574-3.80   |
| 3.9     | 36    | 74     | 4.0      | 6574-3.90   |
| 4.0     | 36    | 74     | 4.0      | 6574-4.00   |
| 4.1     | 36    | 74     | 6.0      | 6574-4.10   |
| 4.2     | 36    | 74     | 6.0      | 6574-4.20   |
| 4.3     | 36    | 74     | 6.0      | 6574-4.30   |
| 4.4     | 36    | 74     | 6.0      | 6574-4.40   |
| 4.5     | 36    | 74     | 6.0      | 6574-4.50   |
| 4.6     | 36    | 74     | 6.0      | 6574-4.60   |
| 4.7     | 36    | 74     | 6.0      | 6574-4.70   |
| 4.8     | 44    | 82     | 6.0      | 6574-4.80   |
| 4.9     | 44    | 82     | 6.0      | 6574-4.90   |
| 5.0     | 44    | 82     | 6.0      | 6574-5.00   |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 5.1     | 44    | 82     | 6.0      | 6574-5.10   |
| 5.2     | 44    | 82     | 6.0      | 6574-5.20   |
| 5.3     | 44    | 82     | 6.0      | 6574-5.30   |
| 5.4     | 44    | 82     | 6.0      | 6574-5.40   |
| 5.5     | 44    | 82     | 6.0      | 6574-5.50   |
| 5.6     | 44    | 82     | 6.0      | 6574-5.60   |
| 5.7     | 44    | 82     | 6.0      | 6574-5.70   |
| 5.8     | 44    | 82     | 6.0      | 6574-5.80   |
| 5.9     | 44    | 82     | 6.0      | 6574-5.90   |
| 6.0     | 44    | 82     | 6.0      | 6574-6.00   |
| 6.1     | 53    | 91     | 8.0      | 6574-6.10   |
| 6.2     | 53    | 91     | 8.0      | 6574-6.20   |
| 6.3     | 53    | 91     | 8.0      | 6574-6.30   |
| 6.4     | 53    | 91     | 8.0      | 6574-6.40   |
| 6.5     | 53    | 91     | 8.0      | 6574-6.50   |
| 6.6     | 53    | 91     | 8.0      | 6574-6.60   |
| 6.7     | 53    | 91     | 8.0      | 6574-6.70   |
| 6.8     | 53    | 91     | 8.0      | 6574-6.80   |
| 6.9     | 53    | 91     | 8.0      | 6574-6.90   |
| 7.0     | 53    | 91     | 8.0      | 6574-7.00   |
| 7.1     | 53    | 91     | 8.0      | 6574-7.10   |
| 7.2     | 53    | 91     | 8.0      | 6574-7.20   |
| 7.3     | 53    | 91     | 8.0      | 6574-7.30   |
| 7.4     | 53    | 91     | 8.0      | 6574-7.40   |
| 7.5     | 53    | 91     | 8.0      | 6574-7.50   |
| 7.6     | 53    | 91     | 8.0      | 6574-7.60   |
| 7.7     | 53    | 91     | 8.0      | 6574-7.70   |
| 7.8     | 53    | 91     | 8.0      | 6574-7.80   |
| 7.9     | 53    | 91     | 8.0      | 6574-7.90   |
| 8.0     | 53    | 91     | 8.0      | 6574-8.00   |
| 8.1     | 61    | 103    | 10.0     | 6574-8.10   |
| 8.2     | 61    | 103    | 10.0     | 6574-8.20   |
| 8.3     | 61    | 103    | 10.0     | 6574-8.30   |
| 8.4     | 61    | 103    | 10.0     | 6574-8.40   |
| 8.5     | 61    | 103    | 10.0     | 6574-8.50   |
| 8.6     | 61    | 103    | 10.0     | 6574-8.60   |
| 8.7     | 61    | 103    | 10.0     | 6574-8.70   |
| 8.8     | 61    | 103    | 10.0     | 6574-8.80   |
| 8.9     | 61    | 103    | 10.0     | 6574-8.90   |
| 9.0     | 61    | 103    | 10.0     | 6574-9.00   |
| 9.1     | 61    | 103    | 10.0     | 6574-9.10   |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 9.2     | 61    | 103    | 10.0     | 6574-9.20   |
| 9.3     | 61    | 103    | 10.0     | 6574-9.30   |
| 9.4     | 61    | 103    | 10.0     | 6574-9.40   |
| 9.5     | 61    | 103    | 10.0     | 6574-9.50   |
| 9.6     | 61    | 103    | 10.0     | 6574-9.60   |
| 9.7     | 61    | 103    | 10.0     | 6574-9.70   |
| 9.8     | 61    | 103    | 10.0     | 6574-9.80   |
| 9.9     | 61    | 103    | 10.0     | 6574-9.90   |
| 10.0    | 61    | 103    | 10.0     | 6574-10.00  |
| 10.1    | 71    | 118    | 12.0     | 6574-10.10  |
| 10.2    | 71    | 118    | 12.0     | 6574-10.20  |
| 10.3    | 71    | 118    | 12.0     | 6574-10.30  |
| 10.4    | 71    | 118    | 12.0     | 6574-10.40  |
| 10.5    | 71    | 118    | 12.0     | 6574-10.50  |
| 10.6    | 71    | 118    | 12.0     | 6574-10.60  |
| 10.7    | 71    | 118    | 12.0     | 6574-10.70  |
| 10.8    | 71    | 118    | 12.0     | 6574-10.80  |
| 10.9    | 71    | 118    | 12.0     | 6574-10.90  |
| 11.0    | 71    | 118    | 12.0     | 6574-11.00  |
| 11.1    | 71    | 118    | 12.0     | 6574-11.10  |
| 11.2    | 71    | 118    | 12.0     | 6574-11.20  |
| 11.3    | 71    | 118    | 12.0     | 6574-11.30  |
| 11.4    | 71    | 118    | 12.0     | 6574-11.40  |
| 11.5    | 71    | 118    | 12.0     | 6574-11.50  |
| 11.6    | 71    | 118    | 12.0     | 6574-11.60  |
| 11.7    | 71    | 118    | 12.0     | 6574-11.70  |
| 11.8    | 71    | 118    | 12.0     | 6574-11.80  |
| 11.9    | 71    | 118    | 12.0     | 6574-11.90  |
| 12.0    | 71    | 118    | 12.0     | 6574-12.00  |
| 12.1    | 77    | 124    | 14.0     | 6574-12.10  |
| 12.2    | 77    | 124    | 14.0     | 6574-12.20  |
| 12.3    | 77    | 124    | 14.0     | 6574-12.30  |
| 12.4    | 77    | 124    | 14.0     | 6574-12.40  |
| 12.5    | 77    | 124    | 14.0     | 6574-12.50  |
| 12.6    | 77    | 124    | 14.0     | 6574-12.60  |
| 12.7    | 77    | 124    | 14.0     | 6574-12.70  |
| 12.8    | 77    | 124    | 14.0     | 6574-12.80  |
| 12.9    | 77    | 124    | 14.0     | 6574-12.90  |
| 13.0    | 77    | 124    | 14.0     | 6574-13.00  |
| 13.1    | 77    | 124    | 14.0     | 6574-13.10  |
| 13.2    | 77    | 124    | 14.0     | 6574-13.20  |

### APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED            | 90 A ●       | 80 B ●          | 75 D ●           | 40 D ●     | 35 D ○          | 75 C ●    | 200 A ○         | 140 B ○        | 80 B ○        | 20 E ○       | 15 E ○          | 20 E ○         |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

# CARBIDE DRILLS 5xD

Suitable for materials up to 1400N/mm<sup>2</sup>  
Edge preparation enhances tool life  
and improves cutting performance  
TiAlSiN-S Coated



GROUP

HPXD



Tungsten Carbide



Coating



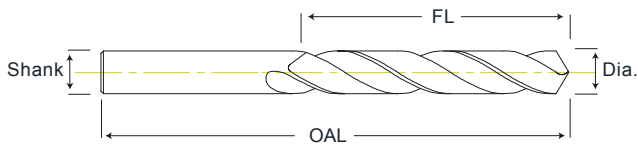
30° Helix



140°



< 1400N/mm<sup>2</sup>



| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 13.3    | 77    | 124    | 14.0     | 6574-13.30  |
| 13.4    | 77    | 124    | 14.0     | 6574-13.40  |
| 13.5    | 77    | 124    | 14.0     | 6574-13.50  |
| 13.6    | 77    | 124    | 14.0     | 6574-13.60  |
| 13.7    | 77    | 124    | 14.0     | 6574-13.70  |
| 13.8    | 77    | 124    | 14.0     | 6574-13.80  |
| 13.9    | 77    | 124    | 14.0     | 6574-13.90  |
| 14.0    | 77    | 124    | 14.0     | 6574-14.00  |
| 14.1    | 83    | 133    | 16.0     | 6574-14.10  |
| 14.2    | 83    | 133    | 16.0     | 6574-14.20  |
| 14.3    | 83    | 133    | 16.0     | 6574-14.30  |
| 14.4    | 83    | 133    | 16.0     | 6574-14.40  |
| 14.5    | 83    | 133    | 16.0     | 6574-14.50  |
| 14.6    | 83    | 133    | 16.0     | 6574-14.60  |
| 14.7    | 83    | 133    | 16.0     | 6574-14.70  |
| 14.8    | 83    | 133    | 16.0     | 6574-14.80  |
| 14.9    | 83    | 133    | 16.0     | 6574-14.90  |
| 15.0    | 83    | 133    | 16.0     | 6574-15.00  |
| 15.1    | 83    | 133    | 16.0     | 6574-15.10  |
| 15.2    | 83    | 133    | 16.0     | 6574-15.20  |
| 15.3    | 83    | 133    | 16.0     | 6574-15.30  |
| 15.4    | 83    | 133    | 16.0     | 6574-15.40  |
| 15.5    | 83    | 133    | 16.0     | 6574-15.50  |
| 15.6    | 83    | 133    | 16.0     | 6574-15.60  |
| 15.7    | 83    | 133    | 16.0     | 6574-15.70  |
| 15.8    | 83    | 133    | 16.0     | 6574-15.80  |
| 15.9    | 83    | 133    | 16.0     | 6574-15.90  |
| 16.0    | 83    | 133    | 16.0     | 6574-16.00  |
| 16.1    | 93    | 143    | 18.0     | 6574-16.10  |
| 16.2    | 93    | 143    | 18.0     | 6574-16.20  |
| 16.3    | 93    | 143    | 18.0     | 6574-16.30  |
| 16.4    | 93    | 143    | 18.0     | 6574-16.40  |
| 16.5    | 93    | 143    | 18.0     | 6574-16.50  |
| 16.6    | 93    | 143    | 18.0     | 6574-16.60  |
| 16.7    | 93    | 143    | 18.0     | 6574-16.70  |
| 16.8    | 93    | 143    | 18.0     | 6574-16.80  |
| 16.9    | 93    | 143    | 18.0     | 6574-16.90  |
| 17.0    | 93    | 143    | 18.0     | 6574-17.00  |
| 17.1    | 93    | 143    | 18.0     | 6574-17.10  |
| 17.2    | 93    | 143    | 18.0     | 6574-17.20  |
| 17.3    | 93    | 143    | 18.0     | 6574-17.30  |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 17.4    | 93    | 143    | 18.0     | 6574-17.40  |
| 17.5    | 93    | 143    | 18.0     | 6574-17.50  |
| 17.6    | 93    | 143    | 18.0     | 6574-17.60  |
| 17.7    | 93    | 143    | 18.0     | 6574-17.70  |
| 17.8    | 93    | 143    | 18.0     | 6574-17.80  |
| 17.9    | 93    | 143    | 18.0     | 6574-17.90  |
| 18.0    | 93    | 143    | 18.0     | 6574-18.00  |
| 18.1    | 101   | 153    | 20.0     | 6574-18.10  |
| 18.2    | 101   | 153    | 20.0     | 6574-18.20  |
| 18.3    | 101   | 153    | 20.0     | 6574-18.30  |
| 18.4    | 101   | 153    | 20.0     | 6574-18.40  |
| 18.5    | 101   | 153    | 20.0     | 6574-18.50  |
| 18.6    | 101   | 153    | 20.0     | 6574-18.60  |
| 18.7    | 101   | 153    | 20.0     | 6574-18.70  |
| 18.8    | 101   | 153    | 20.0     | 6574-18.80  |
| 18.9    | 101   | 153    | 20.0     | 6574-18.90  |
| 19.0    | 101   | 153    | 20.0     | 6574-19.00  |
| 19.1    | 101   | 153    | 20.0     | 6574-19.10  |
| 19.2    | 101   | 153    | 20.0     | 6574-19.20  |
| 19.3    | 101   | 153    | 20.0     | 6574-19.30  |
| 19.4    | 101   | 153    | 20.0     | 6574-19.40  |
| 19.5    | 101   | 153    | 20.0     | 6574-19.50  |
| 19.6    | 101   | 153    | 20.0     | 6574-19.60  |
| 19.7    | 101   | 153    | 20.0     | 6574-19.70  |
| 19.8    | 101   | 153    | 20.0     | 6574-19.80  |
| 19.9    | 101   | 153    | 20.0     | 6574-19.90  |
| 20.0    | 101   | 153    | 20.0     | 6574-20.00  |

| FEED TABLE (MM/REV) |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|------|
| DIA.                | 2    | 3    | 4    | 5    | 6    | 8    | 10   | 12   |
| A                   | 0.10 | 0.14 | 0.18 | 0.21 | 0.24 | 0.31 | 0.37 | 0.42 |
| B                   | 0.08 | 0.11 | 0.14 | 0.17 | 0.19 | 0.25 | 0.30 | 0.34 |
| C                   | 0.06 | 0.09 | 0.12 | 0.14 | 0.16 | 0.20 | 0.24 | 0.28 |
| D                   | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.16 | 0.19 | 0.23 |
| E                   | 0.04 | 0.06 | 0.08 | 0.09 | 0.10 | 0.13 | 0.16 | 0.18 |
| F                   | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED            | 90 A ●       | 80 B ●          | 75 D ●           | 40 D ●     | 35 D ○          | 75 C ●    | 200 A ○         | 140 B ○        | 80 B ○        | 20 E ○       | 15 E ○          | 20 E ○         |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

## CARBIDE DRILLS 5xD –THRU COOLANT

Suitable for materials up to 1400N/mm<sup>2</sup>  
Edge preparation enhances tool life  
and improves cutting performance  
TiAlSiN-S Coated



GROUP

HPXD



Tungsten Carbide



Coating



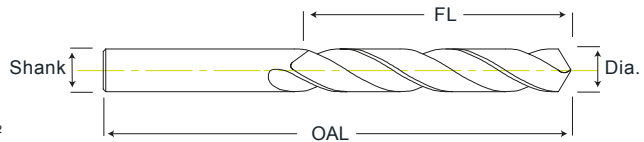
30° Helix



140°



< 1400N/mm<sup>2</sup>



| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 3.0     | 28    | 66     | 4.0      | 6575-3.00   |
| 3.1     | 28    | 66     | 4.0      | 6575-3.10   |
| 3.2     | 28    | 66     | 4.0      | 6575-3.20   |
| 3.3     | 28    | 66     | 4.0      | 6575-3.30   |
| 3.4     | 28    | 66     | 4.0      | 6575-3.40   |
| 3.5     | 28    | 66     | 4.0      | 6575-3.50   |
| 3.6     | 28    | 66     | 4.0      | 6575-3.60   |
| 3.7     | 28    | 66     | 4.0      | 6575-3.70   |
| 3.8     | 36    | 74     | 4.0      | 6575-3.80   |
| 3.9     | 36    | 74     | 4.0      | 6575-3.90   |
| 4.0     | 36    | 74     | 4.0      | 6575-4.00   |
| 4.1     | 36    | 74     | 6.0      | 6575-4.10   |
| 4.2     | 36    | 74     | 6.0      | 6575-4.20   |
| 4.3     | 36    | 74     | 6.0      | 6575-4.30   |
| 4.4     | 36    | 74     | 6.0      | 6575-4.40   |
| 4.5     | 36    | 74     | 6.0      | 6575-4.50   |
| 4.6     | 36    | 74     | 6.0      | 6575-4.60   |
| 4.7     | 36    | 74     | 6.0      | 6575-4.70   |
| 4.8     | 44    | 82     | 6.0      | 6575-4.80   |
| 4.9     | 44    | 82     | 6.0      | 6575-4.90   |
| 5.0     | 44    | 82     | 6.0      | 6575-5.00   |
| 5.1     | 44    | 82     | 6.0      | 6575-5.10   |
| 5.2     | 44    | 82     | 6.0      | 6575-5.20   |
| 5.3     | 44    | 82     | 6.0      | 6575-5.30   |
| 5.4     | 44    | 82     | 6.0      | 6575-5.40   |
| 5.5     | 44    | 82     | 6.0      | 6575-5.50   |
| 5.6     | 44    | 82     | 6.0      | 6575-5.60   |
| 5.7     | 44    | 82     | 6.0      | 6575-5.70   |
| 5.8     | 44    | 82     | 6.0      | 6575-5.80   |
| 5.9     | 44    | 82     | 6.0      | 6575-5.90   |
| 6.0     | 44    | 82     | 6.0      | 6575-6.00   |
| 6.1     | 53    | 91     | 8.0      | 6575-6.10   |
| 6.2     | 53    | 91     | 8.0      | 6575-6.20   |
| 6.3     | 53    | 91     | 8.0      | 6575-6.30   |
| 6.4     | 53    | 91     | 8.0      | 6575-6.40   |
| 6.5     | 53    | 91     | 8.0      | 6575-6.50   |
| 6.6     | 53    | 91     | 8.0      | 6575-6.60   |
| 6.7     | 53    | 91     | 8.0      | 6575-6.70   |
| 6.8     | 53    | 91     | 8.0      | 6575-6.80   |
| 6.9     | 53    | 91     | 8.0      | 6575-6.90   |
| 7.0     | 53    | 91     | 8.0      | 6575-7.00   |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 7.1     | 53    | 91     | 8.0      | 6575-7.10   |
| 7.2     | 53    | 91     | 8.0      | 6575-7.20   |
| 7.3     | 53    | 91     | 8.0      | 6575-7.30   |
| 7.4     | 53    | 91     | 8.0      | 6575-7.40   |
| 7.5     | 53    | 91     | 8.0      | 6575-7.50   |
| 7.6     | 53    | 91     | 8.0      | 6575-7.60   |
| 7.7     | 53    | 91     | 8.0      | 6575-7.70   |
| 7.8     | 53    | 91     | 8.0      | 6575-7.80   |
| 7.9     | 53    | 91     | 8.0      | 6575-7.90   |
| 8.0     | 53    | 91     | 8.0      | 6575-8.00   |
| 8.1     | 61    | 103    | 10.0     | 6575-8.10   |
| 8.2     | 61    | 103    | 10.0     | 6575-8.20   |
| 8.3     | 61    | 103    | 10.0     | 6575-8.30   |
| 8.4     | 61    | 103    | 10.0     | 6575-8.40   |
| 8.5     | 61    | 103    | 10.0     | 6575-8.50   |
| 8.6     | 61    | 103    | 10.0     | 6575-8.60   |
| 8.7     | 61    | 103    | 10.0     | 6575-8.70   |
| 8.8     | 61    | 103    | 10.0     | 6575-8.80   |
| 8.9     | 61    | 103    | 10.0     | 6575-8.90   |
| 9.0     | 61    | 103    | 10.0     | 6575-9.00   |
| 9.1     | 61    | 103    | 10.0     | 6575-9.10   |
| 9.2     | 61    | 103    | 10.0     | 6575-9.20   |
| 9.3     | 61    | 103    | 10.0     | 6575-9.30   |
| 9.4     | 61    | 103    | 10.0     | 6575-9.40   |
| 9.5     | 61    | 103    | 10.0     | 6575-9.50   |
| 9.6     | 61    | 103    | 10.0     | 6575-9.60   |
| 9.7     | 61    | 103    | 10.0     | 6575-9.70   |
| 9.8     | 61    | 103    | 10.0     | 6575-9.80   |
| 9.9     | 61    | 103    | 10.0     | 6575-9.90   |
| 10.0    | 61    | 103    | 10.0     | 6575-10.00  |
| 10.1    | 71    | 118    | 12.0     | 6575-10.10  |
| 10.2    | 71    | 118    | 12.0     | 6575-10.20  |
| 10.3    | 71    | 118    | 12.0     | 6575-10.30  |
| 10.4    | 71    | 118    | 12.0     | 6575-10.40  |
| 10.5    | 71    | 118    | 12.0     | 6575-10.50  |
| 10.6    | 71    | 118    | 12.0     | 6575-10.60  |
| 10.7    | 71    | 118    | 12.0     | 6575-10.70  |
| 10.8    | 71    | 118    | 12.0     | 6575-10.80  |
| 10.9    | 71    | 118    | 12.0     | 6575-10.90  |
| 11.0    | 71    | 118    | 12.0     | 6575-11.00  |
| 11.1    | 71    | 118    | 12.0     | 6575-11.10  |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 11.2    | 71    | 118    | 12.0     | 6575-11.20  |
| 11.3    | 71    | 118    | 12.0     | 6575-11.30  |
| 11.4    | 71    | 118    | 12.0     | 6575-11.40  |
| 11.5    | 71    | 118    | 12.0     | 6575-11.50  |
| 11.6    | 71    | 118    | 12.0     | 6575-11.60  |
| 11.7    | 71    | 118    | 12.0     | 6575-11.70  |
| 11.8    | 71    | 118    | 12.0     | 6575-11.80  |
| 11.9    | 71    | 118    | 12.0     | 6575-11.90  |
| 12.0    | 71    | 118    | 12.0     | 6575-12.00  |
| 12.1    | 77    | 124    | 14.0     | 6575-12.10  |
| 12.2    | 77    | 124    | 14.0     | 6575-12.20  |
| 12.3    | 77    | 124    | 14.0     | 6575-12.30  |
| 12.4    | 77    | 124    | 14.0     | 6575-12.40  |
| 12.5    | 77    | 124    | 14.0     | 6575-12.50  |
| 12.6    | 77    | 124    | 14.0     | 6575-12.60  |
| 12.7    | 77    | 124    | 14.0     | 6575-12.70  |
| 12.8    | 77    | 124    | 14.0     | 6575-12.80  |
| 12.9    | 77    | 124    | 14.0     | 6575-12.90  |
| 13.0    | 77    | 124    | 14.0     | 6575-13.00  |
| 13.1    | 77    | 124    | 14.0     | 6575-13.10  |
| 13.2    | 77    | 124    | 14.0     | 6575-13.20  |
| 13.3    | 77    | 124    | 14.0     | 6575-13.30  |
| 13.4    | 77    | 124    | 14.0     | 6575-13.40  |
| 13.5    | 77    | 124    | 14.0     | 6575-13.50  |
| 13.6    | 77    | 124    | 14.0     | 6575-13.60  |
| 13.7    | 77    | 124    | 14.0     | 6575-13.70  |
| 13.8    | 77    | 124    | 14.0     | 6575-13.80  |
| 13.9    | 77    | 124    | 14.0     | 6575-13.90  |
| 14.0    | 77    | 124    | 14.0     | 6575-14.00  |
| 14.1    | 83    | 133    | 16.0     | 6575-14.10  |
| 14.2    | 83    | 133    | 16.0     | 6575-14.20  |
| 14.3    | 83    | 133    | 16.0     | 6575-14.30  |
| 14.4    | 83    | 133    | 16.0     | 6575-14.40  |
| 14.5    | 83    | 133    | 16.0     | 6575-14.50  |
| 14.6    | 83    | 133    | 16.0     | 6575-14.60  |
| 14.7    | 83    | 133    | 16.0     | 6575-14.70  |
| 14.8    | 83    | 133    | 16.0     | 6575-14.80  |
| 14.9    | 83    | 133    | 16.0     | 6575-14.90  |
| 15.0    | 83    | 133    | 16.0     | 6575-15.00  |
| 15.1    | 83    | 133    | 16.0     | 6575-15.10  |
| 15.2    | 83    | 133    | 16.0     | 6575-15.20  |

### APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED            | 90 A ●       | 80 B ●          | 75 D ●           | 40 D ●     | 35 D ○          | 75 C ●    | 200 A ○         | 140 B ○        | 80 B ○        | 20 E ○       | 15 E ○          | 20 E ○         |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

# CARBIDE DRILLS 5xD –THRU COOLANT

Suitable for materials up to 1400N/mm<sup>2</sup>  
Edge preparation enhances tool life  
and improves cutting performance  
TiAlSiN-S Coated



GROUP

HPXD



Tungsten Carbide



Coating



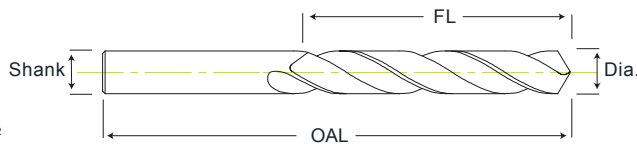
30° Helix



140°



< 1400N/mm<sup>2</sup>



| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 15.3    | 83    | 133    | 16.0     | 6575-15.30  |
| 15.4    | 83    | 133    | 16.0     | 6575-15.40  |
| 15.5    | 83    | 133    | 16.0     | 6575-15.50  |
| 15.6    | 83    | 133    | 16.0     | 6575-15.60  |
| 15.7    | 83    | 133    | 16.0     | 6575-15.70  |
| 15.8    | 83    | 133    | 16.0     | 6575-15.80  |
| 15.9    | 83    | 133    | 16.0     | 6575-15.90  |
| 16.0    | 83    | 133    | 16.0     | 6575-16.00  |
| 16.1    | 93    | 143    | 18.0     | 6575-16.10  |
| 16.2    | 93    | 143    | 18.0     | 6575-16.20  |
| 16.3    | 93    | 143    | 18.0     | 6575-16.30  |
| 16.4    | 93    | 143    | 18.0     | 6575-16.40  |
| 16.5    | 93    | 143    | 18.0     | 6575-16.50  |
| 16.6    | 93    | 143    | 18.0     | 6575-16.60  |
| 16.7    | 93    | 143    | 18.0     | 6575-16.70  |
| 16.8    | 93    | 143    | 18.0     | 6575-16.80  |
| 16.9    | 93    | 143    | 18.0     | 6575-16.90  |
| 17.0    | 93    | 143    | 18.0     | 6575-17.00  |
| 17.1    | 93    | 143    | 18.0     | 6575-17.10  |
| 17.2    | 93    | 143    | 18.0     | 6575-17.20  |
| 17.3    | 93    | 143    | 18.0     | 6575-17.30  |
| 17.4    | 93    | 143    | 18.0     | 6575-17.40  |
| 17.5    | 93    | 143    | 18.0     | 6575-17.50  |
| 17.6    | 93    | 143    | 18.0     | 6575-17.60  |
| 17.7    | 93    | 143    | 18.0     | 6575-17.70  |
| 17.8    | 93    | 143    | 18.0     | 6575-17.80  |
| 17.9    | 93    | 143    | 18.0     | 6575-17.90  |
| 18.0    | 93    | 143    | 18.0     | 6575-18.00  |
| 18.1    | 101   | 153    | 20.0     | 6575-18.10  |
| 18.2    | 101   | 153    | 20.0     | 6575-18.20  |
| 18.3    | 101   | 153    | 20.0     | 6575-18.30  |
| 18.4    | 101   | 153    | 20.0     | 6575-18.40  |
| 18.5    | 101   | 153    | 20.0     | 6575-18.50  |
| 18.6    | 101   | 153    | 20.0     | 6575-18.60  |
| 18.7    | 101   | 153    | 20.0     | 6575-18.70  |
| 18.8    | 101   | 153    | 20.0     | 6575-18.80  |
| 18.9    | 101   | 153    | 20.0     | 6575-18.90  |
| 19.0    | 101   | 153    | 20.0     | 6575-19.00  |
| 19.1    | 101   | 153    | 20.0     | 6575-19.10  |
| 19.2    | 101   | 153    | 20.0     | 6575-19.20  |
| 19.3    | 101   | 153    | 20.0     | 6575-19.30  |

| DIA. MM | FL MM | OAL MM | SHANK MM | PART NUMBER |
|---------|-------|--------|----------|-------------|
| 19.4    | 101   | 153    | 20.0     | 6575-19.40  |
| 19.5    | 101   | 153    | 20.0     | 6575-19.50  |
| 19.6    | 101   | 153    | 20.0     | 6575-19.60  |
| 19.7    | 101   | 153    | 20.0     | 6575-19.70  |
| 19.8    | 101   | 153    | 20.0     | 6575-19.80  |
| 19.9    | 101   | 153    | 20.0     | 6575-19.90  |
| 20.0    | 101   | 153    | 20.0     | 6575-20.00  |

| FEED TABLE (MM/REV) |      |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|------|
| DIA.                | 2    | 3    | 4    | 5    | 6    | 8    | 10   | 12   |
| A                   | 0.10 | 0.14 | 0.18 | 0.21 | 0.24 | 0.31 | 0.37 | 0.42 |
| B                   | 0.08 | 0.11 | 0.14 | 0.17 | 0.19 | 0.25 | 0.30 | 0.34 |
| C                   | 0.06 | 0.09 | 0.12 | 0.14 | 0.16 | 0.20 | 0.24 | 0.28 |
| D                   | 0.05 | 0.07 | 0.09 | 0.11 | 0.13 | 0.16 | 0.19 | 0.23 |
| E                   | 0.04 | 0.06 | 0.08 | 0.09 | 0.10 | 0.13 | 0.16 | 0.18 |
| F                   | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.11 |

| APPLICATION TABLE OF PROCESSED MATERIALS |              |                 |                  |            |                 |           |                 |                |               |              |                 |                |
|--|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc/FEED                                  | 90 A ●       | 80 B ●          | 75 D ●           | 40 D ●     | 35 D ○          | 75 C ●    | 200 A ○         | 140 B ○        | 80 B ○        | 20 E ○       | 15 E ○          | 20 E ○         |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

# TAPS



# SPIRAL POINT (GUN NOSE) TAPS – POWDERED METAL

High Performance Tapping  
Suitable for most materials  
Powdered metal material gives  
greater tool life



**GROUP**

**HPTP**



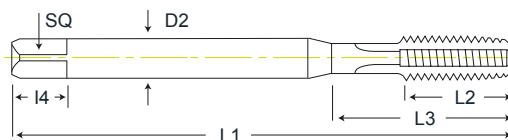
**Powdered Metal**



**Coating**



**Through Hole**



**METRIC COARSE**

| SIZE MM     | STD     | L1 MM | L2 MM | L3 MM | D2 MM | SQ MM | I4 MM | TAP DRILL MM | PART NUMBER  |
|-------------|---------|-------|-------|-------|-------|-------|-------|--------------|--------------|
| M2 X 0.4    | DIN 371 | 45    | 8     | 13    | 2.8   | 2.1   | 5     | 1.6          | 6620-2.00SP  |
| M2.5 X 0.45 | DIN 371 | 50    | 10    | 14    | 2.8   | 2.1   | 5     | 2.1          | 6620-2.50SP  |
| M3 X 0.5    | DIN 371 | 56    | 10    | 18    | 3.5   | 2.7   | 6     | 2.5          | 6620-3.00SP  |
| M4 X 0.7    | DIN 371 | 63    | 12    | 21    | 4.5   | 3.4   | 6     | 3.3          | 6620-4.00SP  |
| M5 X 0.8    | DIN 371 | 70    | 14    | 25    | 6.0   | 4.9   | 8     | 4.2          | 6620-5.00SP  |
| M6 X 1      | DIN 371 | 80    | 16    | 29    | 6.0   | 4.9   | 8     | 5.0          | 6620-6.00SP  |
| M8 X 1.25   | DIN 371 | 90    | 22    | 18    | 8.0   | 6.2   | 9     | 6.8          | 6620-8.00SP  |
| M10 X 1.5   | DIN 371 | 100   | 24    | 20    | 10.0  | 8.0   | 11    | 8.5          | 6620-10.00SP |
| M12 X 1.75  | DIN 376 | 110   | 24    | –     | 9.0   | 7.0   | 10    | 10.2         | 6620-12.00SP |
| M14 X 2     | DIN 376 | 110   | 26    | –     | 11.0  | 9.0   | 12    | 12.0         | 6620-14.00SP |
| M16 X 2     | DIN 376 | 110   | 26    | –     | 12.0  | 9.0   | 12    | 14.0         | 6620-16.00SP |
| M18 X 2.5   | DIN 376 | 125   | 30    | –     | 14.0  | 11.0  | 14    | 15.5         | 6620-18.00SP |
| M20 X 2.5   | DIN 376 | 140   | 32    | –     | 16.0  | 12.0  | 15    | 17.5         | 6620-20.00SP |
| M22 X 2.5   | DIN 376 | 140   | 30    | –     | 18.0  | 14.5  | 17    | 19.5         | 6620-22.00SP |
| M24 X 3     | DIN 376 | 160   | 36    | –     | 18.0  | 14.5  | 17    | 21.0         | 6620-24.00SP |

**METRIC FINE**

|             |         |     |    |    |      |      |    |      |              |
|-------------|---------|-----|----|----|------|------|----|------|--------------|
| MF3 X 0.35  | DIN 371 | 56  | 10 | 18 | 3.5  | 2.7  | 6  | 2.7  | 6621-3.00SP  |
| MF4 X 0.5   | DIN 371 | 63  | 12 | 21 | 4.5  | 3.4  | 6  | 3.5  | 6621-4.00SP  |
| MF5 X 0.5   | DIN 371 | 70  | 14 | 25 | 6.0  | 4.9  | 8  | 4.5  | 6621-5.00SP  |
| MF6 X 0.5   | DIN 371 | 80  | 16 | 29 | 6.0  | 4.9  | 8  | 5.5  | 6621-6.00SP  |
| MF6 X 0.75  | DIN 371 | 80  | 16 | 29 | 6.0  | 4.9  | 8  | 5.3  | 6622-6.00SP  |
| MF8 X 0.75  | DIN 371 | 90  | 18 | 35 | 8.0  | 6.2  | 9  | 7.3  | 6621-8.00SP  |
| MF8 X 1     | DIN 371 | 90  | 18 | 35 | 8.0  | 6.2  | 9  | 7.0  | 6622-8.00SP  |
| MF10 X 1    | DIN 371 | 100 | 20 | 39 | 10.0 | 8.0  | 11 | 9.0  | 6621-10.00SP |
| MF10 X 1.25 | DIN 371 | 100 | 20 | 39 | 10.0 | 8.0  | 11 | 9.0  | 6622-10.00SP |
| MF12 X 1    | DIN 376 | 110 | 24 | –  | 9.0  | 7.0  | 10 | 11.0 | 6621-12.00SP |
| MF12 X 1.25 | DIN 376 | 110 | 24 | –  | 9.0  | 7.0  | 10 | 10.8 | 6622-12.00SP |
| MF12 X 1.5  | DIN 376 | 110 | 24 | –  | 9.0  | 7.0  | 10 | 10.5 | 6623-12.00SP |
| MF14 X 1    | DIN 376 | 110 | 26 | –  | 11.0 | 9.0  | 12 | 12.5 | 6621-14.00SP |
| MF14 X 1.25 | DIN 376 | 110 | 26 | –  | 11.0 | 9.0  | 12 | 12.5 | 6622-14.00SP |
| MF14 X 1.5  | DIN 376 | 110 | 26 | –  | 11.0 | 9.0  | 12 | 12.5 | 6623-14.00SP |
| MF16 X 1    | DIN 376 | 110 | 26 | –  | 12.0 | 9.0  | 12 | 14.5 | 6621-16.00SP |
| MF16 X 1.5  | DIN 376 | 110 | 26 | –  | 12.0 | 9.0  | 12 | 14.5 | 6622-16.00SP |
| MF18 X 1.5  | DIN 376 | 125 | 30 | –  | 14.0 | 11.0 | 14 | 16.5 | 6621-18.00SP |
| MF20 X 1.5  | DIN 376 | 140 | 32 | –  | 16.0 | 12.0 | 15 | 18.5 | 6621-20.00SP |
| MF22 X 1.5  | DIN 376 | 140 | 30 | –  | 18.0 | 14.5 | 17 | 20.5 | 6621-22.00SP |
| MF24 X 1.5  | DIN 376 | 160 | 36 | –  | 18.0 | 14.5 | 17 | 22.5 | 6621-24.00SP |

**APPLICATION TABLE OF PROCESSED MATERIALS**

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc                 | 25 ●         | 25 ●            | 15 ●             | 15 ●       | 15 ●            | 22 ○      | 27 ●            | 18 ●           | 25 ●          | 10 ●         | 15 ○            |                |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

## SPIRAL POINT (GUN NOSE) TAPS – POWDERED METAL

High Performance Tapping  
Suitable for most materials  
Powdered metal material gives  
greater tool life



GROUP

HPTP



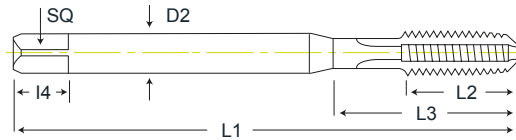
Powdered Metal



Coating



Through Hole



| UNC         |         |       |       |       |       |       |       |              |             |
|-------------|---------|-------|-------|-------|-------|-------|-------|--------------|-------------|
| SIZE INCH   | STD     | L1 MM | L2 MM | L3 MM | D2 MM | SQ MM | I4 MM | TAP DRILL MM | PART NUMBER |
| 4-40 UNC    | DIN 371 | 56    | 10    | 18    | 3.5   | 2.7   | 6     | 2.3          | 6632-4GSP   |
| 5-40 UNC    | DIN 371 | 63    | 12    | 21    | 4.5   | 3.4   | 6     | 2.6          | 6632-5GSP   |
| 6-32 UNC    | DIN 371 | 63    | 12    | 21    | 4.5   | 3.4   | 6     | 2.8          | 6632-6GSP   |
| 8-32 UNC    | DIN 371 | 70    | 14    | 25    | 6.0   | 4.9   | 8     | 3.4          | 6632-8GSP   |
| 10-24 UNC   | DIN 371 | 70    | 14    | 25    | 6.0   | 4.9   | 8     | 3.8          | 6632-10GSP  |
| 12-24 UNC   | DIN 371 | 80    | 16    | 29    | 6.0   | 4.9   | 8     | 4.5          | 6632-12GSP  |
| 1/4-20 UNC  | DIN 371 | 90    | 18    | 35    | 8.0   | 6.2   | 9     | 5.1          | 6632-1/4SP  |
| 5/16-18 UNC | DIN 371 | 90    | 18    | 35    | 8.0   | 6.2   | 9     | 6.6          | 6632-5/16SP |
| 3/8-16 UNC  | DIN 371 | 100   | 20    | 39    | 10.0  | 8.0   | 11    | 8.0          | 6632-3/8SP  |
|             |         |       |       |       |       |       |       |              |             |
| 7/16-14 UNC | DIN 376 | 110   | 24    | -     | 9.0   | 7.0   | 10    | 9.4          | 6632-7/16SP |
| 1/2-13 UNC  | DIN 376 | 110   | 26    | -     | 11.0  | 9.0   | 12    | 10.8         | 6632-1/2SP  |
| 9/16-12 UNC | DIN 376 | 110   | 26    | -     | 12.0  | 9.0   | 12    | 12.2         | 6632-9/16SP |
| 5/8-11 UNC  | DIN 376 | 110   | 26    | -     | 12.0  | 9.0   | 12    | 13.5         | 6632-5/8SP  |
| 3/4-10 UNC  | DIN 376 | 140   | 32    | -     | 16.0  | 12.0  | 15    | 16.5         | 6632-3/4SP  |
| 7/8-9 UNC   | DIN 376 | 140   | 30    | -     | 18.0  | 14.5  | 17    | 19.5         | 6632-7/8SP  |
| 1-8 UNC     | DIN 376 | 160   | 36    | -     | 20.0  | 16.0  | 19    | 22.5         | 6632-1SP    |
|             |         |       |       |       |       |       |       |              |             |
| UNF         |         |       |       |       |       |       |       |              |             |
| SIZE INCH   | STD     | L1 MM | L2 MM | L3 MM | D2 MM | SQ MM | I4 MM | TAP DRILL MM | PART NUMBER |
| 4-48 UNF    | DIN 371 | 56    | 10    | 18    | 3.5   | 2.7   | 6     | 2.4          | 6634-4GSP   |
| 5-44 UNF    | DIN 371 | 63    | 12    | 21    | 4.5   | 3.4   | 6     | 2.7          | 6634-5GSP   |
| 6-40 UNF    | DIN 371 | 63    | 12    | 21    | 4.5   | 3.4   | 6     | 2.9          | 6634-6GSP   |
| 8-36 UNF    | DIN 371 | 70    | 14    | 25    | 6.0   | 4.9   | 8     | 3.5          | 6634-8GSP   |
| 10-32 UNF   | DIN 371 | 70    | 14    | 25    | 6.0   | 4.9   | 8     | 4.1          | 6634-10GSP  |
| 12-28 UNF   | DIN 371 | 80    | 16    | 29    | 6.0   | 4.9   | 8     | 4.6          | 6634-12GSP  |
| 1/4-28 UNF  | DIN 371 | 90    | 18    | 35    | 8.0   | 6.2   | 9     | 5.5          | 6634-1/4SP  |
| 5/16-24 UNF | DIN 371 | 90    | 18    | 35    | 8.0   | 6.2   | 9     | 6.9          | 6634-5/16SP |
| 3/8-24 UNF  | DIN 371 | 100   | 20    | 39    | 10.0  | 8.0   | 11    | 8.5          | 6634-3/8SP  |
|             |         |       |       |       |       |       |       |              |             |
| 7/16-20 UNF | DIN 376 | 110   | 24    | -     | 9.0   | 7.0   | 10    | 9.8          | 6634-7/16SP |
| 1/2-20 UNF  | DIN 376 | 110   | 26    | -     | 11.0  | 9.0   | 12    | 11.5         | 6634-1/2SP  |
| 9/16-18 UNF | DIN 376 | 110   | 26    | -     | 12.0  | 9.0   | 12    | 12.8         | 6634-9/16SP |
| 5/8-18 UNF  | DIN 376 | 110   | 26    | -     | 12.0  | 9.0   | 12    | 14.5         | 6634-5/8SP  |
| 3/4-16 UNF  | DIN 376 | 140   | 32    | -     | 16.0  | 12.0  | 15    | 17.5         | 6634-3/4SP  |
| 7/8-14 UNF  | DIN 376 | 140   | 30    | -     | 18.0  | 14.5  | 17    | 20.5         | 6634-7/8SP  |
| 1-12 UNF    | DIN 376 | 160   | 36    | -     | 20.0  | 16.0  | 19    | 23.5         | 6634-1SP    |

| APPLICATION TABLE OF PROCESSED MATERIALS |              |                 |                  |            |                 |           |                 |                |               |              |                 |                |
|--|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc                                       | 25 ●         | 25 ●            | 15 ●             | 15 ●       | 15 ●            | 22 ○      | 27 ●            | 18 ●           | 25 ●          | 10 ●         | 15 ○            |                |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

# SPIRAL FLUTE TAPS – POWDERED METAL

High Performance Tapping  
Suitable for most materials  
Powdered metal material gives  
greater tool life



**GROUP**

**HPTP**



**Powdered Metal**



**Coating**



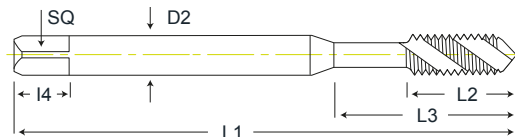
**Through Hole**



**Blind Hole**



**45° Helix**



**METRIC COARSE**

| SIZE MM     | STD     | L1 MM | L2 MM | L3 MM | D2 MM | SQ MM | I4 MM | TAP DRILL MM | PART NUMBER  |
|-------------|---------|-------|-------|-------|-------|-------|-------|--------------|--------------|
| M2 X 0.4    | DIN 371 | 45    | 8     | 13    | 2.8   | 2.1   | 5     | 1.6          | 6620-2.00SF  |
| M2.5 X 0.45 | DIN 371 | 50    | 10    | 14    | 2.8   | 2.1   | 5     | 2.1          | 6620-2.50SF  |
| M3 X 0.5    | DIN 371 | 56    | 5.5   | 18    | 3.5   | 2.7   | 6     | 2.5          | 6620-3.00SF  |
| M4 X 0.7    | DIN 371 | 63    | 7     | 21    | 4.5   | 3.4   | 6     | 3.3          | 6620-4.00SF  |
| M5 X 0.8    | DIN 371 | 70    | 8     | 25    | 6.0   | 4.9   | 8     | 4.2          | 6620-5.00SF  |
| M6 X 1      | DIN 371 | 80    | 10    | 29    | 6.0   | 4.9   | 8     | 5.0          | 6620-6.00SF  |
| M8 X 1.25   | DIN 371 | 90    | 14    | 35    | 8.0   | 6.2   | 9     | 6.8          | 6620-8.00SF  |
| M10 X 1.5   | DIN 371 | 100   | 16    | 39    | 10.0  | 8.0   | 11    | 8.5          | 6620-10.00SF |
| M12 X 1.75  | DIN 376 | 110   | 18.5  | –     | 9.0   | 7.0   | 10    | 10.2         | 6620-12.00SF |
| M14 X 2     | DIN 376 | 110   | 20    | –     | 11.0  | 9.0   | 12    | 12.0         | 6620-14.00SF |
| M16 X 2     | DIN 376 | 110   | 20    | –     | 12.0  | 9.0   | 12    | 14.0         | 6620-16.00SF |
| M18 X 2.5   | DIN 376 | 125   | 25    | –     | 14.0  | 11.0  | 14    | 15.5         | 6620-18.00SF |
| M20 X 2.5   | DIN 376 | 140   | 25    | –     | 16.0  | 12.0  | 15    | 17.5         | 6620-20.00SF |
| M22 X 2.5   | DIN 376 | 140   | 30    | –     | 18.0  | 14.5  | 17    | 19.5         | 6620-22.00SF |
| M24 X 3     | DIN 376 | 160   | 36    | –     | 18.0  | 14.5  | 17    | 21.0         | 6620-24.00SF |

**METRIC FINE**

|             |         |     |      |    |      |      |    |      |              |
|-------------|---------|-----|------|----|------|------|----|------|--------------|
| MF3 X 0.35  | DIN 371 | 56  | 5.5  | 18 | 3.5  | 2.7  | 6  | 2.7  | 6621-3.00SF  |
| MF4 X 0.5   | DIN 371 | 63  | 7    | 21 | 4.5  | 3.4  | 6  | 3.5  | 6621-4.00SF  |
| MF5 X 0.5   | DIN 371 | 70  | 8    | 25 | 6.0  | 4.9  | 8  | 4.5  | 6621-5.00SF  |
| MF6 X 0.5   | DIN 371 | 80  | 10   | 29 | 6.0  | 4.9  | 8  | 5.5  | 6621-6.00SF  |
| MF6 X 0.75  | DIN 371 | 80  | 10   | 29 | 6.0  | 4.9  | 8  | 5.3  | 6622-6.00SF  |
| MF8 X 0.75  | DIN 371 | 90  | 14   | 35 | 8.0  | 6.2  | 9  | 7.3  | 6621-8.00SF  |
| MF8 X 1     | DIN 371 | 90  | 14   | 35 | 8.0  | 6.2  | 9  | 7.0  | 6622-8.00SF  |
| MF10 X 1    | DIN 371 | 100 | 16   | 39 | 10.0 | 8.0  | 11 | 9.0  | 6621-10.00SF |
| MF10 X 1.25 | DIN 371 | 100 | 16   | 39 | 10.0 | 8.0  | 11 | 9.0  | 6622-10.00SF |
| MF12 X 1    | DIN 376 | 110 | 18.5 | –  | 9.0  | 7.0  | 10 | 11.0 | 6621-12.00SF |
| MF12 X 1.25 | DIN 376 | 110 | 18.5 | –  | 9.0  | 7.0  | 10 | 10.8 | 6622-12.00SF |
| MF12 X 1.5  | DIN 376 | 110 | 18.5 | –  | 9.0  | 7.0  | 10 | 10.5 | 6623-12.00SF |
| MF14 X 1    | DIN 376 | 110 | 20   | –  | 11.0 | 9.0  | 12 | 12.5 | 6621-14.00SF |
| MF14 X 1.25 | DIN 376 | 110 | 20   | –  | 11.0 | 9.0  | 12 | 12.5 | 6622-14.00SF |
| MF14 X 1.5  | DIN 376 | 110 | 20   | –  | 11.0 | 9.0  | 12 | 12.5 | 6623-14.00SF |
| MF16 X 1    | DIN 376 | 110 | 20   | –  | 12.0 | 9.0  | 12 | 14.5 | 6621-16.00SF |
| MF16 X 1.5  | DIN 376 | 110 | 20   | –  | 12.0 | 9.0  | 12 | 14.5 | 6622-16.00SF |
| MF18 X 1.5  | DIN 376 | 125 | 25   | –  | 14.0 | 11.0 | 14 | 16.5 | 6621-18.00SF |
| MF20 X 1.5  | DIN 376 | 140 | 25   | –  | 16.0 | 12.0 | 15 | 18.5 | 6621-20.00SF |
| MF22 X 1.5  | DIN 376 | 140 | 30   | –  | 18.0 | 14.5 | 17 | 20.5 | 6621-22.00SF |
| MF24 X 1.5  | DIN 376 | 160 | 36   | –  | 18.0 | 14.5 | 17 | 22.5 | 6621-24.00SF |

**APPLICATION TABLE OF PROCESSED MATERIALS**

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc                 | 25 ●         | 25 ●            | 15 ●             | 15 ●       | 15 ●            | 22 ○      | 27 ●            | 18 ●           | 25 ●          | 10 ●         | 15 ○            |                |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

## SPIRAL FLUTE TAPS – POWDERED METAL

High Performance Tapping  
Suitable for most materials  
Powdered metal material gives  
greater tool life



GROUP

HPTP



Powdered Metal



Coating



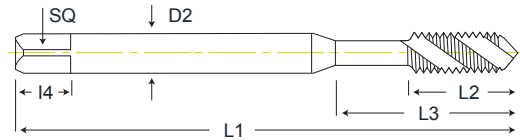
Through Hole



Blind Hole



45° Helix



| UNC         |         |       |       |       |       |       |       |              |             |
|-------------|---------|-------|-------|-------|-------|-------|-------|--------------|-------------|
| SIZE INCH   | STD     | L1 MM | L2 MM | L3 MM | D2 MM | SQ MM | I4 MM | TAP DRILL MM | PART NUMBER |
| 4-40 UNC    | DIN 371 | 56    | 5.5   | 18    | 3.5   | 2.7   | 6     | 2.3          | 6632-4GSF   |
| 5-40 UNC    | DIN 371 | 63    | 7     | 21    | 4.5   | 3.4   | 6     | 2.6          | 6632-5GSF   |
| 6-32 UNC    | DIN 371 | 63    | 7     | 21    | 4.5   | 3.4   | 6     | 2.8          | 6632-6GSF   |
| 8-32 UNC    | DIN 371 | 70    | 8     | 25    | 6.0   | 4.9   | 8     | 3.4          | 6632-8GSF   |
| 10-24 UNC   | DIN 371 | 70    | 8     | 25    | 6.0   | 4.9   | 8     | 3.8          | 6632-10GSF  |
| 12-24 UNC   | DIN 371 | 80    | 10    | 29    | 6.0   | 4.9   | 8     | 4.5          | 6632-12GSF  |
| 1/4-20 UNC  | DIN 371 | 90    | 14    | 35    | 8.0   | 6.2   | 9     | 5.1          | 6632-1/4SF  |
| 5/16-18 UNC | DIN 371 | 90    | 14    | 35    | 8.0   | 6.2   | 9     | 6.6          | 6632-5/16SF |
| 3/8-16 UNC  | DIN 371 | 100   | 16    | 39    | 10.0  | 8.0   | 11    | 8.0          | 6632-3/8SF  |
|             |         |       |       |       |       |       |       |              |             |
| 7/16-14 UNC | DIN 376 | 110   | 18.5  | –     | 9.0   | 7.0   | 10    | 9.4          | 6632-7/16SF |
| 1/2-13 UNC  | DIN 376 | 110   | 20    | –     | 11.0  | 9.0   | 12    | 10.8         | 6632-1/2SF  |
| 9/16-12 UNC | DIN 376 | 110   | 20    | –     | 12.0  | 9.0   | 12    | 12.2         | 6632-9/16SF |
| 5/8-11 UNC  | DIN 376 | 110   | 20    | –     | 12.0  | 9.0   | 12    | 13.5         | 6632-5/8SF  |
| 3/4-10 UNC  | DIN 376 | 140   | 25    | –     | 16.0  | 12.0  | 15    | 16.5         | 6632-3/4SF  |
| 7/8-9 UNC   | DIN 376 | 140   | 30    | –     | 18.0  | 14.5  | 17    | 19.5         | 6632-7/8SF  |
| 1-8 UNC     | DIN 376 | 160   | 34    | –     | 20.0  | 16.0  | 19    | 22.5         | 6632-1SF    |
|             |         |       |       |       |       |       |       |              |             |
| UNF         |         |       |       |       |       |       |       |              |             |
| SIZE INCH   | STD     | L1 MM | L2 MM | L3 MM | D2 MM | SQ MM | I4 MM | TAP DRILL MM | PART NUMBER |
| 4-48 UNF    | DIN 371 | 56    | 5.5   | 18    | 3.5   | 2.7   | 6     | 2.4          | 6634-4GSF   |
| 5-44 UNF    | DIN 371 | 63    | 7     | 21    | 4.5   | 3.4   | 6     | 2.7          | 6634-5GSF   |
| 6-40 UNF    | DIN 371 | 63    | 7     | 21    | 4.5   | 3.4   | 6     | 2.9          | 6634-6GSF   |
| 8-36 UNF    | DIN 371 | 70    | 8     | 25    | 6.0   | 4.9   | 8     | 3.5          | 6634-8GSF   |
| 10-32 UNF   | DIN 371 | 70    | 8     | 25    | 6.0   | 4.9   | 8     | 4.1          | 6634-10GSF  |
| 12-28 UNF   | DIN 371 | 80    | 10    | 29    | 6.0   | 4.9   | 8     | 4.6          | 6634-12GSF  |
| 1/4-28 UNF  | DIN 371 | 90    | 14    | 35    | 8.0   | 6.2   | 9     | 5.5          | 6634-1/4SF  |
| 5/16-24 UNF | DIN 371 | 90    | 14    | 35    | 8.0   | 6.2   | 9     | 6.9          | 6634-5/16SF |
| 3/8-24 UNF  | DIN 371 | 100   | 16    | 39    | 10.0  | 8.0   | 11    | 8.5          | 6634-3/8SF  |
|             |         |       |       |       |       |       |       |              |             |
| 7/16-20 UNF | DIN 376 | 110   | 18.5  | –     | 9.0   | 7.0   | 10    | 9.8          | 6634-7/16SF |
| 1/2-20 UNF  | DIN 376 | 110   | 20    | –     | 11.0  | 9.0   | 12    | 11.5         | 6634-1/2SF  |
| 9/16-18 UNF | DIN 376 | 110   | 20    | –     | 12.0  | 9.0   | 12    | 12.8         | 6634-9/16SF |
| 5/8-18 UNF  | DIN 376 | 110   | 20    | –     | 12.0  | 9.0   | 12    | 14.5         | 6634-5/8SF  |
| 3/4-16 UNF  | DIN 376 | 140   | 25    | –     | 16.0  | 12.0  | 15    | 17.5         | 6634-3/4SF  |
| 7/8-14 UNF  | DIN 376 | 140   | 30    | –     | 18.0  | 14.5  | 17    | 20.5         | 6634-7/8SF  |
| 1-12 UNF    | DIN 376 | 160   | 34    | –     | 20.0  | 16.0  | 19    | 23.5         | 6634-1SF    |

### APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc                 | 25 ●         | 25 ●            | 15 ●             | 15 ●       | 15 ●            | 22 ○      | 27 ●            | 18 ●           | 25 ●          | 10 ●         | 15 ○            |                |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

# STRAIGHT FLUTE TAPS GG – POWDERED METAL

High Performance Tapping  
Suitable for cast iron  
Powdered metal material gives greater tool life  
For through and blind holes



GROUP

HPTP



Powdered  
Metal



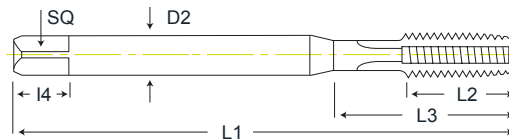
Coating



Through  
Hole



Blind  
Hole



METRIC COARSE

| SIZE<br>MM | STD     | L1<br>MM | L2<br>MM | L3<br>MM | D2<br>MM | SQ<br>MM | L4<br>MM | TAP DRILL<br>MM | PART<br>NUMBER |
|------------|---------|----------|----------|----------|----------|----------|----------|-----------------|----------------|
| M3 X 0.5   | DIN 371 | 56       | 10       | 18       | 3.5      | 2.7      | 6        | 2.5             | 6620-3.00BGG   |
| M4 X 0.7   | DIN 371 | 63       | 12       | 21       | 4.5      | 3.4      | 6        | 3.3             | 6620-4.00BGG   |
| M5 X 0.8   | DIN 371 | 70       | 14       | 25       | 6.0      | 4.9      | 8        | 4.2             | 6620-5.00BGG   |
| M6 X 1     | DIN 371 | 80       | 16       | 29       | 6.0      | 4.9      | 8        | 5.0             | 6620-6.00BGG   |
| M8 X 1.25  | DIN 371 | 90       | 18       | 35       | 8.0      | 6.2      | 9        | 6.8             | 6620-8.00BGG   |
| M10 X 1.5  | DIN 371 | 100      | 20       | 39       | 10.0     | 8.0      | 11       | 8.5             | 6620-10.00BGG  |
| M12 X 1.75 | DIN 376 | 110      | 24       | 49       | 9.0      | 7.0      | 10       | 10.2            | 6620-12.00BGG  |
| M14 X 2    | DIN 376 | 110      | 26       | 53       | 11.0     | 9.0      | 12       | 12.0            | 6620-14.00BGG  |
| M16 X 2    | DIN 376 | 110      | 26       | 54       | 12.0     | 9.0      | 12       | 14.0            | 6620-16.00BGG  |
| M18 X 2.5  | DIN 376 | 125      | 30       | 62       | 14.0     | 11.0     | 14       | 15.5            | 6620-18.00BGG  |
| M20 X 2.5  | DIN 376 | 140      | 32       | 68       | 16.0     | 12.0     | 15       | 17.5            | 6620-20.00BGG  |

METRIC FINE

|             |         |     |    |    |      |      |    |      |               |
|-------------|---------|-----|----|----|------|------|----|------|---------------|
| MF3 X 0.35  | DIN 371 | 56  | 10 | 18 | 3.5  | 2.7  | 6  | 2.7  | 6621-3.00BGG  |
| MF4 X 0.5   | DIN 371 | 63  | 12 | 21 | 4.5  | 3.4  | 6  | 3.5  | 6621-4.00BGG  |
| MF5 X 0.5   | DIN 371 | 70  | 14 | 25 | 6.0  | 4.9  | 8  | 4.5  | 6621-5.00BGG  |
| MF6 X 0.5   | DIN 371 | 80  | 16 | 29 | 6.0  | 4.9  | 8  | 5.5  | 6621-6.00BGG  |
| MF6 X 0.75  | DIN 371 | 80  | 16 | 29 | 6.0  | 4.9  | 8  | 5.3  | 6622-6.00BGG  |
| MF8 X 0.75  | DIN 371 | 90  | 18 | 35 | 8.0  | 6.2  | 9  | 7.3  | 6621-8.00BGG  |
| MF8 X 1     | DIN 371 | 90  | 18 | 35 | 8.0  | 6.2  | 9  | 7.0  | 6622-8.00BGG  |
| MF10 X 1    | DIN 371 | 100 | 20 | 39 | 10.0 | 8.0  | 11 | 9.0  | 6621-10.00BGG |
| MF10 X 1.25 | DIN 371 | 100 | 20 | 39 | 10.0 | 8.0  | 11 | 9.0  | 6622-10.00BGG |
| MF12 X 1    | DIN 376 | 110 | 24 | –  | 9.0  | 7.0  | 10 | 11.0 | 6621-12.00BGG |
| MF12 X 1.25 | DIN 376 | 110 | 24 | –  | 9.0  | 7.0  | 10 | 10.8 | 6622-12.00BGG |
| MF12 X 1.5  | DIN 376 | 110 | 24 | –  | 9.0  | 7.0  | 10 | 10.5 | 6623-12.00BGG |
| MF14 X 1    | DIN 376 | 110 | 26 | –  | 11.0 | 9.0  | 12 | 12.5 | 6621-14.00BGG |
| MF14 X 1.25 | DIN 376 | 110 | 26 | –  | 11.0 | 9.0  | 12 | 12.5 | 6622-14.00BGG |
| MF14 X 1.5  | DIN 376 | 110 | 26 | –  | 11.0 | 9.0  | 12 | 12.5 | 6623-14.00BGG |
| MF16 X 1    | DIN 376 | 110 | 26 | –  | 12.0 | 9.0  | 12 | 14.5 | 6621-16.00BGG |
| MF16 X 1.5  | DIN 376 | 110 | 26 | –  | 12.0 | 9.0  | 12 | 14.5 | 6622-16.00BGG |
| MF18 X 1.5  | DIN 376 | 125 | 30 | –  | 14.0 | 11.0 | 14 | 16.5 | 6621-18.00BGG |
| MF20 X 1.5  | DIN 376 | 140 | 32 | –  | 16.0 | 12.0 | 15 | 18.5 | 6621-20.00BGG |
| MF22 X 1.5  | DIN 376 | 140 | 30 | –  | 18.0 | 14.5 | 17 | 20.5 | 6621-22.00BGG |
| MF24 X 1.5  | DIN 376 | 160 | 36 | –  | 18.0 | 14.5 | 17 | 22.5 | 6621-24.00BGG |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                   | P               | P                  | P                   | P             | M                  | K            | N                  | N                 | N                | S               | S                  | H                 |
|-----------------------|-----------------|--------------------|---------------------|---------------|--------------------|--------------|--------------------|-------------------|------------------|-----------------|--------------------|-------------------|
| WORKPIECE<br>MATERIAL | CARBON<br>STEEL | LOW ALLOY<br>STEEL | HIGH ALLOY<br>STEEL | TOOL<br>STEEL | STAINLESS<br>STEEL | CAST<br>IRON | ALUMINIUM<br>ALLOY | CAST<br>ALUMINIUM | COPPER<br>ALLOYS | SUPER<br>ALLOYS | TITANIUM<br>ALLOYS | HARDENED<br>STEEL |
|                       | <900N           | <1000N             | <1400N              | <1400N        | <900N              | <750N        | Si<12%             | Si>12%            | <750N            | <1100N          | <1100N             | <1400N            |
| Vc                    |                 |                    |                     |               |                    | 15 ●         |                    |                   |                  |                 |                    |                   |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

## STRAIGHT FLUTE TAP 55HRC – POWDERED METAL

High Performance Tapping  
 Suitable for hardened steel 40 to 55HRC  
 Powdered metal material gives greater tool life  
 For through and blind holes



GROUP

HPTP



Powdered Metal



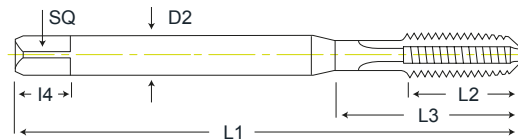
Coating



Through Hole



Blind Hole



| METRIC COARSE |     |       |       |       |       |       |       |              |               |
|---------------|-----|-------|-------|-------|-------|-------|-------|--------------|---------------|
| SIZE MM       | STD | L1 MM | L2 MM | L3 MM | D2 MM | SQ MM | L4 MM | TAP DRILL MM | PART NUMBER   |
| M3 X 0.5      | JIS | 52    | 8     | 12    | 5.0   | 4.0   | 7     | 2.5          | 6620-3.00BHS  |
| M4 X 0.7      | JIS | 52    | 14    | 18    | 5.0   | 4.0   | 7     | 3.3          | 6620-4.00BHS  |
| M5 X 0.8      | JIS | 60    | 18    | 23    | 5.5   | 4.5   | 7     | 4.2          | 6620-5.00BHS  |
| M6 X 1        | JIS | 62    | 20    | 27    | 6.0   | 4.5   | 7     | 5.0          | 6620-6.00BHS  |
| M8 X 1.25     | JIS | 70    | 19    | 37    | 6.2   | 5.0   | 8     | 6.8          | 6620-8.00BHS  |
| M10 X 1.5     | JIS | 75    | 22    | 41    | 7.0   | 5.5   | 8     | 8.5          | 6620-10.00BHS |
| M12 X 1.75    | JIS | 82    | 26    | 48    | 8.5   | 6.5   | 9     | 10.4         | 6620-12.00BHS |
| M14 X 2       | JIS | 88    | 30    | 48    | 10.5  | 8.0   | 11    | 12.0         | 6620-14.00BHS |
| M16 X 2       | JIS | 95    | 30    | 52    | 12.5  | 10.0  | 13    | 14.0         | 6620-16.00BHS |
| M18 X 2.5     | JIS | 100   | 37    | 58    | 14.0  | 11.0  | 14    | 15.5         | 6620-18.00BHS |
| M20 X 2.5     | JIS | 105   | 37    | 58    | 15.0  | 12.0  | 15    | 17.5         | 6620-20.00BHS |
| METRIC FINE   |     |       |       |       |       |       |       |              |               |
| MF8 X 1       | JIS | 70    | 19    | 37    | 6.2   | 5.0   | 8     | 7.1          | 6622-8.00BHS  |
| MF10 X 1      | JIS | 75    | 22    | 41    | 7.0   | 5.5   | 8     | 9.1          | 6621-10.00BHS |
| MF10 X 1.25   | JIS | 75    | 22    | 41    | 7.0   | 5.5   | 8     | 8.9          | 6622-10.00BHS |
| MF12 X 1.25   | JIS | 82    | 26    | 48    | 8.5   | 6.5   | 9     | 10.9         | 6622-12.00BHS |
| MF12 X 1.5    | JIS | 82    | 26    | 48    | 8.5   | 6.5   | 9     | 10.6         | 6623-12.00BHS |
| MF14 X 1.5    | JIS | 88    | 30    | 48    | 10.5  | 8.0   | 11    | 12.6         | 6623-14.00BHS |
| MF16 X 1.5    | JIS | 95    | 30    | 52    | 12.5  | 10.0  | 13    | 14.5         | 6622-16.00BHS |
| MF18 X 1.5    | JIS | 100   | 37    | 58    | 14.0  | 11.0  | 14    | 16.5         | 6621-18.00BHS |
| MF20 X 1.5    | JIS | 105   | 37    | 58    | 15.0  | 12.0  | 15    | 18.5         | 6621-20.00BHS |

| APPLICATION TABLE OF PROCESSED MATERIALS |              |                 |                  |            |                 |           |                 |                |               |              |                 |                |
|--|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <HRC55         |
| Vc                                       |              |                 |                  |            |                 |           |                 |                |               |              |                 | 4 ●            |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

# FORMING (FLUTELESS) TAPS – POWDERED METAL

High Performance Tapping  
 Suitable for forming threads  
 Powdered metal material gives greater tool life  
 For through and blind holes



GROUP

HPTP



Powdered Metal



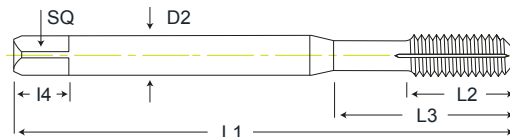
Coating



Through Hole



Blind Hole



**METRIC COARSE**

| SIZE MM     | STD     | L1 MM | L2 MM | L3 MM | D2 MM | SQ MM | I4 MM | TAP DRILL MM | PART NUMBER  |
|-------------|---------|-------|-------|-------|-------|-------|-------|--------------|--------------|
| M2 X 0.4    | DIN 371 | 45    | 8     | 13    | 2.8   | 2.1   | 5     | 1.9          | 6620-2.00FL  |
| M2.5 X 0.45 | DIN 371 | 50    | 10    | 14    | 2.8   | 2.1   | 5     | 2.3          | 6620-2.50FL  |
| M3 X 0.5    | DIN 371 | 56    | 5.5   | 18    | 3.5   | 2.7   | 6     | 2.8          | 6620-3.00FL  |
| M4 X 0.7    | DIN 371 | 63    | 7     | 21    | 4.5   | 3.4   | 6     | 3.7          | 6620-4.00FL  |
| M5 X 0.8    | DIN 371 | 70    | 8     | 25    | 6.0   | 4.9   | 8     | 4.7          | 6620-5.00FL  |
| M6 X 1      | DIN 371 | 80    | 10    | 29    | 6.0   | 4.9   | 8     | 5.6          | 6620-6.00FL  |
| M8 X 1.25   | DIN 371 | 90    | 14    | 35    | 8.0   | 6.2   | 9     | 7.4          | 6620-8.00FL  |
| M10 X 1.5   | DIN 371 | 100   | 16    | 39    | 10.0  | 8.0   | 11    | 9.4          | 6620-10.00FL |
| M12 X 1.75  | DIN 376 | 110   | 18.5  | 49    | 9.0   | 7.0   | 10    | 11.2         | 6620-12.00FL |
| M14 X 2     | DIN 376 | 110   | 20    | 53    | 11.0  | 9.0   | 12    | 13.1         | 6620-14.00FL |
| M16 X 2     | DIN 376 | 110   | 20    | 54    | 12.0  | 9.0   | 12    | 15.1         | 6620-16.00FL |

**METRIC FINE**

|             |         |     |      |    |      |     |    |      |              |
|-------------|---------|-----|------|----|------|-----|----|------|--------------|
| MF3 X 0.35  | DIN 371 | 56  | 5.5  | 18 | 3.5  | 2.7 | 6  | 3.0  | 6621-3.00FL  |
| MF4 X 0.5   | DIN 371 | 63  | 7    | 21 | 4.5  | 3.4 | 6  | 3.8  | 6621-4.00FL  |
| MF5 X 0.5   | DIN 371 | 70  | 8    | 25 | 6.0  | 4.9 | 8  | 4.8  | 6621-5.00FL  |
| MF6 X 0.5   | DIN 371 | 80  | 10   | 29 | 6.0  | 4.9 | 8  | 5.8  | 6621-6.00FL  |
| MF6 X 0.75  | DIN 371 | 80  | 10   | 29 | 6.0  | 4.9 | 8  | 5.7  | 6622-6.00FL  |
| MF8 X 0.75  | DIN 371 | 90  | 14   | 35 | 8.0  | 6.2 | 9  | 7.7  | 6621-8.00FL  |
| MF8 X 1     | DIN 371 | 90  | 14   | 35 | 8.0  | 6.2 | 9  | 7.6  | 6622-8.00FL  |
| MF10 X 1    | DIN 371 | 100 | 16   | 39 | 10.0 | 8.0 | 11 | 9.6  | 6621-10.00FL |
| MF10 X 1.25 | DIN 371 | 100 | 16   | 39 | 10.0 | 8.0 | 11 | 9.5  | 6622-10.00FL |
| MF12 X 1    | DIN 376 | 110 | 18.5 | –  | 9.0  | 7.0 | 10 | 11.6 | 6621-12.00FL |
| MF12 X 1.25 | DIN 376 | 110 | 18.5 | –  | 9.0  | 7.0 | 10 | 11.5 | 6622-12.00FL |
| MF12 X 1.5  | DIN 376 | 110 | 18.5 | –  | 9.0  | 7.0 | 10 | 11.4 | 6623-12.00FL |
| MF14 X 1    | DIN 376 | 110 | 20   | –  | 11.0 | 9.0 | 12 | 13.6 | 6621-14.00FL |
| MF14 X 1.25 | DIN 376 | 110 | 20   | –  | 12.0 | 9.0 | 12 | 13.5 | 6622-14.00FL |
| MF14 X 1.5  | DIN 376 | 110 | 20   | –  | 11.0 | 9.0 | 12 | 13.4 | 6623-14.00FL |
| MF16 X 1    | DIN 376 | 110 | 20   | –  | 12.0 | 9.0 | 12 | 15.6 | 6621-16.00FL |
| MF16 X 1.5  | DIN 376 | 110 | 20   | –  | 12.0 | 9.0 | 12 | 15.3 | 6622-16.00FL |

**APPLICATION TABLE OF PROCESSED MATERIALS**

| ISO                | P            | P               | P                | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|--------------|-----------------|------------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | CARBON STEEL | LOW ALLOY STEEL | HIGH ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <900N        | <1000N          | <1400N           | <1400N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc                 | 25 ●         | 25 ●            | 15 ●             | 15 ●       | 12 ●            |           | 30 ●            |                | 25 ●          |              |                 |                |

Vc = CUTTING SPEED (m/min) ● OPTIMAL ○ EFFECTIVE

# SPADE DRILLS



**SPEEDS  
& FEEDS  
PAGES  
120-123**

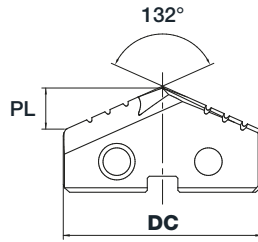
**9.5  
TO  
12.5  
MM**

**9.5  
TO  
12.5  
MM**

GROUP

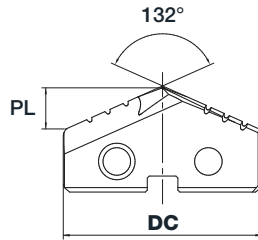
SPDR

**PM HSS  
Co8**



| SERIES | SIZE  |       |      | INSERT   |         | PART NUMBER |
|--------|-------|-------|------|----------|---------|-------------|
|        | DC MM | PL MM | T MM | MATERIAL | COATING | PM HSS-Co8  |
| YO     | 9.50  | 2.1   | 2.38 | HSS-Co8  | AlCrN   | 6512-9.50   |
|        | 10.00 | 2.2   |      |          |         | 6512-10.00  |
|        | 10.50 | 2.3   |      |          |         | 6512-10.50  |
|        | 11.00 | 2.4   |      |          |         | 6512-11.00  |
| ZO     | 11.50 | 2.6   | 2.38 | HSS-Co8  | AlCrN   | 6512-11.50  |
|        | 12.00 | 2.7   |      |          |         | 6512-12.00  |
|        | 12.50 | 2.8   |      |          |         | 6512-12.50  |

**TC**



| SERIES | SIZE  |       |      | INSERT           |         | PART NUMBER | PART NUMBER | PART NUMBER      |
|--------|-------|-------|------|------------------|---------|-------------|-------------|------------------|
|        | DC MM | PL MM | T MM | MATERIAL         | COATING | STEEL       | CAST IRON   | ALUMINIUM ALLOYS |
| YO     | 9.50  | 2.1   | 2.38 | Tungsten Carbide | AlCrSiN | 6513-9.50   | 6513-9.50K  | 6513-9.50N       |
|        | 9.80  | 2.2   |      |                  |         | 6513-9.80   | 6513-9.80K  | 6513-9.80N       |
|        | 10.00 | 2.3   |      |                  |         | 6513-10.00  | 6513-10.00K | 6513-10.00N      |
|        | 11.00 | 2.4   |      |                  |         | 6513-11.00  | 6513-11.00K | 6513-11.00N      |
| ZO     | 11.50 | 2.6   | 2.38 | Tungsten Carbide | AlCrSiN | 6513-11.50  | 6513-11.50K | 6513-11.50N      |
|        | 12.00 | 2.7   |      |                  |         | 6513-12.00  | 6513-12.00K | 6513-12.00N      |
|        | 12.50 | 2.8   |      |                  |         | 6513-12.50  | 6513-12.50K | 6513-12.50N      |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| 6512               | ●          | ●             | ●           | ●          | ●               | ●         | ○               | ○              | ○             | ○            | ○               | ●              |
| 6513               | ●          | ●             | ●           | ●          | ●               | ○         | ○               | ○              | ○             | ●            | ●               | ●              |
| 6513..K            | ○          | ○             | ○           |            |                 | ●         | ○               | ○              |               |              |                 |                |
| 6513..N            |            |               |             |            |                 |           | ●               | ●              | ●             | ○            | ○               |                |

● VERY SUITABLE ○ SUITABLE

ALL DRILLS INCLUDE TORX KEY & SCREWS

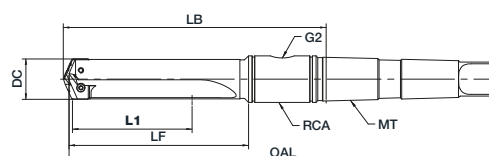
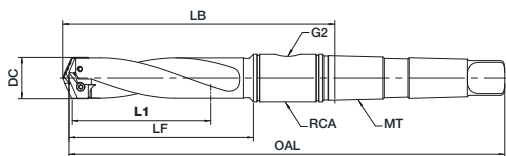


# 9.5 TO 12.5 MM

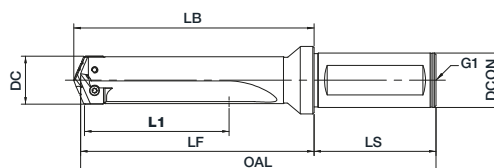
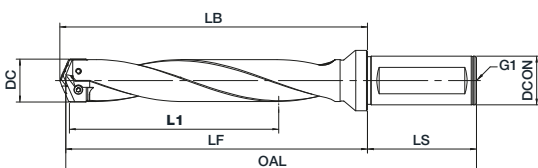
# 9.5 TO 12.5 MM

GROUP

SPDR

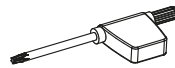
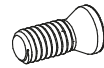
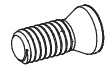


| SERIES | SIZE           |       |       |       |        |    |         | PART NUMBER   |                |
|--------|----------------|-------|-------|-------|--------|----|---------|---------------|----------------|
|        | DC MM          | L1 MM | LF MM | LB MM | OAL MM | MT | G2 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| YO     | 9.50 to 11.00  | 32    | 52    | 88    | 160    | 2  | Rc 1/16 | 6515-Y0HF20   | 6515-Y0SF20    |
|        |                | 60    | 80    | 117   | 189    |    |         | 6515-Y0HF40   |                |
|        |                | 111   | 131   | 167   | 240    |    |         | 6515-Y0HF50   |                |
| ZO     | 11.50 to 12.50 | 32    | 52    | 88    | 160    | 2  | Rc 1/16 | 6515-Z0HF20   | 6515-Z0SF20    |
|        |                | 60    | 80    | 117   | 189    |    |         | 6515-Z0HF40   |                |
|        |                | 111   | 131   | 167   | 240    |    |         | 6515-Z0HF50   |                |



| SERIES | SIZE           |       |       |             |         |       |         | PART NUMBER   |                |
|--------|----------------|-------|-------|-------------|---------|-------|---------|---------------|----------------|
|        | DC MM          | L1 MM | LF MM | OAL MM      | DCON MM | LS MM | G1 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| YO     | 9.50 to 11.00  | 19    | 48    | 96          | 20      | 48    | Rc 1/16 |               | 6516-Y0SF10    |
|        |                | 32    | 61    | 111         |         |       |         | 6516-Y0SF20   |                |
|        |                | 60    | 90    | 140         |         |       |         | 6516-Y0HF40   |                |
|        |                | 111   | 141   | 191         |         |       |         | 6516-Y0HF50   |                |
|        |                | 222   | 252   | 302         |         |       |         | 6516-Y0SF70   |                |
| ZO     | 11.50 to 12.50 | 19    | 48    | 96          | 20      | 50    | Rc 1/8  |               | 6516-Y0SF90    |
|        |                | 32    | 61    | 111         |         |       |         | 6516-Z0SF10   |                |
|        |                | 60    | 90    | 140         |         |       |         | 6516-Z0SF20   |                |
|        |                | 111   | 141   | 191         |         |       |         | 6516-Z0HF40   |                |
|        |                | 222   | 252   | 302         |         |       |         | 6516-Z0HF50   |                |
|        |                |       |       | 6516-Z0SF70 |         |       |         |               |                |
|        |                |       |       | 6516-Z0SF90 |         |       |         |               |                |

RCA



| PART NUMBERS                |          |          |                            |
|-----------------------------|----------|----------|----------------------------|
| TO SUIT MORSE TAPER YO & ZO | YO       | ZO       | TO SUIT YO & ZO - TORX® T7 |
| 6514-1905R                  | 6518-047 | 6518-048 | 6519-018                   |

**SPEEDS  
& FEEDS  
PAGES  
120-123**

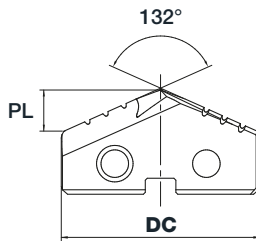
**13.0  
TO  
17.5  
MM**

**13.0  
TO  
17.5  
MM**

GROUP

SPDR

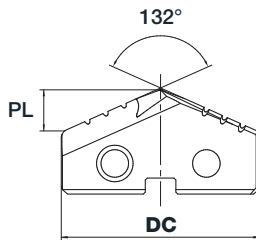
**PM HSS  
Co8**



**SERIES 05 INSERTS WILL FIT INTO BOTH SERIES 00 AND 05 HOLDERS. HOWEVER, SERIES 00 INSERTS ONLY FIT INTO SERIES 00 HOLDERS.**

| SERIES | SIZE  |       |      | INSERT   |         | PART NUMBER |
|--------|-------|-------|------|----------|---------|-------------|
|        | DC MM | PL MM | T MM | MATERIAL | COATING | PM HSS-Co8  |
| 00     | 13.00 | 2.9   | 3.18 | HSS-Co8  | AlCrN   | 6512-13.00  |
|        | 13.50 | 3.0   |      |          |         | 6512-13.50  |
|        | 14.00 | 3.1   |      |          |         | 6512-14.00  |
|        | 14.50 | 3.2   |      |          |         | 6512-14.50  |
|        | 15.00 | 3.3   |      |          |         | 6512-15.00  |
| 05     | 15.50 | 3.5   | 3.18 | HSS-Co8  | AlCrN   | 6512-15.50  |
|        | 16.00 | 3.6   |      |          |         | 6512-16.00  |
|        | 16.50 | 3.7   |      |          |         | 6512-16.50  |
|        | 17.00 | 3.8   |      |          |         | 6512-17.00  |
|        | 17.50 | 3.9   |      |          |         | 6512-17.50  |

**TC**



**SERIES 05 INSERTS WILL FIT INTO BOTH SERIES 00 AND 05 HOLDERS. HOWEVER, SERIES 00 INSERTS ONLY FIT INTO SERIES 00 HOLDERS.**

| SERIES | SIZE  |       |      | INSERT           |         | PART NUMBER | PART NUMBER | PART NUMBER      |
|--------|-------|-------|------|------------------|---------|-------------|-------------|------------------|
|        | DC MM | PL MM | T MM | MATERIAL         | COATING | STEEL       | CAST IRON   | ALUMINIUM ALLOYS |
| 00     | 13.00 | 2.9   | 3.18 | Tungsten Carbide | AlCrSiN | 6513-13.00  | 6513-13.00K | 6513-13.00N      |
|        | 13.50 | 3.0   |      |                  |         | 6513-13.50  | 6513-13.50K | 6513-13.50N      |
|        | 14.00 | 3.1   |      |                  |         | 6513-14.00  | 6513-14.00K | 6513-14.00N      |
|        | 14.50 | 3.2   |      |                  |         | 6513-14.50  | 6513-14.50K | 6513-14.50N      |
|        | 15.00 | 3.3   |      |                  |         | 6513-15.00  | 6513-15.00K | 6513-15.00N      |
| 05     | 15.50 | 3.5   | 3.18 | Tungsten Carbide | AlCrSiN | 6513-15.50  | 6513-15.50K | 6513-15.50N      |
|        | 16.00 | 3.6   |      |                  |         | 6513-16.00  | 6513-16.00K | 6513-16.00N      |
|        | 16.50 | 3.7   |      |                  |         | 6513-16.50  | 6513-16.50K | 6513-16.50N      |
|        | 17.00 | 3.8   |      |                  |         | 6513-17.00  | 6513-17.00K | 6513-17.00N      |
|        | 17.50 | 3.9   |      |                  |         | 6513-17.50  | 6513-17.50K | 6513-17.50N      |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| 6512               | ●          | ●             | ●           | ●          | ●               | ●         | ○               | ○              | ○             | ○            | ○               | ●              |
| 6513               | ●          | ●             | ●           | ●          | ●               | ○         | ○               | ○              | ○             | ●            | ●               | ●              |
| 6513..K            | ○          | ○             | ○           |            |                 | ●         | ○               | ○              |               |              |                 |                |
| 6513..N            |            |               |             |            |                 |           | ●               | ●              | ●             | ○            | ○               |                |

● VERY SUITABLE ○ SUITABLE

ALL DRILLS INCLUDE TORX KEY & SCREWS

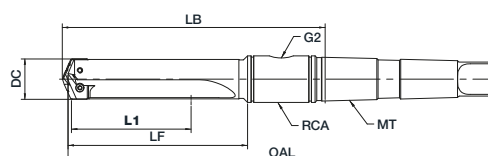
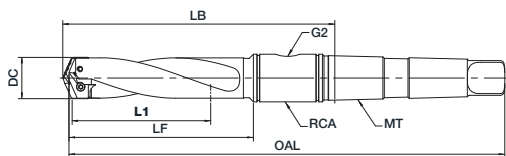


# 13.0 TO 17.5 MM

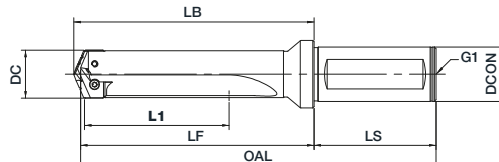
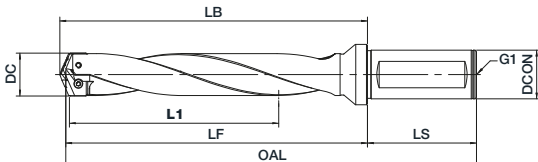
# 13.0 TO 17.5 MM

GROUP

SPDR

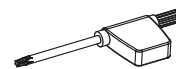
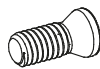


| SERIES | SIZE           |       |       |       |        |    |         | PART NUMBER   |                |
|--------|----------------|-------|-------|-------|--------|----|---------|---------------|----------------|
|        | DC MM          | L1 MM | LF MM | LB MM | OAL MM | MT | G2 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| 00     | 13.00 to 17.50 | 35    | 56    | 92    | 164    | 2  | Rc 1/16 | 6515-00HF20   | 6515-00SF20    |
|        |                | 64    | 84    | 121   | 193    |    |         | 6515-00HF40   |                |
|        |                | 114   | 135   | 172   | 244    |    |         | 6515-00HF50   |                |
|        |                | 178   | 199   | 235   | 307    |    |         | 6515-00HF60   |                |
| 05     | 15.50 to 17.50 | 35    | 56    | 92    | 164    | 2  | Rc 1/16 | 6515-05HF20   | 6515-05SF20    |
|        |                | 64    | 84    | 121   | 193    |    |         | 6515-05HF40   |                |
|        |                | 114   | 135   | 172   | 244    |    |         | 6515-05HF50   |                |
|        |                | 178   | 199   | 235   | 307    |    |         | 6515-05HF60   |                |



| SERIES | SIZE           |       |       |             |         |       |         | PART NUMBER   |                |
|--------|----------------|-------|-------|-------------|---------|-------|---------|---------------|----------------|
|        | DC MM          | L1 MM | LF MM | OAL MM      | DCON MM | LS MM | G1 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| 00     | 13.00 to 17.50 | 22    | 48    | 98          | 20      | 50    | Rc 1/8  |               | 6516-00SF10    |
|        |                | 35    | 64    | 114         |         |       |         | 6516-00SF20   |                |
|        |                | 64    | 92    | 142         |         |       |         | 6516-00HF40   |                |
|        |                | 114   | 143   | 193         |         |       |         | 6516-00HF50   |                |
|        |                | 178   | 206   | 256         |         |       |         | 6516-00HF60   |                |
|        |                | 295   | 324   | 374         |         |       |         |               | 6516-00SF70    |
| 05     | 15.50 to 17.50 | 22    | 48    | 98          | 20      | 50    | Rc 1/8  |               | 6516-00SF90    |
|        |                | 35    | 64    | 114         |         |       |         | 6516-05SF10   |                |
|        |                | 64    | 92    | 142         |         |       |         | 6516-05SF20   |                |
|        |                | 114   | 143   | 193         |         |       |         | 6516-05HF40   |                |
|        |                | 178   | 206   | 256         |         |       |         | 6516-05HF50   |                |
|        |                | 295   | 324   | 374         |         |       |         | 6516-05HF60   |                |
|        |                |       |       | 6516-05SF70 |         |       |         |               |                |

RCA



PART NUMBERS

| TO SUIT MORSE TAPER 00 & 05 | 00       | 05       | TO SUIT 00 & 05 - TORX® T8 |
|-----------------------------|----------|----------|----------------------------|
| 6514-1905R                  | 6518-230 | 6518-046 | 6519-017                   |

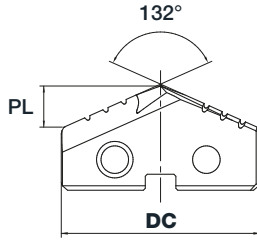
**SPEEDS  
& FEEDS  
PAGES  
120-123**

**18.0  
TO  
24.0  
MM**

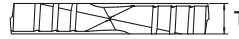
**18.0  
TO  
24.0  
MM**

GROUP **SPDR**

PM HSS  
Co5  
  
PM HSS  
Co8

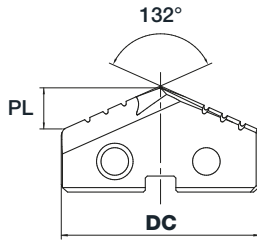


**SERIES 15 INSERTS WILL FIT INTO BOTH SERIES 10 AND 15 HOLDERS. HOWEVER, SERIES 10 INSERTS ONLY FIT INTO SERIES 10 HOLDERS.**

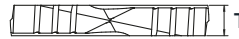


| SERIES | SIZE  |       |      | INSERT   |         | PART NUMBER | INSERT   |         | PART NUMBER |
|--------|-------|-------|------|----------|---------|-------------|----------|---------|-------------|
|        | DC MM | PL MM | T MM | MATERIAL | COATING | PM HSS-Co5  | MATERIAL | COATING | PM HSS-Co8  |
| 10     | 18.00 | 4.0   | 3.97 | HSS-Co5  | TiAlN   | 6511-18.00  | HSS-Co8  | AlCrN   | 6512-18.00  |
|        | 18.50 | 4.1   |      |          |         | 6511-18.50  |          |         | 6512-18.50  |
|        | 19.00 | 4.2   |      |          |         | 6511-19.00  |          |         | 6512-19.00  |
|        | 19.50 | 4.3   |      |          |         | 6511-19.50  |          |         | 6512-19.50  |
|        | 20.00 | 4.5   |      |          |         | 6511-20.00  |          |         | 6512-20.00  |
|        | 20.50 | 4.6   |      |          |         | 6511-20.50  |          |         | 6512-20.50  |
|        | 21.00 | 4.7   |      |          |         | 6511-21.00  |          |         | 6512-21.00  |
| 15     | 22.00 | 4.9   | 3.97 | HSS-Co5  | TiAlN   | 6511-22.00  | HSS-Co8  | AlCrN   | 6512-22.00  |
|        | 23.00 | 5.1   |      |          |         | 6511-23.00  |          |         | 6512-23.00  |
|        | 24.00 | 5.3   |      |          |         | 6511-24.00  |          |         | 6512-24.00  |

TC



**SERIES 15 INSERTS WILL FIT INTO BOTH SERIES 10 AND 15 HOLDERS. HOWEVER, SERIES 10 INSERTS ONLY FIT INTO SERIES 10 HOLDERS.**



| SERIES | SIZE  |       |      | INSERT           |         | PART NUMBER | PART NUMBER | PART NUMBER      |
|--------|-------|-------|------|------------------|---------|-------------|-------------|------------------|
|        | DC MM | PL MM | T MM | MATERIAL         | COATING | STEEL       | CAST IRON   | ALUMINIUM ALLOYS |
| 10     | 18.00 | 4.0   | 3.97 | Tungsten Carbide | AlCrSiN | 6513-18.00  | 6513-18.00K | 6513-18.00N      |
|        | 18.50 | 4.1   |      |                  |         | 6513-18.50  | 6513-18.50K | 6513-18.50N      |
|        | 19.00 | 4.2   |      |                  |         | 6513-19.00  | 6513-19.00K | 6513-19.00N      |
|        | 19.50 | 4.3   |      |                  |         | 6513-19.50  | 6513-19.50K | 6513-19.50N      |
|        | 20.00 | 4.5   |      |                  |         | 6513-20.00  | 6513-20.00K | 6513-20.00N      |
|        | 20.50 | 4.6   |      |                  |         | 6513-20.50  | 6513-20.50K | 6513-20.50N      |
|        | 21.00 | 4.7   |      |                  |         | 6513-21.00  | 6513-21.00K | 6513-21.00N      |
| 15     | 22.00 | 4.9   | 3.97 | Tungsten Carbide | AlCrSiN | 6513-22.00  | 6513-22.00K | 6513-22.00N      |
|        | 23.00 | 5.1   |      |                  |         | 6513-23.00  | 6513-23.00K | 6513-23.00N      |
|        | 24.00 | 5.3   |      |                  |         | 6513-24.00  | 6513-24.00K | 6513-24.00N      |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| 6511               | ●          | ●             | ●           | ●          | ●               | ○         | ○               | ○              | ○             | ○            |                 |                |
| 6512               | ●          | ●             | ●           | ●          | ●               | ●         | ○               | ○              | ○             | ○            | ○               | ●              |
| 6513               | ●          | ●             | ●           | ●          | ●               | ○         | ○               | ○              | ○             | ●            | ●               | ●              |
| 6513..K            | ○          | ○             | ○           |            |                 | ●         | ○               | ○              |               |              |                 |                |
| 6513..N            |            |               |             |            |                 |           | ●               | ●              | ●             | ○            | ○               |                |

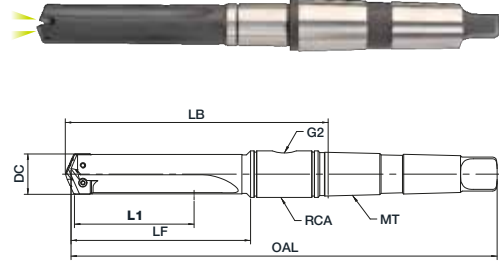
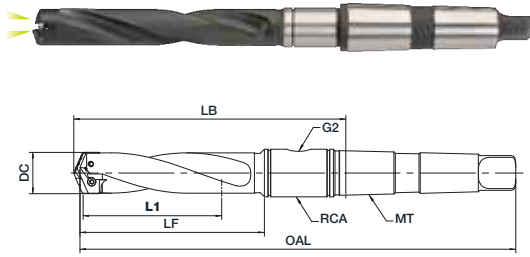
● VERY SUITABLE ○ SUITABLE



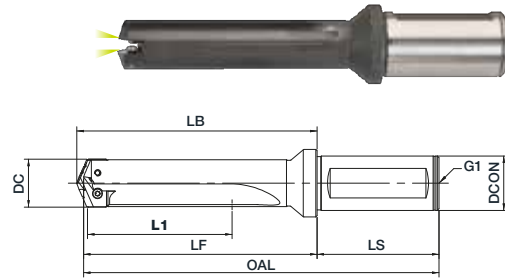
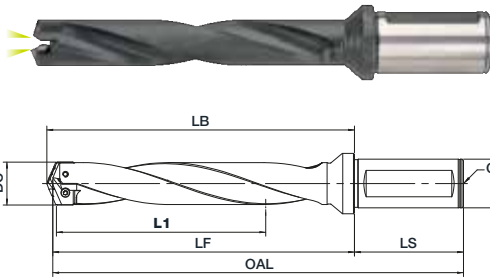
# 18.0 TO 24.0 MM

GROUP

SPDR

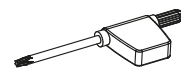
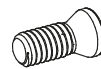


| SERIES | SIZE           |       |       |       |        |    |         | PART NUMBER   |                |
|--------|----------------|-------|-------|-------|--------|----|---------|---------------|----------------|
|        | DC MM          | L1 MM | LF MM | LB MM | OAL MM | MT | G2 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| 10     | 18.00 to 24.00 | 70    | 98    | 143   | 233    | 3  | Rc 1/8  | 6515-10HF20   | 6515-10SF20    |
|        |                | 121   | 149   | 193   | 283    |    |         | 6515-10HF30   |                |
|        |                | 172   | 200   | 244   | 334    |    |         | 6515-10HF40   |                |
|        |                | 273   | 302   | 346   | 436    |    |         | 6515-10HF50   |                |
| 15     | 22.00 to 24.00 | 70    | 98    | 143   | 233    | 3  | Rc 1/8  | 6515-15HF20   | 6515-15SF20    |
|        |                | 121   | 149   | 193   | 283    |    |         | 6515-15HF30   |                |
|        |                | 172   | 200   | 244   | 334    |    |         | 6515-15HF40   |                |
|        |                | 273   | 302   | 346   | 436    |    |         | 6515-15HF50   |                |



| SERIES | SIZE           |       |             |        |         |       |         | PART NUMBER   |                |
|--------|----------------|-------|-------------|--------|---------|-------|---------|---------------|----------------|
|        | DC MM          | L1 MM | LF MM       | OAL MM | DCON MM | LS MM | G1 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| 10     | 18.00 to 24.00 | 48    | 76          | 132    | 25      | 56    | Rc 1/8  |               | 6516-10SF10    |
|        |                | 67    | 107         | 163    |         |       |         | 6516-10SF20   |                |
|        |                | 118   | 155         | 211    |         |       |         | 6516-10HF30   |                |
|        |                | 168   | 206         | 262    |         |       |         | 6516-10HF40   |                |
|        |                | 270   | 307         | 363    |         |       |         | 6516-10HF50   |                |
|        |                | 457   | 495         | 551    |         |       |         |               |                |
| 15     | 22.00 to 24.00 | 48    | 76          | 132    | 25      | 56    | Rc 1/8  |               | 6516-10SF70    |
|        |                | 67    | 107         | 163    |         |       |         | 6516-10SF90   |                |
|        |                | 118   | 155         | 211    |         |       |         | 6516-15SF10   |                |
|        |                | 168   | 206         | 262    |         |       |         | 6516-15SF20   |                |
|        |                | 270   | 307         | 363    |         |       |         | 6516-15HF30   |                |
|        |                |       |             |        |         |       |         | 6516-15HF40   |                |
|        |                |       | 6516-15HF50 |        |         |       |         |               |                |

# 18.0 TO 24.0 MM



| PART NUMBERS                |                 |                            |
|-----------------------------|-----------------|----------------------------|
| TO SUIT MORSE TAPER 10 & 15 | TO SUIT 10 & 15 | TO SUIT 10 & 15 - TORX® T9 |
| 6514-2540R                  | 6518-049        | 6519-016                   |

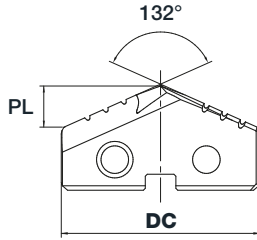
**SPEEDS  
& FEEDS  
PAGES  
120-123**

**25.0  
TO  
35.0  
MM**

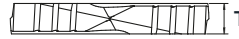
**25.0  
TO  
35.0  
MM**

GROUP **SPDR**

PM HSS  
Co5  
  
PM HSS  
Co8

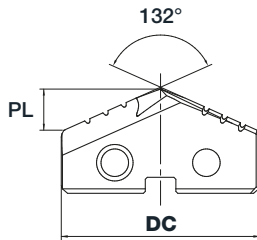


**SERIES 25 INSERTS WILL FIT INTO BOTH SERIES 20 AND 25 HOLDERS. HOWEVER, SERIES 20 INSERTS ONLY FIT INTO SERIES 20 HOLDERS.**



| SERIES | SIZE  |       |      | INSERT   |         | PART NUMBER | INSERT   |         | PART NUMBER |
|--------|-------|-------|------|----------|---------|-------------|----------|---------|-------------|
|        | DC MM | PL MM | T MM | MATERIAL | COATING | PM HSS-Co5  | MATERIAL | COATING | PM HSS-Co8  |
| 20     | 25.00 | 5.6   | 4.76 | HSS-Co5  | TiAlN   | 6511-25.00  | HSS-Co8  | AlCrN   | 6512-25.00  |
|        | 26.00 | 5.8   |      |          |         | 6511-26.00  |          |         | 6512-26.00  |
|        | 27.00 | 6.0   |      |          |         | 6511-27.00  |          |         | 6512-27.00  |
|        | 28.00 | 6.2   |      |          |         | 6511-28.00  |          |         | 6512-28.00  |
|        | 29.00 | 6.5   |      |          |         | 6511-29.00  |          |         | 6512-29.00  |
| 25     | 30.00 | 6.7   | 4.76 | HSS-Co5  | TiAlN   | 6511-30.00  | HSS-Co8  | AlCrN   | 6512-30.00  |
|        | 31.00 | 6.9   |      |          |         | 6511-31.00  |          |         | 6512-31.00  |
|        | 32.00 | 7.1   |      |          |         | 6511-32.00  |          |         | 6512-32.00  |
|        | 33.00 | 7.3   |      |          |         | 6511-33.00  |          |         | 6512-33.00  |
|        | 34.00 | 7.6   |      |          |         | 6511-34.00  |          |         | 6512-34.00  |
|        | 35.00 | 7.8   |      |          |         | 6511-35.00  |          |         | 6512-35.00  |

TC



**SERIES 25 INSERTS WILL FIT INTO BOTH SERIES 20 AND 25 HOLDERS. HOWEVER, SERIES 20 INSERTS ONLY FIT INTO SERIES 20 HOLDERS.**



| SERIES | SIZE  |       |      | INSERT           |         | PART NUMBER | PART NUMBER | PART NUMBER      |
|--------|-------|-------|------|------------------|---------|-------------|-------------|------------------|
|        | DC MM | PL MM | T MM | MATERIAL         | COATING | STEEL       | CAST IRON   | ALUMINIUM ALLOYS |
| 20     | 25.00 | 5.6   | 4.76 | Tungsten Carbide | AlCrSiN | 6513-25.00  | 6513-25.00K | 6513-25.00N      |
|        | 26.00 | 5.8   |      |                  |         | 6513-26.00  | 6513-26.00K | 6513-26.00N      |
|        | 27.00 | 6.0   |      |                  |         | 6513-27.00  | 6513-27.00K | 6513-27.00N      |
|        | 28.00 | 6.2   |      |                  |         | 6513-28.00  | 6513-28.00K | 6513-28.00N      |
|        | 29.00 | 6.5   |      |                  |         | 6513-29.00  | 6513-29.00K | 6513-29.00N      |
| 25     | 30.00 | 6.7   | 4.76 | Tungsten Carbide | AlCrSiN | 6513-30.00  | 6513-30.00K | 6513-30.00N      |
|        | 31.00 | 6.9   |      |                  |         | 6513-31.00  | 6513-31.00K | 6513-31.00N      |
|        | 32.00 | 7.1   |      |                  |         | 6513-32.00  | 6513-32.00K | 6513-32.00N      |
|        | 33.00 | 7.3   |      |                  |         | 6513-33.00  | 6513-33.00K | 6513-33.00N      |
|        | 34.00 | 7.6   |      |                  |         | 6513-34.00  | 6513-34.00K | 6513-34.00N      |
|        | 35.00 | 7.8   |      |                  |         | 6513-35.00  | 6513-35.00K | 6513-35.00N      |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| 6511               | ●          | ●             | ●           | ●          | ●               | ○         | ○               | ○              | ○             | ○            |                 |                |
| 6512               | ●          | ●             | ●           | ●          | ●               | ●         | ○               | ○              | ○             | ○            | ○               | ●              |
| 6513               | ●          | ●             | ●           | ●          | ●               | ○         | ○               | ○              | ○             | ●            | ●               | ●              |
| 6513..K            | ○          | ○             | ○           |            |                 | ●         | ○               | ○              |               |              |                 |                |
| 6513..N            |            |               |             |            |                 |           | ●               | ●              | ●             | ○            | ○               |                |

● VERY SUITABLE ○ SUITABLE

ALL DRILLS INCLUDE TORX KEY & SCREWS

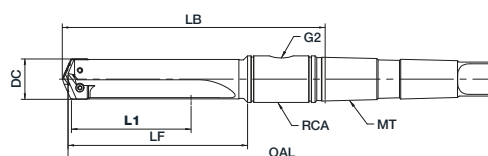
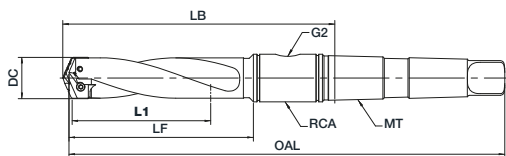


# 25.0 TO 35.0 MM

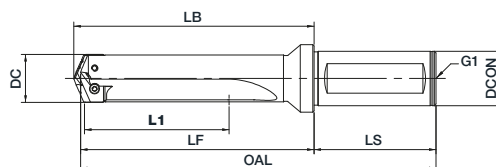
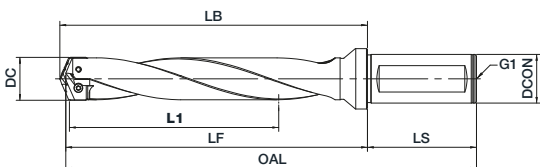
# 25.0 TO 35.0 MM

GROUP

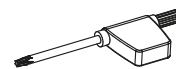
SPDR



| SERIES | SIZE           |       |       |       |        |    |         | PART NUMBER   |                |
|--------|----------------|-------|-------|-------|--------|----|---------|---------------|----------------|
|        | DC MM          | L1 MM | LF MM | LB MM | OAL MM | MT | G2 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| 20     | 25.00 to 35.00 | 86    | 114   | 160   | 274    | 4  | Rc 1/8  | 6515-20HF20   | 6515-20SF20    |
|        |                | 137   | 165   | 211   | 325    |    |         | 6515-20HF30   |                |
|        |                | 187   | 216   | 262   | 375    |    |         | 6515-20HF40   |                |
|        |                | 289   | 318   | 364   | 477    |    |         | 6515-20HF50   |                |
| 25     | 30.00 to 35.00 | 86    | 114   | 168   | 281    | 4  | Rc 1/4  | 6515-25HF20   | 6515-25SF20    |
|        |                | 137   | 165   | 218   | 332    |    |         | 6515-25HF30   |                |
|        |                | 187   | 216   | 269   | 383    |    |         | 6515-25HF40   |                |
|        |                | 289   | 318   | 371   | 484    |    |         | 6515-25HF50   |                |



| SERIES | SIZE           |       |       |             |             |             |         | PART NUMBER   |                |
|--------|----------------|-------|-------|-------------|-------------|-------------|---------|---------------|----------------|
|        | DC MM          | L1 MM | LF MM | OAL MM      | DCON MM     | LS MM       | G1 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| 20     | 25.00 to 35.00 | 57    | 89    | 149         | 32          | 60          | Rc 1/4  |               | 6516-20SF10    |
|        |                | 86    | 129   | 189         |             |             |         | 6516-20SF20   |                |
|        |                | 137   | 179   | 239         |             |             |         | 6516-20HF30   |                |
|        |                | 187   | 230   | 290         |             |             |         | 6516-20HF40   |                |
|        |                | 289   | 332   | 392         |             |             |         | 6516-20HF50   |                |
|        |                | 511   | 554   | 614         |             |             |         |               | 6516-20SF70    |
| 25     | 30.00 to 35.00 | 692   | 735   | 795         |             | 6516-20SF90 |         |               |                |
|        |                | 57    | 89    | 149         |             | 6516-25SF10 |         |               |                |
|        |                | 86    | 129   | 189         |             | 6516-25SF20 |         |               |                |
|        |                | 137   | 179   | 239         | 6516-25HF30 |             |         |               |                |
|        |                | 187   | 230   | 290         | 6516-25HF40 |             |         |               |                |
|        |                | 289   | 332   | 392         | 6516-25HF50 |             |         |               |                |
| 511    | 554            | 614   |       | 6516-25SF70 |             |             |         |               |                |
| 692    | 735            | 795   |       | 6516-25SF90 |             |             |         |               |                |



PART NUMBERS

| TO SUIT MORSE TAPER 20 | TO SUIT MORSE TAPER 25 | TO SUIT 20 & 25 | TO SUIT 20 & 25 - TORX® T15 |
|------------------------|------------------------|-----------------|-----------------------------|
| 6514-2540R             | 6514-3175R             | 6518-045        | 6519-020                    |

SPEEDS  
& FEEDS  
PAGES  
120-123

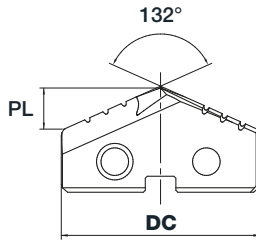
36.0  
TO  
47.0  
MM

GROUP

SPDR

PM HSS  
Co5

PM HSS  
Co8



SERIES 35 INSERTS WILL FIT INTO BOTH SERIES 30 AND 35 HOLDERS. HOWEVER, SERIES 30 INSERTS ONLY FIT INTO SERIES 30 HOLDERS.



| SERIES | SIZE  |       |      | INSERT   |         | PART NUMBER | INSERT   |         | PART NUMBER |
|--------|-------|-------|------|----------|---------|-------------|----------|---------|-------------|
|        | DC MM | PL MM | T MM | MATERIAL | COATING | PM HSS-Co5  | MATERIAL | COATING | PM HSS-Co8  |
| 30     | 36.00 | 8.0   | 6.35 | HSS-Co5  | TiAlN   | 6511-36.00  | HSS-Co8  | AlCrN   | 6512-36.00  |
|        | 37.00 | 8.2   |      |          |         | 6511-37.00  |          |         | 6512-37.00  |
|        | 38.00 | 8.5   |      |          |         | 6511-38.00  |          |         | 6512-38.00  |
|        | 39.00 | 8.7   |      |          |         | 6511-39.00  |          |         | 6512-39.00  |
|        | 40.00 | 8.9   |      |          |         | 6511-40.00  |          |         | 6512-40.00  |
|        | 41.00 | 9.1   |      |          |         | 6511-41.00  |          |         | 6512-41.00  |
| 35     | 42.00 | 9.3   | 6.35 | HSS-Co5  | TiAlN   | 6511-42.00  | HSS-Co8  | AlCrN   | 6512-42.00  |
|        | 43.00 | 9.6   |      |          |         | 6511-43.00  |          |         | 6512-43.00  |
|        | 44.00 | 9.8   |      |          |         | 6511-44.00  |          |         | 6512-44.00  |
|        | 45.00 | 10.0  |      |          |         | 6511-45.00  |          |         | 6512-45.00  |
|        | 46.00 | 10.2  |      |          |         | 6511-46.00  |          |         | 6512-46.00  |
|        | 47.00 | 10.5  |      |          |         | 6511-47.00  |          |         | 6512-47.00  |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | SI<12%          | SI>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| 6511               | ●          | ●             | ●           | ●          | ●               | ○         | ○               | ○              | ○             | ○            |                 |                |
| 6512               | ●          | ●             | ●           | ●          | ●               | ●         | ○               | ○              | ○             | ○            | ○               | ●              |

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ALL DRILLS INCLUDE TORX KEY & SCREWS

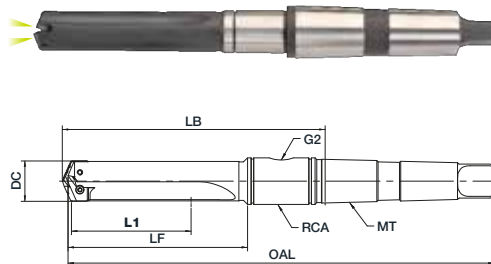
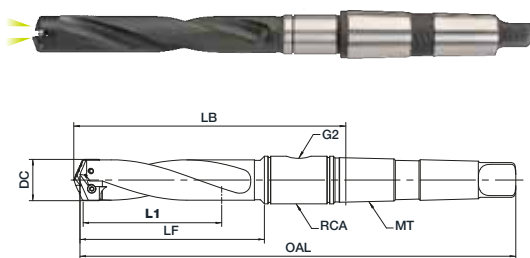


# 36.0 TO 47.0 MM

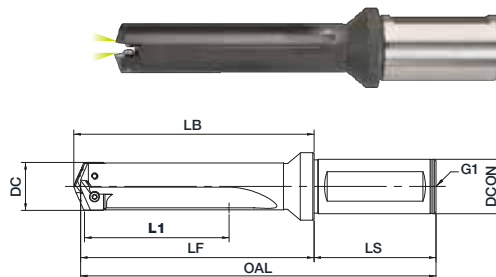
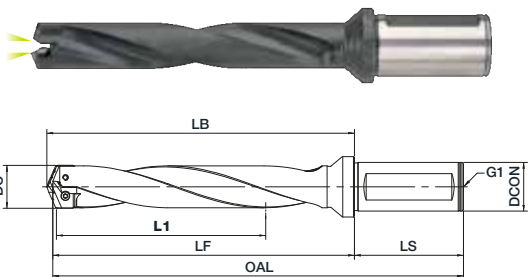
# 36.0 TO 47.0 MM

GROUP

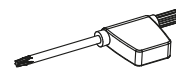
SPDR



| SERIES | SIZE           |       |       |       |             |    |         | PART NUMBER   |                |
|--------|----------------|-------|-------|-------|-------------|----|---------|---------------|----------------|
|        | DC MM          | L1 MM | LF MM | LB MM | OAL MM      | MT | G2 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| 30     | 36.00 to 47.00 | 121   | 152   | 206   | 319         | 4  | Rc 1/4  | 6515-30HF20   | 6515-30SF20    |
|        |                | 165   | 197   | 251   | 364         |    |         | 6515-30HF30   |                |
|        |                | 210   | 241   | 295   | 408         |    |         | 6515-30HF40   |                |
|        |                | 349   | 381   | 435   | 548         |    |         |               | 6515-30SF50    |
|        |                | 559   | 591   | 645   | 757         |    |         |               | 6515-30SF70    |
| 787    | 819            | 873   | 986   |       | 6515-30SF90 |    |         |               |                |
| 35     | 42.00 to 47.00 | 121   | 152   | 206   | 319         | 4  | Rc 1/4  | 6515-35HF20   | 6515-35SF20    |
|        |                | 165   | 197   | 251   | 364         |    |         | 6515-35HF30   |                |
|        |                | 210   | 241   | 295   | 408         |    |         | 6515-35HF40   |                |
|        |                | 349   | 381   | 435   | 548         |    |         |               | 6515-35SF50    |



| SERIES | SIZE           |       |       |             |         |       |         | PART NUMBER   |                |
|--------|----------------|-------|-------|-------------|---------|-------|---------|---------------|----------------|
|        | DC MM          | L1 MM | LF MM | OAL MM      | DCON MM | LS MM | G1 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| 30     | 36.00 to 47.00 | 76    | 125   | 195         | 40      | 70    | Rc 1/4  |               | 6516-30SF10    |
|        |                | 121   | 173   | 243         |         |       |         | 6516-30SF20   |                |
|        |                | 165   | 218   | 288         |         |       |         | 6516-30HF30   |                |
|        |                | 210   | 262   | 332         |         |       |         | 6516-30HF40   |                |
|        |                | 349   | 402   | 472         |         |       |         |               | 6516-30SF50    |
|        |                | 559   | 611   | 681         |         |       |         |               | 6516-30SF70    |
| 787    | 840            | 910   |       | 6516-30SF90 |         |       |         |               |                |
| 35     | 42.00 to 47.00 | 121   | 173   | 243         | 40      | 70    | Rc 1/4  |               | 6516-35SF20    |
|        |                | 165   | 218   | 288         |         |       |         | 6516-35HF30   |                |
|        |                | 210   | 262   | 332         |         |       |         | 6516-35HF40   |                |
|        |                | 349   | 402   | 472         |         |       |         |               | 6516-35SF50    |
|        |                | 559   | 611   | 681         |         |       |         |               | 6516-35SF70    |
| 787    | 840            | 910   |       | 6516-35SF90 |         |       |         |               |                |



| PART NUMBERS                |                 |                             |
|-----------------------------|-----------------|-----------------------------|
| TO SUIT MORSE TAPER 30 & 35 | TO SUIT 30 & 35 | TO SUIT 30 & 35 - TORX® T20 |
| 6514-3175R                  | 6518-044        | 6519-015                    |

SPEEDS  
& FEEDS  
PAGES  
120-123

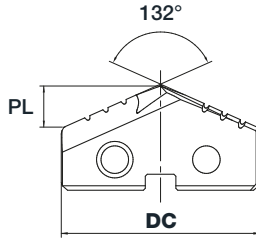
48.0  
TO  
65.0  
MM

GROUP

SPDR

PM HSS  
Co5

PM HSS  
Co8



SERIES 45 INSERTS WILL FIT INTO BOTH SERIES 40 AND 45 HOLDERS. HOWEVER, SERIES 40 INSERTS ONLY FIT INTO SERIES 40 HOLDERS.



| SERIES | SIZE  |       |            | INSERT     |         | PART NUMBER | INSERT   |         | PART NUMBER |
|--------|-------|-------|------------|------------|---------|-------------|----------|---------|-------------|
|        | DC MM | PL MM | T MM       | MATERIAL   | COATING | PM HSS-Co5  | MATERIAL | COATING | PM HSS-Co8  |
| 40     | 48.00 | 10.7  | 7.94       | HSS-Co5    | TiAlN   | 6511-48.00  | HSS-Co8  | AlCrN   | 6512-48.00  |
|        | 49.00 | 10.9  |            |            |         | 6511-49.00  |          |         | 6512-49.00  |
|        | 50.00 | 11.1  |            |            |         | 6511-50.00  |          |         | 6512-50.00  |
|        | 51.00 | 11.4  |            |            |         | 6511-51.00  |          |         | 6512-51.00  |
|        | 52.00 | 11.6  |            |            |         | 6511-52.00  |          |         | 6512-52.00  |
|        | 53.00 | 11.8  |            |            |         | 6511-53.00  |          |         | 6512-53.00  |
|        | 54.00 | 12.0  |            |            |         | 6511-54.00  |          |         | 6512-54.00  |
|        | 55.00 | 12.2  |            |            |         | 6511-55.00  |          |         | 6512-55.00  |
|        | 45    | 56.00 |            |            |         | 12.5        |          |         | 7.94        |
| 57.00  |       | 12.7  | 6511-57.00 | 6512-57.00 |         |             |          |         |             |
| 58.00  |       | 12.9  | 6511-58.00 | 6512-58.00 |         |             |          |         |             |
| 59.00  |       | 13.1  | 6511-59.00 | 6512-59.00 |         |             |          |         |             |
| 60.00  |       | 13.4  | 6511-60.00 | 6512-60.00 |         |             |          |         |             |
| 61.00  |       | 13.6  | 6511-61.00 | 6512-61.00 |         |             |          |         |             |
| 62.00  |       | 13.8  | 6511-62.00 | 6512-62.00 |         |             |          |         |             |
| 63.00  |       | 14.0  | 6511-63.00 | 6512-63.00 |         |             |          |         |             |
| 64.00  |       | 14.2  | 6511-64.00 | 6512-64.00 |         |             |          |         |             |
| 65.00  |       | 14.5  | 6511-65.00 | 6512-65.00 |         |             |          |         |             |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| 6511               | ●          | ●             | ●           | ●          | ●               | ○         | ○               | ○              | ○             | ○            |                 |                |
| 6512               | ●          | ●             | ●           | ●          | ●               | ●         | ○               | ○              | ○             | ○            | ○               | ●              |

● VERY SUITABLE ○ SUITABLE

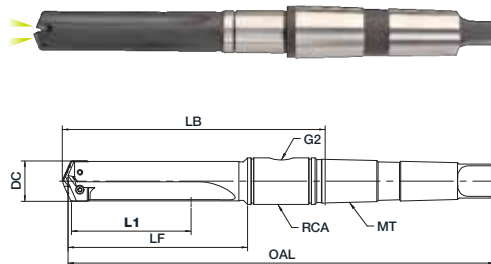
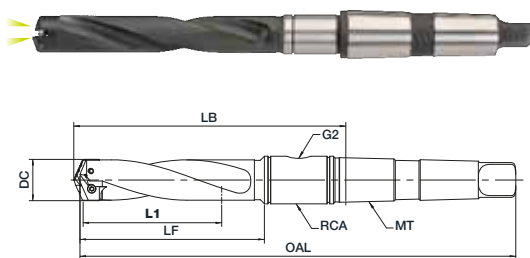
ALL DRILLS INCLUDE TORX KEY & SCREWS



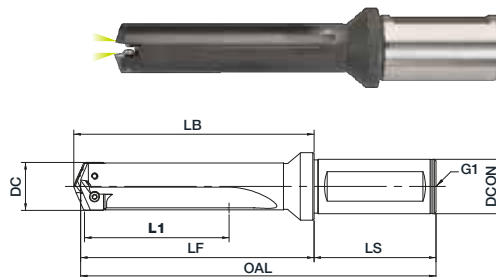
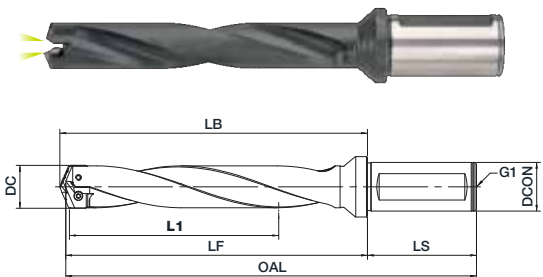
# 48.0 TO 65.0 MM

GROUP

SPDR

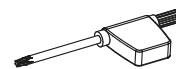


| SERIES | SIZE           |       |       |       |        |    |         | PART NUMBER   |                |
|--------|----------------|-------|-------|-------|--------|----|---------|---------------|----------------|
|        | DC MM          | L1 MM | LF MM | LB MM | OAL MM | MT | G2 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| 40     | 48.00 to 65.00 | 130   | 165   | 219   | 364    | 5  | Rc 1/4  | 6515-40HF20   | 6515-40SF20    |
|        |                | 232   | 267   | 321   | 465    |    |         | 6515-40HF40   |                |
|        |                | 422   | 457   | 511   | 656    |    |         |               | 6515-40SF50    |
|        |                | 625   | 660   | 714   | 859    |    |         |               | 6515-40SF70    |
|        |                | 879   | 914   | 968   | 1113   |    |         |               | 6515-40SF90    |
| 45     | 56.00 to 65.00 | 130   | 165   | 219   | 364    | 5  | Rc 1/4  | 6515-45HF20   | 6515-45SF20    |
|        |                | 232   | 267   | 321   | 465    |    |         | 6515-45HF40   |                |
|        |                | 422   | 457   | 511   | 656    |    |         |               | 6515-45SF50    |
|        |                | 625   | 660   | 714   | 859    |    |         |               | 6515-45SF70    |
|        |                | 879   | 914   | 968   | 1113   |    |         |               | 6515-45SF90    |



| SERIES | SIZE           |       |       |        |         |       |         | PART NUMBER   |                |
|--------|----------------|-------|-------|--------|---------|-------|---------|---------------|----------------|
|        | DC MM          | L1 MM | LF MM | OAL MM | DCON MM | LS MM | G1 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| 40     | 48.00 to 65.00 | 130   | 179   | 249    | 40      | 70    | Rc 1/4  |               | 6516-40SF20    |
|        |                | 232   | 281   | 351    |         |       |         | 6516-40HF40   |                |
|        |                | 422   | 472   | 542    |         |       |         |               | 6516-40SF50    |
|        |                | 625   | 675   | 745    |         |       |         |               | 6516-40SF70    |
|        |                | 879   | 929   | 999    |         |       |         |               | 6516-40SF90    |
| 45     | 56.00 to 65.00 | 130   | 179   | 249    | 40      | 70    | Rc 1/4  |               | 6516-45SF20    |
|        |                | 232   | 281   | 351    |         |       |         | 6516-45HF40   |                |
|        |                | 422   | 472   | 542    |         |       |         |               | 6516-45SF50    |
|        |                | 625   | 675   | 745    |         |       |         |               | 6516-45SF70    |

# 48.0 TO 65.0 MM



| PART NUMBERS                |                 |                             |
|-----------------------------|-----------------|-----------------------------|
| TO SUIT MORSE TAPER 40 & 45 | TO SUIT 40 & 45 | TO SUIT 40 & 45 - TORX® T20 |
| 6514-4445R                  | 6518-044        | 6519-015                    |

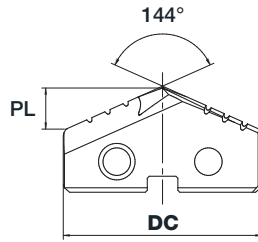
SPEEDS  
& FEEDS  
PAGES  
120-123

66.0  
TO  
89.0  
MM

GROUP

SPDR

PM HSS  
Co5



SERIES 55 INSERTS WILL FIT INTO BOTH SERIES 50 AND 55 HOLDERS. HOWEVER, SERIES 50 INSERTS ONLY FIT INTO SERIES 50 HOLDERS.



| SERIES | SIZE  |       |       | INSERT   |         | PART NUMBER |
|--------|-------|-------|-------|----------|---------|-------------|
|        | DC MM | PL MM | T MM  | MATERIAL | COATING | PM HSS-Co5  |
| 50     | 66.00 | 10.7  | 11.11 | HSS-Co5  | TiAlN   | 6511-66.00  |
|        | 68.00 | 11.0  |       |          |         | 6511-68.00  |
|        | 70.00 | 11.4  |       |          |         | 6511-70.00  |
|        | 72.00 | 11.7  |       |          |         | 6511-72.00  |
|        | 74.00 | 12.0  |       |          |         | 6511-74.00  |
|        | 76.00 | 12.3  |       |          |         | 6511-76.00  |
| 55     | 77.00 | 12.5  | 11.11 | HSS-Co5  | TiAlN   | 6511-77.00  |
|        | 78.00 | 12.7  |       |          |         | 6511-78.00  |
|        | 80.00 | 13.0  |       |          |         | 6511-80.00  |
|        | 82.00 | 13.3  |       |          |         | 6511-82.00  |
|        | 84.00 | 13.6  |       |          |         | 6511-84.00  |
|        | 86.00 | 14.0  |       |          |         | 6511-86.00  |
|        | 88.00 | 14.3  |       |          |         | 6511-88.00  |
|        | 89.00 | 14.5  |       |          |         | 6511-89.00  |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | SI<12%          | SI>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| 6511               | ●          | ●             | ●           | ●          | ●               | ○         | ○               | ○              | ○             | ○            |                 |                |

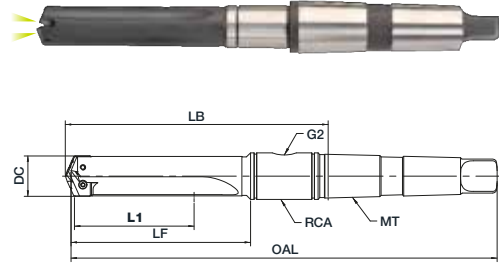
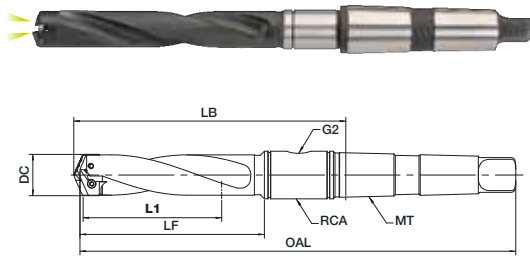
● VERY SUITABLE ○ SUITABLE



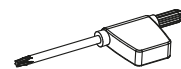
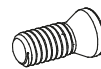
# 66.0 TO 89.0 MM

GROUP

SPDR



| SERIES | SIZE                 |       |       |       |        |    |         | PART NUMBER   |                |
|--------|----------------------|-------|-------|-------|--------|----|---------|---------------|----------------|
|        | DC MM                | L1 MM | LF MM | LB MM | OAL MM | MT | G2 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| 50     | 66.00<br>to<br>89.00 | 172   | 216   | 287   | 430    | 5  | Rc 1/2  | 6515-50HF20   | 6515-50SF20    |
|        |                      | 273   | 318   | 389   | 532    |    |         | 6515-50HF40   |                |
|        |                      | 464   | 508   | 579   | 722    |    |         |               | 6515-50SF50    |
|        |                      | 660   | 705   | 776   | 919    |    |         |               | 6515-50SF70    |
|        |                      | 889   | 933   | 1005  | 1148   |    |         |               | 6515-50SF90    |
| 55     | 78.00<br>to<br>89.00 | 172   | 216   | 287   | 430    | 5  | Rc 1/2  | 6515-55HF20   | 6515-55SF20    |
|        |                      | 273   | 318   | 389   | 532    |    |         | 6515-55HF40   |                |
|        |                      | 464   | 508   | 579   | 722    |    |         |               | 6515-55SF50    |
|        |                      | 660   | 705   | 776   | 919    |    |         |               | 6515-55SF70    |
|        |                      | 889   | 933   | 1005  | 1148   |    |         |               | 6515-55SF90    |



| PART NUMBERS                |                 |                             |
|-----------------------------|-----------------|-----------------------------|
| TO SUIT MORSE TAPER 50 & 55 | TO SUIT 50 & 55 | TO SUIT 50 & 55 – TORX® T25 |
| 6514-5715R                  | 6518-043        | 6519-019                    |

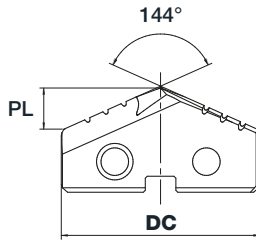
**SPEEDS  
& FEEDS  
PAGES  
120-123**

**90.0  
TO  
114.0  
MM**

GROUP

SPDR

**PM HSS  
Co5**



**SERIES 55 INSERTS WILL FIT INTO BOTH SERIES 50 AND 55 HOLDERS. HOWEVER, SERIES 50 INSERTS ONLY FIT INTO SERIES 50 HOLDERS.**



| SERIES | SIZE   |       |       | INSERT   |         | PART NUMBER |
|--------|--------|-------|-------|----------|---------|-------------|
|        | DC MM  | PL MM | T MM  | MATERIAL | COATING | PM HSS-Co5  |
| 70     | 90.00  | 14.6  | 11.11 | HSS-Co5  | TiAlN   | 6511-90.00  |
|        | 92.00  | 14.9  |       |          |         | 6511-92.00  |
|        | 94.00  | 15.3  |       |          |         | 6511-94.00  |
|        | 96.00  | 15.6  |       |          |         | 6511-96.00  |
|        | 98.00  | 15.9  |       |          |         | 6511-98.00  |
|        | 100.00 | 16.2  |       |          |         | 6511-100.00 |
| 80     | 102.00 | 16.6  | 11.11 | HSS-Co5  | TiAlN   | 6511-102.00 |
|        | 104.00 | 16.9  |       |          |         | 6511-104.00 |
|        | 106.00 | 17.2  |       |          |         | 6511-106.00 |
|        | 108.00 | 17.5  |       |          |         | 6511-108.00 |
|        | 110.00 | 17.9  |       |          |         | 6511-110.00 |
|        | 112.00 | 18.2  |       |          |         | 6511-112.00 |
|        | 114.00 | 18.5  |       |          |         | 6511-114.00 |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | SI<12%          | SI>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| <b>6511</b>        | ●          | ●             | ●           | ●          | ●               | ○         | ○               | ○              | ○             | ○            |                 |                |

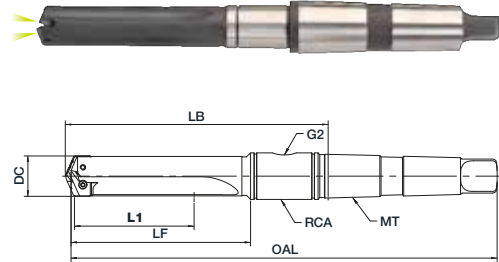
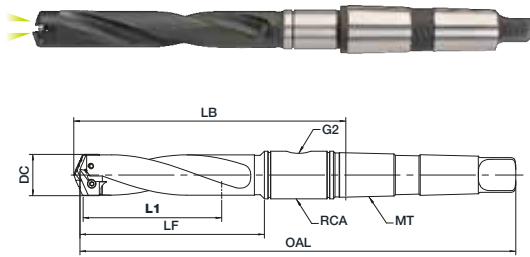
● VERY SUITABLE ○ SUITABLE



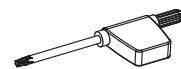
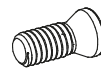
# 90.0 TO 114.0 MM

GROUP

SPDR



| SERIES | SIZE                   |       |       |       |        |    |         | PART NUMBER   |                |
|--------|------------------------|-------|-------|-------|--------|----|---------|---------------|----------------|
|        | DC MM                  | L1 MM | LF MM | LB MM | OAL MM | MT | G2 INCH | HELICAL FLUTE | STRAIGHT FLUTE |
| 70     | 90.00<br>to<br>114.00  | 172   | 225   | 297   | 440    | 5  | Rc 1/2  | 6515-70HF20   | 6515-70SF20    |
|        |                        | 273   | 327   | 399   | 541    |    |         | 6515-70HF40   |                |
|        |                        | 556   | 610   | 681   | 824    |    |         |               | 6515-70SF50    |
|        |                        | 685   | 740   | 811   | 954    |    |         |               | 6515-70SF70    |
|        |                        | 939   | 994   | 1065  | 1208   |    |         |               | 6515-70SF90    |
| 80     | 102.00<br>to<br>114.00 | 172   | 225   | 297   | 440    | 5  | Rc 1/2  | 6515-80HF20   | 6515-80SF20    |
|        |                        | 273   | 327   | 399   | 541    |    |         | 6515-80HF40   |                |
|        |                        | 556   | 610   | 681   | 824    |    |         |               | 6515-80SF50    |
|        |                        | 685   | 740   | 811   | 954    |    |         |               | 6515-80SF70    |
|        |                        | 939   | 994   | 1065  | 1208   |    |         |               | 6515-80SF90    |

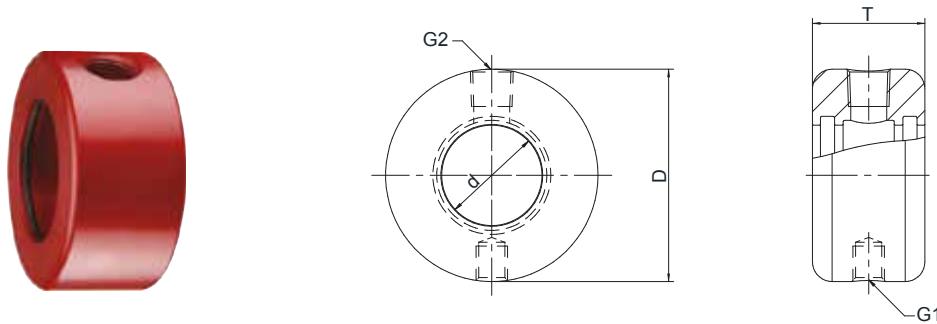


| PART NUMBERS                |                 |                             |
|-----------------------------|-----------------|-----------------------------|
| TO SUIT MORSE TAPER 70 & 80 | TO SUIT 70 & 80 | TO SUIT 70 & 80 - TORX® T25 |
| 6514-5715R                  | 6518-043        | 6519-019                    |

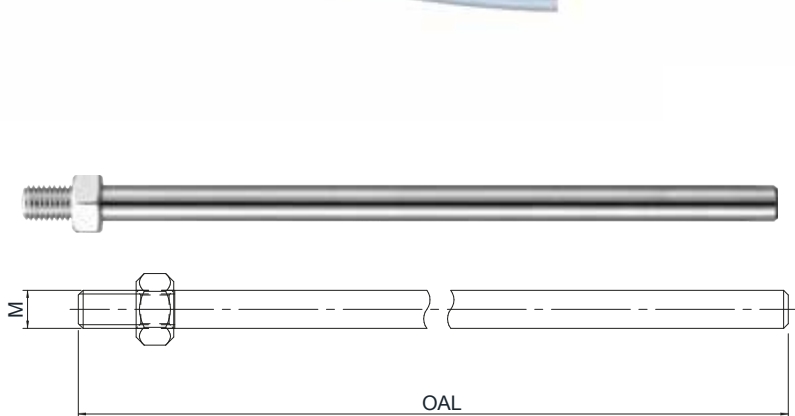
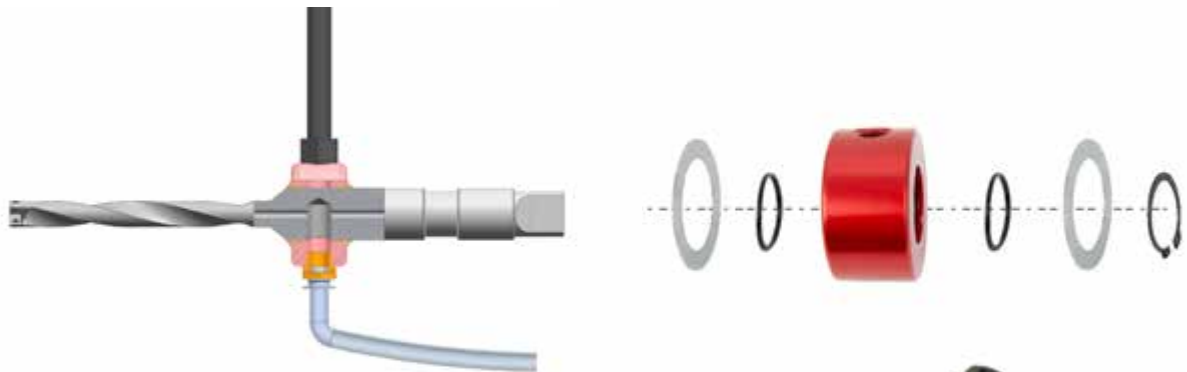
**OIL  
RING  
COOLANT  
RING**

**DRIVE  
ROD**

GROUP SPDR



| PART NUMBER | DIMENSIONS            |                       |                   |                      |                           | PART NUMBER |
|-------------|-----------------------|-----------------------|-------------------|----------------------|---------------------------|-------------|
| OIL RING    | d MM<br>INTERNAL DIA. | D MM<br>EXTERNAL DIA. | T MM<br>THICKNESS | G1 MM<br>DRIVING ROD | G2 INCH<br>COOLANT NOZZLE | O-RING      |
| 6514-1905R  | 19.05                 | 44.45                 | 22.23             | M8 X 1.25            | Rc 1/8"                   | 6511-90.00  |
| 6514-2540R  | 25.40                 | 53.97                 | 28.57             | M8 X 1.25            | Rc 1/8"                   | 6511-92.00  |
| 6514-3175R  | 31.75                 | 63.50                 | 34.92             | M10 X 1.5            | Rc 1/4"                   | 6511-94.00  |
| 6514-4445R  | 44.45                 | 76.20                 | 34.92             | M10 X 1.5            | Rc 1/4"                   | 6511-96.00  |
| 6514-5715R  | 57.15                 | 95.27                 | 44.45             | M12 X 1.75           | Rc 1/2"                   | 6511-98.00  |



| SUITS OIL RING | DIMENSIONS     |                  | PART NUMBER |
|----------------|----------------|------------------|-------------|
|                | M MM<br>THREAD | OAL MM<br>LENGTH | DRIVE ROD   |
| 6514-1905R     | M8 X 1.25      | 250              | 6517-M8     |
| 6514-2540R     | M8 X 1.25      | 250              | 6517-M8     |
| 6514-3175R     | M10 X 1.5      | 250              | 6517-M10    |
| 6514-4445R     | M10 X 1.5      | 250              | 6517-M10    |
| 6514-5715R     | M12 X 1.75     | 250              | 6517-M12    |

# CARBIDE END MILLS



## 2 FLUTE, GENERAL PURPOSE

Universal applications, suitable for materials up to 1600N/mm<sup>2</sup>.  
For milling of slots and cavities.  
Black Nano Coating.

GROUP

CDEM



Tungsten Carbide



2 Flutes



Coating



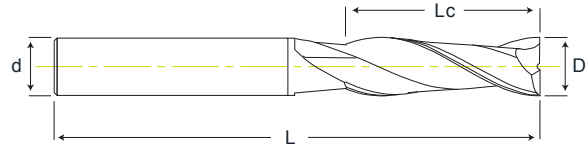
35° Helix



Square



< 1600N/mm<sup>2</sup>



### SHORT SERIES

| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| 1.0             | 3             | 50         | 4            | 0.005       | 6561-1.00X50   |
| 1.5             | 4             | 50         | 4            | 0.005       | 6561-1.50X50   |
| 2.0             | 6             | 50         | 4            | 0.010       | 6561-2.00X50   |
| 2.5             | 8             | 50         | 4            | 0.010       | 6561-2.50X50   |
| 3.0             | 8             | 50         | 4            | 0.020       | 6561-3.00X50   |
| 3.5             | 10            | 50         | 4            | 0.020       | 6561-3.50X50   |
| 4.0             | 11            | 50         | 4            | 0.020       | 6561-4.00X50   |
| 5.0             | 13            | 50         | 6            | 0.030       | 6561-5.00X50   |
| 6.0             | 15            | 50         | 6            | 0.035       | 6561-6.00X50   |
| 8.0             | 20            | 60         | 8            | 0.040       | 6561-8.00X60   |
| 10.0            | 25            | 75         | 10           | 0.045       | 6561-10.00X75  |
| 12.0            | 30            | 75         | 12           | 0.055       | 6561-12.00X75  |
| 14.0            | 35            | 100        | 14           | 0.060       | 6561-14.00X100 |
| 16.0            | 40            | 100        | 16           | 0.065       | 6561-16.00X100 |
| 18.0            | 45            | 100        | 18           | 0.070       | 6561-18.00X100 |
| 20.0            | 45            | 100        | 20           | 0.070       | 6561-20.00X100 |



### LONG SERIES

| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| 3.0             | 10            | 75         | 3            | 0.020       | 6561-3.00X75   |
| 4.0             | 15            | 75         | 4            | 0.020       | 6561-4.00X75   |
| 5.0             | 20            | 75         | 5            | 0.030       | 6561-5.00X75   |
| 6.0             | 20            | 75         | 6            | 0.035       | 6561-6.00X75   |
| 8.0             | 35            | 100        | 8            | 0.040       | 6561-8.00X100  |
| 10.0            | 40            | 100        | 10           | 0.045       | 6561-10.00X100 |
| 12.0            | 55            | 150        | 12           | 0.055       | 6561-12.00X150 |
| 14.0            | 60            | 150        | 14           | 0.060       | 6561-14.00X150 |
| 16.0            | 65            | 150        | 16           | 0.065       | 6561-16.00X150 |
| 20.0            | 75            | 150        | 20           | 0.070       | 6561-20.00X150 |

### APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc (m/min)         | 140 ●      | 110 ●         | 80 ●        | 60 ●       | 70 ○            | 110 ○     | 150 ○           | 150 ○          | 150 ○         | -            | -               | -              |

● OPTIMAL ○ EFFECTIVE

## 4 FLUTE, VARIABLE HELIX



High performance machining, suitable for most materials up to 1600N/mm<sup>2</sup>. Unequal helix angle and unequal spacing of teeth greatly reduces vibration. AlCrSiN coating with high oxidation resistance and high adhesion.

**GROUP**
**CDEM**

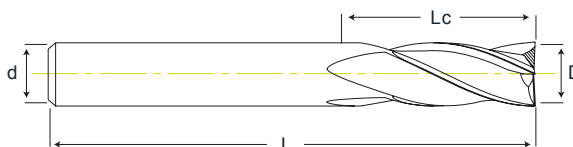
**Tungsten Carbide**

**4 Flutes**

**Coating**

**Variable Helix**

**Square**

**< 1600N/mm<sup>2</sup>**


| SHORT SERIES    |               |            |              |             | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH |                |
| 1.0             | 3             | 50         | 4            | 0.008       | 6562-1.00X50   |
| 1.5             | 4             | 50         | 4            | 0.012       | 6562-1.50X50   |
| 2.0             | 6             | 50         | 4            | 0.017       | 6562-2.00X50   |
| 2.5             | 7             | 50         | 4            | 0.020       | 6562-2.50X50   |
| 3.0             | 8             | 50         | 4            | 0.025       | 6562-3.00X50   |
| 4.0             | 11            | 50         | 4            | 0.033       | 6562-4.00X50   |
| 5.0             | 13            | 50         | 6            | 0.040       | 6562-5.00X50   |
| 6.0             | 15            | 50         | 6            | 0.045       | 6562-6.00X50   |
| 8.0             | 20            | 60         | 8            | 0.065       | 6562-8.00X60   |
| 10.0            | 25            | 75         | 10           | 0.070       | 6562-10.00X75  |
| 12.0            | 30            | 75         | 12           | 0.075       | 6562-12.00X75  |
| 14.0            | 45            | 100        | 14           | 0.080       | 6562-14.00X100 |
| 16.0            | 45            | 100        | 16           | 0.085       | 6562-16.00X100 |
| 20.0            | 45            | 100        | 20           | 0.095       | 6562-20.00X100 |



| SHORT SERIES 4 PIECE SET |               |            |              |             | PART NUMBER   |
|--------------------------|---------------|------------|--------------|-------------|---------------|
| DIAMETER (D) MM          | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | CONTAINS      |
| 6.0                      | 15            | 50         | 6            | 0.045       | 6562-6.00X50  |
| 8.0                      | 20            | 60         | 8            | 0.065       | 6562-8.00X60  |
| 10.0                     | 25            | 75         | 10           | 0.070       | 6562-10.00X75 |
| 12.0                     | 30            | 75         | 12           | 0.075       | 6562-12.00X75 |

| APPLICATION TABLE OF PROCESSED MATERIALS |            |               |             |            |                 |           |                 |                |               |              |                 |                |
|--|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
| Vc (m/min)                               | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
|  | 210 ●      | 175 ●         | 110 ●       | 90 ●       | 120 ●           | 150 ●     | 200 ○           | 200 ○          | 200 ○         | 50 ○         | 70 ●            | 120 ●          |

● OPTIMAL ○ EFFECTIVE

# 4 FLUTE, VARIABLE HELIX – LONG



High performance machining, suitable for most materials up to 1600N/mm<sup>2</sup>. Unequal helix angle and unequal spacing of teeth greatly reduces vibration. AlCrSiN coating with high oxidation resistance and high adhesion.

GROUP

CDEM



Tungsten Carbide



4 Flutes



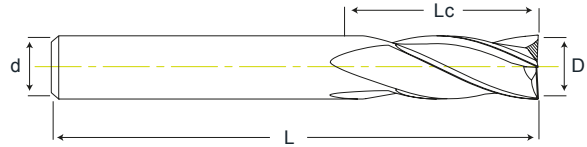
Coating



Variable Helix



Square < 1600N/mm<sup>2</sup>



| LONG SERIES     |               |            |              |             | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH |                |
| 3.0             | 12            | 75         | 4            | 0.025       | 6562-3.00X75   |
| 4.0             | 15            | 75         | 4            | 0.033       | 6562-4.00X75   |
| 6.0             | 24            | 75         | 6            | 0.045       | 6562-6.00X75   |
| 8.0             | 25            | 75         | 8            | 0.065       | 6562-8.00X75   |
| 8.0             | 32            | 100        | 8            | 0.065       | 6562-8.00X100  |
| 10.0            | 35            | 100        | 10           | 0.070       | 6562-10.00X100 |
| 12.0            | 37            | 100        | 12           | 0.075       | 6562-12.00X100 |

| APPLICATION TABLE OF PROCESSED MATERIALS |            |               |             |            |                 |           |                 |                |               |              |                 |                |
|--|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc (m/min)                               | 210 ●      | 175 ●         | 110 ●       | 90 ●       | 120 ●           | 150 ●     | 200 ○           | 200 ○          | 200 ○         | 50 ○         | 70 ●            | 120 ●          |

● OPTIMAL ○ EFFECTIVE

## 4 FLUTE, GENERAL PURPOSE – EXTRA LONG

Universal applications, suitable for materials up to 1400N/mm<sup>2</sup>.  
AlCrSiN coating with high oxidation resistance and high adhesion.

**GROUP**
**CDEM**

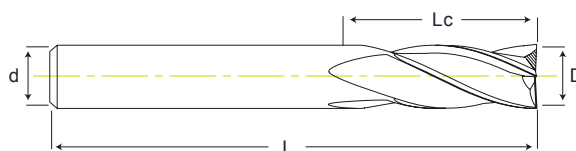
**Tungsten Carbide**

**4 Flutes**

**AlCrSiN Coating**

**35° Helix**

**Square**

**< 1400N/mm<sup>2</sup>**


| EXTRA LONG      |               |            |              |             | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH |                |
| 10.0            | 50            | 150        | 10           | 0.045       | 6564-10.00X150 |
| 12.0            | 50            | 150        | 12           | 0.055       | 6564-12.00X150 |
| 14.0            | 60            | 150        | 14           | 0.060       | 6564-14.00X150 |
| 16.0            | 60            | 150        | 16           | 0.065       | 6564-16.00X150 |
| 20.0            | 60            | 150        | 20           | 0.070       | 6564-20.00X150 |

| APPLICATION TABLE OF PROCESSED MATERIALS |            |               |             |            |                 |           |                 |                |               |              |                 |                |
|--|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc (m/min)                               | 140 ●      | 110 ●         | 80 ●        | 60 ●       | 70 ○            | 110 ○     | 100 ○           | 100 ○          | 100 ○         | -            | -               | -              |

● OPTIMAL ○ EFFECTIVE

# 4 FLUTE, VARIABLE HELIX, CORNER RADIUS



High performance machining, suitable for most materials up to 1600N/mm<sup>2</sup>. Unequal helix angle and unequal spacing of teeth greatly reduces vibration. AlCrSiN coating with high oxidation resistance and high adhesion.

GROUP

CDEM



Tungsten Carbide



4 Flutes



Coating



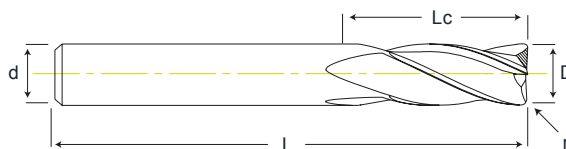
Variable Helix



Corner Radius



< 1600N/mm<sup>2</sup>



| DIAMETER (D) MM | CNR RAD (r) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER    |
|-----------------|----------------|---------------|------------|--------------|-------------|----------------|
| 3.0             | 0.2            | 9             | 50         | 4            | 0.025       | 6563-3.00R0.2  |
| 3.0             | 0.5            | 9             | 50         | 4            | 0.025       | 6563-3.00R0.5  |
| 4.0             | 0.2            | 10            | 50         | 4            | 0.033       | 6563-4.00R0.2  |
| 4.0             | 0.5            | 10            | 50         | 4            | 0.033       | 6563-4.00R0.5  |
| 4.0             | 1.0            | 10            | 50         | 4            | 0.033       | 6563-4.00R1.0  |
| 5.0             | 0.5            | 15            | 50         | 6            | 0.040       | 6563-5.00R0.5  |
| 5.0             | 1.0            | 15            | 50         | 6            | 0.040       | 6563-5.00R1.0  |
| 6.0             | 0.2            | 15            | 50         | 6            | 0.045       | 6563-6.00R0.2  |
| 6.0             | 0.5            | 15            | 50         | 6            | 0.045       | 6563-6.00R0.5  |
| 6.0             | 1.0            | 15            | 50         | 6            | 0.045       | 6563-6.00R1.0  |
| 8.0             | 0.5            | 20            | 60         | 8            | 0.065       | 6563-8.00R0.5  |
| 8.0             | 1.0            | 20            | 60         | 8            | 0.065       | 6563-8.00R1.0  |
| 10.0            | 0.5            | 25            | 75         | 10           | 0.070       | 6563-10.00R0.5 |
| 10.0            | 1.0            | 25            | 75         | 10           | 0.070       | 6563-10.00R1.0 |
| 10.0            | 2.0            | 25            | 75         | 10           | 0.070       | 6563-10.00R2.0 |
| 12.0            | 0.5            | 30            | 75         | 12           | 0.075       | 6563-12.00R0.5 |
| 12.0            | 1.0            | 30            | 75         | 12           | 0.075       | 6563-12.00R1.0 |
| 12.0            | 1.5            | 30            | 75         | 12           | 0.075       | 6563-12.00R1.5 |
| 12.0            | 2.0            | 30            | 75         | 12           | 0.075       | 6563-12.00R2.0 |
| 16.0            | 1.0            | 40            | 100        | 16           | 0.085       | 6563-16.00R1.0 |
| 20.0            | 1.0            | 45            | 100        | 20           | 0.095       | 6563-20.00R1.0 |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | SI<12%          | SI>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc (m/min)         | 210 ●      | 175 ●         | 110 ●       | 90 ●       | 120 ●           | 150 ●     | 200 ○           | 200 ○          | 200 ○         | 50 ○         | 70 ●            | 120 ●          |

● OPTIMAL ○ EFFECTIVE

## 2 FLUTE, BALL NOSE

For profile and contour milling, suitable for materials up to 1600N/mm<sup>2</sup>.  
AlCrSiN coating with high oxidation resistance and high adhesion.

**GROUP**
**CDEM**

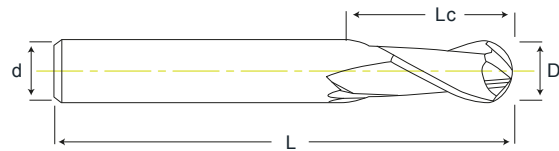
**Tungsten Carbide**

**2 Flutes**

**Coating**

**30° Helix**

**Ball Nose**

**< 1600N/mm<sup>2</sup>**


| SHORT SERIES    |               |            |              |             | PART NUMBER   |
|-----------------|---------------|------------|--------------|-------------|---------------|
| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH |               |
| 1.0             | 2             | 50         | 4            | 0.015       | 6565-1.00X50  |
| 1.5             | 3             | 50         | 4            | 0.020       | 6565-1.50X50  |
| 2.0             | 4             | 50         | 4            | 0.025       | 6565-2.00X50  |
| 2.5             | 5             | 50         | 4            | 0.030       | 6565-2.50X50  |
| 3.0             | 6             | 50         | 4            | 0.035       | 6565-3.00X50  |
| 4.0             | 8             | 50         | 4            | 0.040       | 6565-4.00X50  |
| 5.0             | 10            | 50         | 6            | 0.050       | 6565-5.00X50  |
| 6.0             | 12            | 50         | 6            | 0.060       | 6565-6.00X50  |
| 8.0             | 16            | 60         | 8            | 0.080       | 6565-8.00X60  |
| 10.0            | 20            | 75         | 10           | 0.100       | 6565-10.00X75 |
| 12.0            | 24            | 75         | 12           | 0.120       | 6565-12.00X75 |



| LONG SERIES     |               |            |              |             | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH |                |
| 4.0             | 8             | 75         | 4            | 0.040       | 6565-4.00X75   |
| 6.0             | 12            | 75         | 6            | 0.060       | 6565-6.00X75   |
| 6.0             | 12            | 100        | 6            | 0.060       | 6565-6.00X100  |
| 8.0             | 16            | 75         | 8            | 0.080       | 6565-8.00X75   |
| 8.0             | 16            | 100        | 8            | 0.080       | 6565-8.00X100  |
| 10.0            | 20            | 100        | 10           | 0.100       | 6565-10.00X100 |
| 12.0            | 24            | 100        | 12           | 0.120       | 6565-12.00X100 |

| APPLICATION TABLE OF PROCESSED MATERIALS |            |               |             |            |                 |           |                 |                |               |              |                 |                |
|--|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc (m/min)                               | 140 ●      | 110 ●         | 80 ●        | 60 ●       | 70 ○            | 110 ○     | 150 ○           | 150 ○          | 150 ○         | -            | -               | -              |

● OPTIMAL ○ EFFECTIVE

# 4 FLUTE, BALL NOSE

For profile and contour milling, suitable for materials up to 1600N/mm<sup>2</sup>.  
AlCrSiN coating with high oxidation resistance and high adhesion.

GROUP

CDEM



Tungsten Carbide



4 Flutes



Coating



30° Helix



Ball Nose



< 1600N/mm<sup>2</sup>



| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER   |
|-----------------|---------------|------------|--------------|-------------|---------------|
| 4.0             | 8             | 50         | 4            | 0.040       | 6566-4.00X50  |
| 6.0             | 12            | 50         | 6            | 0.060       | 6566-6.00X50  |
| 8.0             | 16            | 60         | 8            | 0.080       | 6566-8.00X60  |
| 10.0            | 20            | 75         | 10           | 0.100       | 6566-10.00X75 |
| 12.0            | 24            | 75         | 12           | 0.120       | 6566-12.00X75 |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc (m/min)         | 140 ●      | 110 ●         | 80 ●        | 65 ●       | 70 ○            | 110 ○     | 150 ○           | 150 ○          | 150           | -            | -               | -              |

● OPTIMAL ○ EFFECTIVE

## 4 FLUTE, HARDENED STEEL



Suitable for materials of hardened steel (<HRC65) semi-finishing and finishing. TiAlCrSiN coating with high hardness and high oxidation resistance.

**GROUP**
**CDEM**

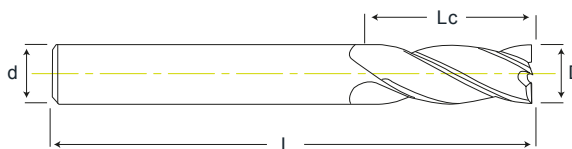
**Tungsten Carbide**

**4 Flutes**

**Coating**

**45° Helix**

**Square**

**< HRC65**


| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| 1.0             | 3             | 50         | 4            | 0.007       | 6567-1.00X50   |
| 1.5             | 4             | 50         | 4            | 0.010       | 6567-1.50X50   |
| 2.0             | 6             | 50         | 4            | 0.013       | 6567-2.00X50   |
| 2.5             | 7             | 50         | 4            | 0.015       | 6567-2.50X50   |
| 3.0             | 9             | 50         | 4            | 0.018       | 6567-3.00X50   |
| 4.0             | 11            | 50         | 4            | 0.025       | 6567-4.00X50   |
| 5.0             | 13            | 50         | 6            | 0.030       | 6567-5.00X50   |
| 6.0             | 15            | 50         | 6            | 0.035       | 6567-6.00X50   |
| 8.0             | 20            | 60         | 8            | 0.045       | 6567-8.00X60   |
| 10.0            | 25            | 75         | 10           | 0.055       | 6567-10.00X75  |
| 12.0            | 30            | 75         | 12           | 0.065       | 6567-12.00X75  |
| 14.0            | 35            | 100        | 14           | 0.075       | 6567-14.00X100 |
| 16.0            | 45            | 100        | 16           | 0.085       | 6567-16.00X100 |

**APPLICATION TABLE OF PROCESSED MATERIALS**

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | SI<12%          | SI>12%         | <750N         | <1100N       | <1100N          | <HRC65         |
| Vc (m/min)         | -          | -             | 75 ●        | 85 ●       | -               | -         | -               | -              | -             | 95 ○         | 85 ○            | 70 ●           |

● OPTIMAL ○ EFFECTIVE

# 4 FLUTE, HARDENED STEEL, CORNER RADIUS



Suitable for materials of hardened steel (<HRC65) semi-finishing and finishing. TiAlCrSiN coating with high hardness and high oxidation resistance.

GROUP

CDEM



Tungsten Carbide



4 Flutes



Coating



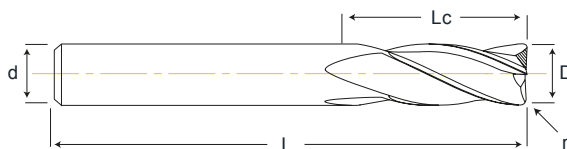
35° Helix



Corner Radius



< HRC65



| DIAMETER (D) MM | CNR RAD (r) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER    |
|-----------------|----------------|---------------|------------|--------------|-------------|----------------|
| 3.0             | 0.2            | 6             | 50         | 4            | 0.018       | 6568-3.00R0.2  |
| 4.0             | 0.3            | 8             | 50         | 4            | 0.025       | 6568-4.00R0.3  |
| 4.0             | 0.5            | 8             | 50         | 4            | 0.025       | 6568-4.00R0.5  |
| 5.0             | 0.5            | 10            | 50         | 6            | 0.030       | 6568-5.00R0.5  |
| 6.0             | 0.5            | 12            | 50         | 6            | 0.035       | 6568-6.00R0.5  |
| 6.0             | 1.0            | 12            | 50         | 6            | 0.035       | 6568-6.00R1.0  |
| 8.0             | 0.5            | 16            | 60         | 8            | 0.045       | 6568-8.00R0.5  |
| 8.0             | 1.0            | 16            | 60         | 8            | 0.045       | 6568-8.00R1.0  |
| 10.0            | 0.5            | 20            | 75         | 10           | 0.055       | 6568-10.00R0.5 |
| 10.0            | 1.0            | 20            | 75         | 10           | 0.055       | 6568-10.00R1.0 |
| 12.0            | 0.5            | 24            | 75         | 12           | 0.065       | 6568-12.00R0.5 |
| 12.0            | 1.0            | 24            | 75         | 12           | 0.065       | 6568-12.00R1.0 |
| 12.0            | 2.0            | 24            | 75         | 12           | 0.065       | 6568-12.00R2.0 |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
| Vc (m/min)         | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | SI<12%          | SI>12%         | <750N         | <1100N       | <1100N          | <HRC65         |
|                    | -          | -             | 75 ●        | 85 ●       | -               | -         | -               | -              | -             | 95 ○         | 85 ○            | 70 ●           |

● OPTIMAL ○ EFFECTIVE

## 2 FLUTE, HARDENED STEEL, BALL NOSE



Suitable for milling hardened steels (<HRC65).  
TiAlCrSiN coating with high hardness and high oxidation resistance.

**GROUP**
**CDEM**

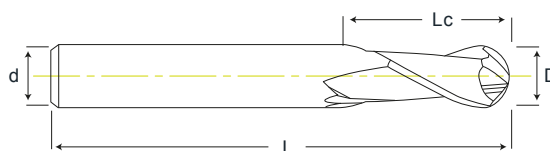
**SOLID TC**  
Tungsten Carbide

**2 Flutes**

**TiAlCrSiN**  
Coating

**30° Helix**

**Ball Nose**

**< HRC65**


| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| 1.0             | 1.5           | 50         | 4            | 0.010       | 6569-1.00X50   |
| 1.5             | 2.5           | 50         | 4            | 0.016       | 6569-1.50X50   |
| 2.0             | 3             | 50         | 4            | 0.024       | 6569-2.00X50   |
| 2.5             | 4             | 50         | 4            | 0.028       | 6569-2.50X50   |
| 3.0             | 5             | 50         | 4            | 0.034       | 6569-3.00X50   |
| 4.0             | 6             | 50         | 4            | 0.044       | 6569-4.00X50   |
| 5.0             | 7.5           | 50         | 6            | 0.055       | 6569-5.00X50   |
| 6.0             | 9             | 50         | 6            | 0.060       | 6569-6.00X50   |
| 8.0             | 12            | 60         | 8            | 0.080       | 6569-8.00X60   |
| 10.0            | 15            | 75         | 10           | 0.100       | 6569-10.00X75  |
| 12.0            | 18            | 75         | 12           | 0.120       | 6569-12.00X75  |
| 16.0            | 24            | 100        | 16           | 0.160       | 6569-16.00X100 |

| APPLICATION TABLE OF PROCESSED MATERIALS |            |               |             |            |                 |           |                 |                |               |              |                 |                |
|--|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | St<12%          | St>12%         | <750N         | <1100N       | <1100N          | <HRC65         |
| Vc (m/min)                               | -          | -             | 90 ●        | 100 ●      | -               | -         | -               | -              | -             | 135 ○        | 100 ○           | 80 ●           |

● OPTIMAL ○ EFFECTIVE

## SINGLE FLUTE



Suitable for application of non ferrous alloys such as aluminium, brass, bronze.  
Also suitable for plastics, MDF, etc.  
Large single flute, mirror-polished.

GROUP

CDEM

Tungsten  
Carbide

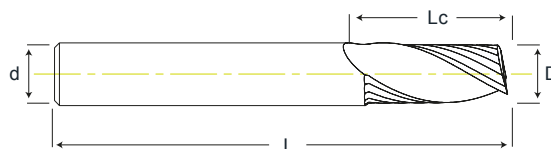
1 Flute



30° Helix



Square



## SHORT SERIES

| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER |
|-----------------|---------------|------------|--------------|-------------|-------------|
| 3.0             | 8             | 50         | 6            | 0.016       | 6560-3.00   |
| 4.0             | 11            | 54         | 6            | 0.021       | 6560-4.00   |
| 5.0             | 13            | 54         | 6            | 0.025       | 6560-5.00   |
| 6.0             | 13            | 54         | 6            | 0.030       | 6560-6.00   |
| 8.0             | 19            | 58         | 8            | 0.040       | 6560-8.00   |
| 10.0            | 22            | 66         | 10           | 0.050       | 6560-10.00  |
| 12.0            | 26            | 73         | 12           | 0.060       | 6560-12.00  |



## LONG SERIES

| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| 3.0             | 20            | 60         | 6            | 0.016       | 6560-3.00X60   |
| 4.0             | 20            | 60         | 6            | 0.021       | 6560-4.00X60   |
| 5.0             | 30            | 75         | 6            | 0.025       | 6560-5.00X75   |
| 6.0             | 20            | 75         | 6            | 0.030       | 6560-6.00X75   |
| 6.0             | 30            | 100        | 6            | 0.030       | 6560-6.00X100  |
| 8.0             | 30            | 75         | 8            | 0.040       | 6560-8.00X75   |
| 8.0             | 40            | 100        | 8            | 0.040       | 6560-8.00X100  |
| 10.0            | 40            | 100        | 10           | 0.050       | 6560-10.00X100 |
| 12.0            | 40            | 100        | 12           | 0.060       | 6560-12.00X100 |

## APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc (m/min)         | -          | -             | -           | -          | -               | -         | 220 ●           | 220 ●          | 160 ●         | -            | -               | -              |

● OPTIMAL ○ EFFECTIVE

## 2 FLUTE, ALUMINIUM



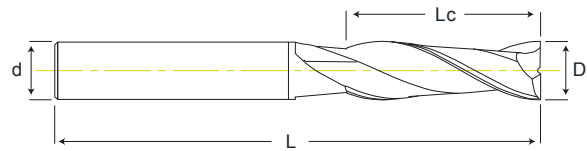
Suitable for slots and cavities in aluminium & non ferrous materials.  
Excellent chip removal.

**GROUP**
**CDEM**

**Tungsten Carbide**

**2 Flutes**

**35° Helix**

**Square**


| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| 1.0             | 3             | 50         | 4            | 0.005       | 6559-1.00X50   |
| 1.5             | 4.5           | 50         | 4            | 0.006       | 6559-1.50X50   |
| 2.0             | 6             | 50         | 4            | 0.007       | 6559-2.00X50   |
| 2.5             | 7             | 50         | 4            | 0.008       | 6559-2.50X50   |
| 3.0             | 8             | 50         | 4            | 0.010       | 6559-3.00X50   |
| 4.0             | 11            | 50         | 4            | 0.014       | 6559-4.00X50   |
| 5.0             | 13            | 50         | 6            | 0.017       | 6559-5.00X50   |
| 6.0             | 15            | 50         | 6            | 0.021       | 6559-6.00X50   |
| 8.0             | 20            | 60         | 8            | 0.028       | 6559-8.00X60   |
| 10.0            | 25            | 75         | 10           | 0.036       | 6559-10.00X75  |
| 12.0            | 30            | 75         | 12           | 0.044       | 6559-12.00X75  |
| 16.0            | 40            | 100        | 16           | 0.055       | 6559-16.00X100 |
| 20.0            | 40            | 100        | 20           | 0.065       | 6559-20.00X100 |

| APPLICATION TABLE OF PROCESSED MATERIALS |            |               |             |            |                 |           |                 |                |               |              |                 |                |
|--|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | SI<12%          | SI>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc (m/min)                               | -          | -             | -           | -          | -               | -         | 350 ●           | 350 ●          | 500 ●         | -            | -               | -              |

● OPTIMAL ○ EFFECTIVE

# 3 FLUTE, ALUMINIUM



Suitable for roughing and finishing of aluminium alloys and copper alloys.  
Variable helix and special edge design reduces vibration, excellent surface finish.

GROUP

CDEM



Tungsten Carbide



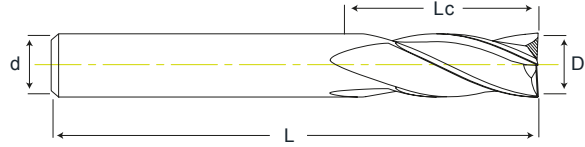
3 Flutes



35° Helix



Square



| SHORT SERIES    |               |            |              |             | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH |                |
| 1.0             | 3             | 50         | 4            | 0.011       | 6570-1.00X50   |
| 1.5             | 5             | 50         | 4            | 0.016       | 6570-1.50X50   |
| 2.0             | 6             | 50         | 4            | 0.023       | 6570-2.00X50   |
| 2.5             | 8             | 50         | 4            | 0.025       | 6570-2.50X50   |
| 3.0             | 9             | 50         | 4            | 0.030       | 6570-3.00X50   |
| 3.5             | 11            | 50         | 4            | 0.035       | 6570-3.50X50   |
| 4.0             | 12            | 50         | 4            | 0.040       | 6570-4.00X50   |
| 5.0             | 15            | 50         | 6            | 0.050       | 6570-5.00X50   |
| 6.0             | 18            | 50         | 6            | 0.055       | 6570-6.00X50   |
| 8.0             | 24            | 60         | 8            | 0.070       | 6570-8.00X60   |
| 10.0            | 30            | 75         | 10           | 0.080       | 6570-10.00X75  |
| 12.0            | 35            | 75         | 12           | 0.100       | 6570-12.00X75  |
| 14.0            | 45            | 100        | 14           | 0.120       | 6570-14.00X100 |
| 16.0            | 45            | 100        | 16           | 0.140       | 6570-16.00X100 |
| 18.0            | 45            | 100        | 18           | 0.160       | 6570-18.00X100 |
| 20.0            | 45            | 100        | 20           | 0.180       | 6570-20.00X100 |



| SHORT SERIES 4 PIECE SET |               |            |              |             | PART NUMBER   |
|--------------------------|---------------|------------|--------------|-------------|---------------|
| DIAMETER (D) MM          | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | CONTAINS      |
| 6.0                      | 18            | 50         | 6            | 0.055       | 6570-6.00X50  |
| 8.0                      | 24            | 60         | 8            | 0.070       | 6570-8.00X60  |
| 10.0                     | 30            | 75         | 10           | 0.080       | 6570-10.00X75 |
| 12.0                     | 35            | 75         | 12           | 0.100       | 6570-12.00X75 |

| APPLICATION TABLE OF PROCESSED MATERIALS |            |               |             |            |                 |           |                 |                |               |              |                 |                |
|--|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
| Vc (m/min)                               | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
|  | -          | -             | -           | -          | -               | -         | 350 ●           | 350 ●          | 500 ●         | -            | -               | -              |

● OPTIMAL ○ EFFECTIVE

## 3 FLUTE, ALUMINIUM



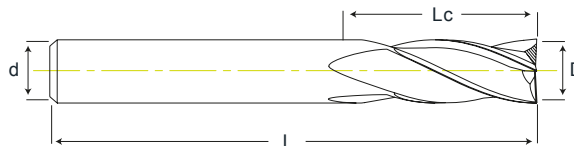
Suitable for roughing and finishing of aluminium alloys and copper alloys.  
Variable helix and special edge design reduces vibration, excellent surface finish.

**GROUP**
**CDEM**

**Tungsten Carbide**

**3 Flutes**

**35° Helix**

**Square**


| LONG SERIES     |               |            |              | PART NUMBER    |
|-----------------|---------------|------------|--------------|----------------|
| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM |                |
| 3.0             | 12            | 75         | 3            | 6570-3.00X75   |
| 3.0             | 12            | 100        | 3            | 6570-3.00X100  |
| 4.0             | 16            | 75         | 4            | 6570-4.00X75   |
| 4.0             | 20            | 100        | 4            | 6570-4.00X100  |
| 5.0             | 20            | 75         | 5            | 6570-5.00X75   |
| 5.0             | 30            | 100        | 5            | 6570-5.00X100  |
| 6.0             | 25            | 75         | 6            | 6570-6.00X75   |
| 6.0             | 30            | 100        | 6            | 6570-6.00X100  |
| 6.0             | 45            | 150        | 6            | 6570-6.00X150  |
| 8.0             | 30            | 75         | 8            | 6570-8.00X75   |
| 8.0             | 35            | 100        | 8            | 6570-8.00X100  |
| 8.0             | 50            | 150        | 8            | 6570-8.00X150  |
| 10.0            | 40            | 100        | 10           | 6570-10.00X100 |
| 10.0            | 55            | 150        | 10           | 6570-10.00X150 |
| 12.0            | 45            | 100        | 12           | 6570-12.00X100 |
| 12.0            | 55            | 150        | 12           | 6570-12.00X150 |
| 14.0            | 70            | 150        | 14           | 6570-14.00X150 |
| 16.0            | 80            | 150        | 16           | 6570-16.00X150 |
| 18.0            | 80            | 150        | 18           | 6570-18.00X150 |
| 20.0            | 80            | 150        | 20           | 6570-20.00X150 |

| APPLICATION TABLE OF PROCESSED MATERIALS |            |               |             |            |                 |           |                 |                |               |              |                 |                |
|--|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | SI<12%          | SI>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc (m/min)                               | -          | -             | -           | -          | -               | -         | 350 ●           | 350 ●          | 500 ●         | -            | -               | -              |

● OPTIMAL ○ EFFECTIVE

## 2 FLUTE, ALUMINIUM, BALL NOSE



Suitable for roughing and finishing of aluminium alloys and copper alloys.  
Special edge design reduces vibration, excellent surface finish.

GROUP

CDEM



Tungsten Carbide



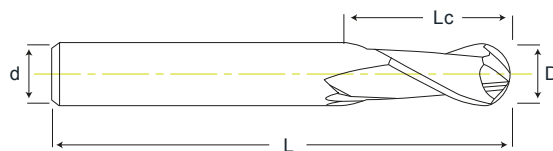
2 Flutes



30° Helix



Ball Nose



| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| 2.0             | 4             | 50         | 4            | 0.024       | 6571-2.00X50   |
| 3.0             | 6             | 50         | 4            | 0.034       | 6571-3.00X50   |
| 4.0             | 8             | 50         | 4            | 0.044       | 6571-4.00X50   |
| 6.0             | 12            | 50         | 6            | 0.060       | 6571-6.00X50   |
| 8.0             | 16            | 60         | 8            | 0.080       | 6571-8.00X60   |
| 10.0            | 20            | 75         | 10           | 0.100       | 6571-10.00X75  |
| 12.0            | 24            | 75         | 12           | 0.120       | 6571-12.00X75  |
| 14.0            | 28            | 100        | 14           | 0.140       | 6571-14.00X100 |
| 16.0            | 32            | 100        | 16           | 0.160       | 6571-16.00X100 |
| 18.0            | 36            | 100        | 18           | 0.180       | 6571-18.00X100 |
| 20.0            | 40            | 100        | 20           | 0.200       | 6571-20.00X100 |

### APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
| Vc (m/min)         | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | SI<12%          | SI>12%         | <750N         | <1100N       | <1100N          | <1400N         |
|                    | -          | -             | -           | -          | -               | -         | 350 ●           | 350 ●          | 500 ●         | -            | -               | -              |

● OPTIMAL ○ EFFECTIVE

## 4 FLUTE, ROUGHING

For roughing applications of steels up to 1600N/mm<sup>2</sup>.  
TiSiN coated.

**GROUP**
**CDEM**

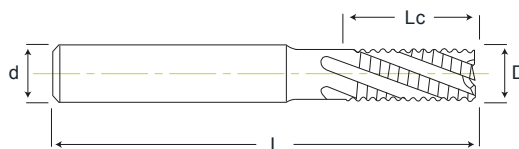
**Tungsten Carbide**

**4 Flutes**

**Coating**

**30° Helix**

**Square**

**< 1600N/mm<sup>2</sup>**


| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER           |
|-----------------|---------------|------------|--------------|-------------|-----------------------|
| <b>4.0</b>      | 10            | 50         | 4            | 0.023       | <b>6557-4.00X50</b>   |
| <b>6.0</b>      | 15            | 50         | 6            | 0.034       | <b>6557-6.00X50</b>   |
| <b>8.0</b>      | 20            | 60         | 8            | 0.045       | <b>6557-8.00X60</b>   |
| <b>10.0</b>     | 25            | 75         | 10           | 0.055       | <b>6557-10.00X75</b>  |
| <b>12.0</b>     | 30            | 75         | 12           | 0.065       | <b>6557-12.00X75</b>  |
| <b>16.0</b>     | 45            | 100        | 16           | 0.085       | <b>6557-16.00X100</b> |
| <b>20.0</b>     | 45            | 100        | 20           | 0.110       | <b>6557-20.00X100</b> |

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc (m/min)         | 180 ●      | 100 ○         | 100 ○       | 80 ○       | -               | 140 ○     | 300 ○           | 300 ○          | -             | -            | -               | -              |

● OPTIMAL ○ EFFECTIVE

3 FLUTE, ROUGHING, ALUMINIUM



For roughing applications of aluminium alloys and copper alloys

GROUP

CDEM



Tungsten Carbide



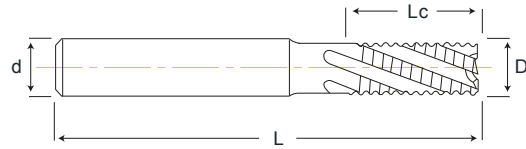
3 Flutes



30° Helix



Square



| DIAMETER (D) MM | FLUTE (Lc) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER    |
|-----------------|---------------|------------|--------------|-------------|----------------|
| 4.0             | 12            | 50         | 4            | 0.040       | 6558-4.00X50   |
| 6.0             | 18            | 50         | 6            | 0.055       | 6558-6.00X50   |
| 8.0             | 24            | 60         | 8            | 0.075       | 6558-8.00X60   |
| 10.0            | 30            | 75         | 10           | 0.090       | 6558-10.00X75  |
| 12.0            | 36            | 75         | 12           | 0.110       | 6558-12.00X75  |
| 16.0            | 45            | 100        | 16           | 0.140       | 6558-16.00X100 |
| 20.0            | 45            | 100        | 20           | 0.180       | 6558-20.00X100 |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|                    | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | SI<12%          | SI>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc (m/min)         | -          | -             | -           | -          | -               | -         | 220 ●           | 220 ●          | 160 ●         | -            | -               | -              |

● OPTIMAL ○ EFFECTIVE

## 4 FLUTE, CHAMFER

For chamfering and deburring. TiSiN coating.

**GROUP** **CDEM**



Tungsten Carbide



4 Flutes



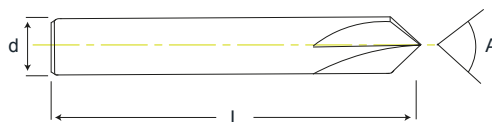
Coating



0° Helix



Chamfer < 1600N/mm<sup>2</sup>



| DIAMETER (D) MM | ANGLE (A) DEGREE | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER   |
|-----------------|------------------|------------|--------------|-------------|---------------|
| 6.0             | 60               | 50         | 6            | 0.050       | 6556-6.00X60  |
| 6.0             | 90               | 50         | 6            | 0.050       | 6556-6.00X90  |
| 8.0             | 60               | 60         | 8            | 0.065       | 6556-8.00X60  |
| 8.0             | 90               | 60         | 8            | 0.065       | 6556-8.00X90  |
| 10.0            | 60               | 75         | 10           | 0.085       | 6556-10.00X60 |
| 10.0            | 90               | 75         | 10           | 0.085       | 6556-10.00X90 |
| 12.0            | 60               | 75         | 12           | 0.100       | 6556-12.00X60 |
| 12.0            | 90               | 75         | 12           | 0.100       | 6556-12.00X90 |

## 4 FLUTE, CORNER ROUNDING

For corner rounding applications. TiSiN coating.



Tungsten Carbide



4 Flutes



Coating



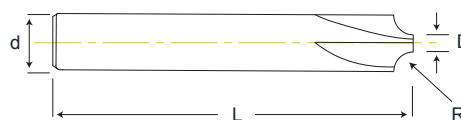
0° Helix



Corner Rounding



< 1600N/mm<sup>2</sup>



| RADIUS (R) MM | FLAT (D) MM | OAL (L) MM | SHANK (d) MM | fz MM/TOOTH | PART NUMBER   |
|---------------|-------------|------------|--------------|-------------|---------------|
| 0.50          | 3.0         | 50         | 4            | 0.036       | 6555-R0.5X50  |
| 0.75          | 2.5         | 50         | 4            | 0.036       | 6555-R0.75X50 |
| 1.00          | 2.0         | 50         | 4            | 0.036       | 6555-R1.0X50  |
| 1.50          | 3.0         | 50         | 6            | 0.050       | 6555-R1.5X50  |
| 2.00          | 2.0         | 50         | 6            | 0.050       | 6555-R2.0X50  |
| 2.50          | 1.0         | 50         | 6            | 0.050       | 6555-R2.5X50  |
| 3.00          | 2.0         | 60         | 8            | 0.065       | 6555-R3.0X60  |
| 4.00          | 2.0         | 60         | 10           | 0.085       | 6555-R4.0X60  |
| 5.00          | 2.0         | 60         | 12           | 0.100       | 6555-R5.0X60  |

APPLICATION TABLE OF PROCESSED MATERIALS

| ISO                | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
|--------------------|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| WORKPIECE MATERIAL | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
| Vc (m/min)         | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | St<12%          | St>12%         | <750N         | <1100N       | <1100N          | <1400N         |
|                    | 180 ●      | 100 ●         | 100 ●       | 80 ●       | 90 ●            | 140 ●     | -               | -              | -             | 50 ●         | 70 ●            | 80 ●           |

● OPTIMAL ○ EFFECTIVE

## ENGRAVING TOOL FOR ALUMINIUM

Uncoated for engraving Aluminium.

GROUP

CDEM



Tungsten Carbide



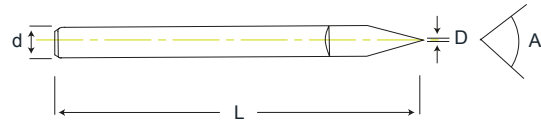
Fluteless



Engraving



< 1600N/mm<sup>2</sup>



| FOR ALUMINIUM |                  |            |              | PART NUMBER |
|---------------|------------------|------------|--------------|-------------|
| POINT (D) MM  | ANGLE (A) DEGREE | OAL (L) MM | SHANK (d) MM |             |
| 0.1           | 20               | 38         | 3.175        | 6553-20X38  |
| 0.1           | 30               | 38         | 3.175        | 6553-30X38  |
| 0.1           | 45               | 38         | 3.175        | 6553-45X38  |
| 0.1           | 60               | 38         | 3.175        | 6553-60X38  |
| 0.1           | 90               | 38         | 3.175        | 6553-90X38  |

## ENGRAVING TOOL FOR STEEL

TiAlN coated for engraving ferrous metals.



Tungsten Carbide



Fluteless



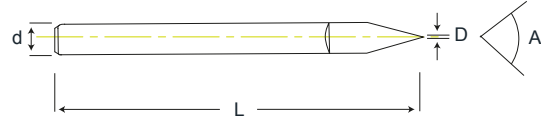
Coating



Engraving



< 1600N/mm<sup>2</sup>



| FOR STEEL    |                  |            |              | PART NUMBER |
|--------------|------------------|------------|--------------|-------------|
| POINT (D) MM | ANGLE (A) DEGREE | OAL (L) MM | SHANK (d) MM |             |
| 0.1          | 20               | 38         | 3.175        | 6554-20X38  |
| 0.1          | 30               | 38         | 3.175        | 6554-30X38  |
| 0.1          | 45               | 38         | 3.175        | 6554-45X38  |
| 0.1          | 60               | 38         | 3.175        | 6554-60X38  |
| 0.1          | 90               | 38         | 3.175        | 6554-90X38  |

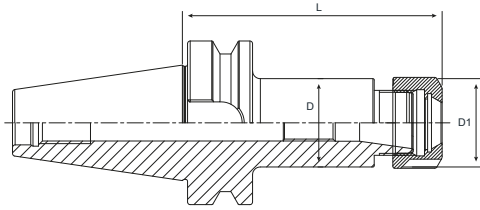
| APPLICATION TABLE OF PROCESSED MATERIALS |            |               |             |            |                 |           |                 |                |               |              |                 |                |
|--|------------|---------------|-------------|------------|-----------------|-----------|-----------------|----------------|---------------|--------------|-----------------|----------------|
| ISO                                      | P          | P             | P           | P          | M               | K         | N               | N              | N             | S            | S               | H              |
| WORKPIECE MATERIAL                       | MILD STEEL | STRUCT. STEEL | ALLOY STEEL | TOOL STEEL | STAINLESS STEEL | CAST IRON | ALUMINIUM ALLOY | CAST ALUMINIUM | COPPER ALLOYS | SUPER ALLOYS | TITANIUM ALLOYS | HARDENED STEEL |
|  | <500N      | <750N         | <1400N      | <1100N     | <900N           | <750N     | Si<12%          | Si>12%         | <750N         | <1100N       | <1100N          | <1400N         |
| Vc (m/min)                               | 180 ●      | 100 ●         | 100 ●       | 80 ●       | 90 ●            | 140 ●     | 350 ●           | 350 ●          | 350 ●         | 50 ●         | 70 ●            | 80 ●           |

● OPTIMAL ○ EFFECTIVE

# HOLDERS



# ER COLLET CHUCK WITH UM NUT



Shank



DIN 6499



≤0.003



25000



15000



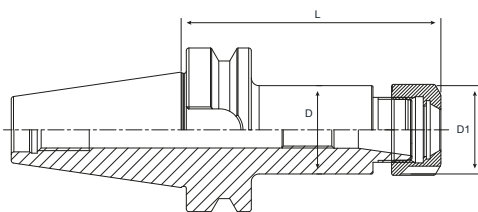
AD

GROUP

TOHO

| SHANK | SIZE | L MM | D MM | D1 MM | G VALUE    | CAPACITY MM | PART NUMBER       |
|-------|------|------|------|-------|------------|-------------|-------------------|
| BT30  | ER16 | 70   | 28   | 32    | G2.5/25000 | 1-10        | 6530-BT30ER16X70  |
| BT30  | ER20 | 70   | 34   | 35    | G2.5/25000 | 1-13        | 6530-BT30ER20X70  |
| BT30  | ER25 | 70   | 42   | 42    | G2.5/25000 | 1-16        | 6530-BT30ER25X70  |
| BT30  | ER32 | 70   | 40   | 50    | G2.5/25000 | 1-20        | 6530-BT30ER32X70  |
| BT30  | ER40 | 70   | 50   | 63    | G2.5/25000 | 2-26        | 6530-BT30ER40X70  |
| BT30  | ER16 | 100  | 28   | 32    | G2.5/25000 | 1-10        | 6530-BT30ER16X100 |
| BT30  | ER20 | 100  | 34   | 35    | G2.5/25000 | 1-13        | 6530-BT30ER20X100 |
| BT30  | ER25 | 100  | 42   | 42    | G2.5/25000 | 1-16        | 6530-BT30ER25X100 |
| BT30  | ER32 | 100  | 40   | 50    | G2.5/25000 | 1-20        | 6530-BT30ER32X100 |
| BT40  | ER16 | 70   | 28   | 32    | G2.5/25000 | 1-10        | 6530-BT40ER16X70  |
| BT40  | ER20 | 70   | 34   | 35    | G2.5/25000 | 1-13        | 6530-BT40ER20X70  |
| BT40  | ER25 | 70   | 42   | 42    | G2.5/25000 | 1-16        | 6530-BT40ER25X70  |
| BT40  | ER32 | 70   | 50   | 50    | G2.5/25000 | 1-20        | 6530-BT40ER32X70  |
| BT40  | ER40 | 80   | 50   | 63    | G2.5/25000 | 2-26        | 6530-BT40ER40X80  |
| BT40  | ER16 | 100  | 28   | 32    | G2.5/25000 | 1-10        | 6530-BT40ER16X100 |
| BT40  | ER20 | 100  | 34   | 35    | G2.5/25000 | 1-13        | 6530-BT40ER20X100 |
| BT40  | ER25 | 100  | 42   | 42    | G2.5/25000 | 1-16        | 6530-BT40ER25X100 |
| BT40  | ER32 | 100  | 50   | 50    | G2.5/25000 | 1-20        | 6530-BT40ER32X100 |
| BT40  | ER40 | 100  | 50   | 63    | G2.5/25000 | 2-26        | 6530-BT40ER40X100 |
| BT40  | ER16 | 160  | 28   | 32    | G2.5/25000 | 1-10        | 6530-BT40ER16X160 |
| BT40  | ER20 | 160  | 34   | 35    | G2.5/25000 | 1-13        | 6530-BT40ER20X160 |
| BT40  | ER25 | 160  | 42   | 42    | G2.5/25000 | 1-16        | 6530-BT40ER25X160 |
| BT40  | ER32 | 160  | 50   | 50    | G2.5/25000 | 1-20        | 6530-BT40ER32X160 |
| BT40  | ER40 | 160  | 50   | 63    | G2.5/25000 | 2-26        | 6530-BT40ER40X160 |
| BT40  | ER16 | 200  | 28   | 32    | G6.3/15000 | 1-10        | 6530-BT40ER16X200 |
| BT40  | ER20 | 200  | 34   | 35    | G6.3/15000 | 1-13        | 6530-BT40ER20X200 |
| BT40  | ER25 | 200  | 42   | 42    | G6.3/15000 | 1-16        | 6530-BT40ER25X200 |
| BT40  | ER32 | 200  | 50   | 50    | G6.3/15000 | 1-20        | 6530-BT40ER32X200 |
| BT40  | ER40 | 200  | 50   | 63    | G6.3/15000 | 2-26        | 6530-BT40ER40X200 |

## ER COLLET CHUCK WITH UM NUT


**Shank**

**DIN 6499**

**≤0.003**

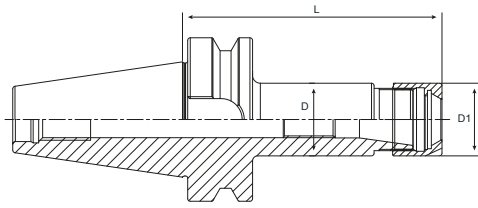
**25000**

**15000**

**AD**
**GROUP**
**TOHO**

| SHANK | SIZE | L MM | D MM | D1 MM | G VALUE    | CAPACITY MM | PART NUMBER       |
|-------|------|------|------|-------|------------|-------------|-------------------|
| BT50  | ER16 | 70   | 28   | 32    | G6.3/15000 | 1-10        | 6530-BT50ER16X70  |
| BT50  | ER20 | 70   | 34   | 35    | G6.3/15000 | 1-13        | 6530-BT50ER20X70  |
| BT50  | ER25 | 70   | 42   | 42    | G6.3/15000 | 1-16        | 6530-BT50ER25X70  |
| BT50  | ER32 | 70   | 50   | 50    | G6.3/15000 | 1-20        | 6530-BT50ER32X70  |
| BT50  | ER40 | 80   | 63   | 63    | G6.3/15000 | 2-26        | 6530-BT50ER40X80  |
| BT50  | ER50 | 100  | 64   | 78    | G6.3/15000 | 4-34        | 6530-BT50ER50X100 |
|       |      |      |      |       |            |             |                   |
| BT50  | ER16 | 100  | 28   | 32    | G6.3/15000 | 1-10        | 6530-BT50ER16X100 |
| BT50  | ER20 | 100  | 34   | 35    | G6.3/15000 | 1-13        | 6530-BT50ER20X100 |
| BT50  | ER25 | 100  | 42   | 42    | G6.3/15000 | 1-16        | 6530-BT50ER25X100 |
| BT50  | ER32 | 100  | 50   | 50    | G6.3/15000 | 1-20        | 6530-BT50ER32X100 |
| BT50  | ER40 | 100  | 63   | 63    | G6.3/15000 | 2-26        | 6530-BT50ER40X100 |
|       |      |      |      |       |            |             |                   |
| BT50  | ER16 | 160  | 28   | 32    | G6.3/15000 | 1-10        | 6530-BT50ER16X160 |
| BT50  | ER20 | 160  | 34   | 35    | G6.3/15000 | 1-13        | 6530-BT50ER20X160 |
| BT50  | ER25 | 160  | 42   | 42    | G6.3/15000 | 1-16        | 6530-BT50ER25X160 |
| BT50  | ER32 | 160  | 50   | 50    | G6.3/15000 | 1-20        | 6530-BT50ER32X160 |
| BT50  | ER40 | 160  | 63   | 63    | G6.3/15000 | 2-26        | 6530-BT50ER40X160 |
|       |      |      |      |       |            |             |                   |
| BT50  | ER16 | 200  | 28   | 32    | G6.3/15000 | 1-10        | 6530-BT50ER16X200 |
| BT50  | ER20 | 200  | 34   | 35    | G6.3/15000 | 1-13        | 6530-BT50ER20X200 |
| BT50  | ER25 | 200  | 42   | 42    | G6.3/15000 | 1-16        | 6530-BT50ER25X200 |
| BT50  | ER32 | 200  | 50   | 50    | G6.3/15000 | 1-20        | 6530-BT50ER32X200 |
| BT50  | ER40 | 200  | 63   | 63    | G6.3/15000 | 2-26        | 6530-BT50ER40X200 |
|       |      |      |      |       |            |             |                   |
| BT50  | ER25 | 250  | 42   | 42    | G6.3/15000 | 1-16        | 6530-BT50ER25X250 |
| BT50  | ER32 | 250  | 50   | 50    | G6.3/15000 | 1-20        | 6530-BT50ER32X250 |
| BT50  | ER40 | 250  | 63   | 63    | G6.3/15000 | 2-26        | 6530-BT50ER40X250 |
|       |      |      |      |       |            |             |                   |
| BT50  | ER25 | 300  | 42   | 42    | G6.3/15000 | 1-16        | 6530-BT50ER25X300 |
| BT50  | ER32 | 300  | 50   | 50    | G6.3/15000 | 1-20        | 6530-BT50ER32X300 |
| BT50  | ER40 | 300  | 63   | 63    | G6.3/15000 | 2-26        | 6530-BT50ER40X300 |

**ER COLLET CHUCK WITH MINI NUT**



Shank



DIN 6499



≤0.003



25000



15000



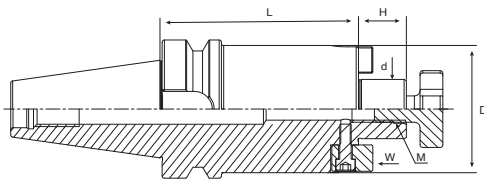
AD

**GROUP**

**TOHO**

| SHANK       | SIZE | L MM | D MM | D1 MM | G VALUE    | CAPACITY MM | PART NUMBER        |
|-------------|------|------|------|-------|------------|-------------|--------------------|
| <b>BT30</b> | ER11 | 70   | 16   | 16    | G2.5/25000 | 1-7         | 6530-BT30ER11MX70  |
| <b>BT30</b> | ER16 | 70   | 22   | 22    | G2.5/25000 | 1-10        | 6530-BT30ER16MX70  |
| <b>BT40</b> | ER11 | 70   | 16   | 16    | G2.5/25000 | 1-7         | 6530-BT40ER11MX70  |
| <b>BT40</b> | ER16 | 70   | 22   | 22    | G2.5/25000 | 1-10        | 6530-BT40ER16MX70  |
| <b>BT40</b> | ER20 | 70   | 28   | 28    | G2.5/25000 | 1-13        | 6530-BT40ER20MX70  |
| <b>BT40</b> | ER25 | 70   | 35   | 35    | G2.5/25000 | 1-16        | 6530-BT40ER25MX70  |
| <b>BT40</b> | ER11 | 100  | 16   | 16    | G2.5/25000 | 1-7         | 6530-BT40ER11MX100 |
| <b>BT40</b> | ER16 | 100  | 22   | 22    | G2.5/25000 | 1-10        | 6530-BT40ER16MX100 |
| <b>BT40</b> | ER20 | 100  | 28   | 28    | G2.5/25000 | 1-13        | 6530-BT40ER20MX100 |
| <b>BT40</b> | ER25 | 100  | 35   | 35    | G2.5/25000 | 1-16        | 6530-BT40ER25MX100 |
| <b>BT40</b> | ER11 | 160  | 16   | 16    | G2.5/25000 | 1-7         | 6530-BT40ER11MX160 |
| <b>BT40</b> | ER16 | 160  | 22   | 22    | G2.5/25000 | 1-10        | 6530-BT40ER16MX160 |
| <b>BT40</b> | ER20 | 160  | 28   | 28    | G2.5/25000 | 1-13        | 6530-BT40ER20MX160 |
| <b>BT40</b> | ER25 | 160  | 35   | 35    | G2.5/25000 | 1-16        | 6530-BT40ER25MX160 |
| <b>BT50</b> | ER16 | 100  | 22   | 22    | G6.3/15000 | 1-10        | 6530-BT50ER16MX100 |
| <b>BT50</b> | ER20 | 100  | 28   | 28    | G6.3/15000 | 1-13        | 6530-BT50ER20MX100 |
| <b>BT50</b> | ER25 | 100  | 35   | 35    | G6.3/15000 | 1-16        | 6530-BT50ER25MX100 |
| <b>BT50</b> | ER16 | 160  | 22   | 22    | G6.3/15000 | 1-10        | 6530-BT50ER16MX160 |
| <b>BT50</b> | ER20 | 160  | 28   | 28    | G6.3/15000 | 1-13        | 6530-BT50ER20MX160 |
| <b>BT50</b> | ER25 | 160  | 35   | 35    | G6.3/15000 | 1-16        | 6530-BT50ER25MX160 |

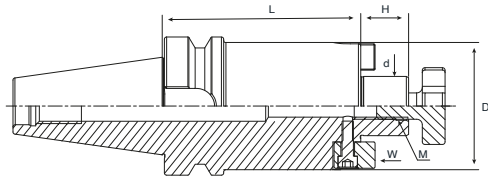
## FACE MILL HOLDER



| GROUP | TOHO |
|-------|------|
|-------|------|

| SHANK       | SIZE d MM | L MM | D MM | H MM | M MM | PART NUMBER        |
|-------------|-----------|------|------|------|------|--------------------|
| <b>BT30</b> | 16        | 40   | 38   | 17   | M8   | 6531-BT30FMH16X40  |
| <b>BT30</b> | 22        | 40   | 48   | 19   | M10  | 6531-BT30FMH22X40  |
| <b>BT30</b> | 27        | 40   | 58   | 21   | M12  | 6531-BT30FMH27X40  |
| <b>BT30</b> | 32        | 50   | 78   | 24   | M16  | 6531-BT30FMH32X50  |
|             |           |      |      |      |      |                    |
| <b>BT40</b> | 16        | 40   | 38   | 17   | M8   | 6531-BT40FMH16X40  |
| <b>BT40</b> | 22        | 40   | 48   | 19   | M10  | 6531-BT40FMH22X40  |
| <b>BT40</b> | 27        | 40   | 58   | 21   | M12  | 6531-BT40FMH27X40  |
| <b>BT40</b> | 32        | 50   | 78   | 24   | M16  | 6531-BT40FMH32X50  |
| <b>BT40</b> | 40        | 50   | 88   | 27   | M20  | 6531-BT40FMH40X50  |
|             |           |      |      |      |      |                    |
| <b>BT40</b> | 22        | 60   | 48   | 19   | M10  | 6531-BT40FMH22X60  |
| <b>BT40</b> | 27        | 60   | 58   | 21   | M12  | 6531-BT40FMH27X60  |
| <b>BT40</b> | 32        | 60   | 78   | 24   | M16  | 6531-BT40FMH32X60  |
| <b>BT40</b> | 40        | 60   | 88   | 27   | M20  | 6531-BT40FMH40X60  |
|             |           |      |      |      |      |                    |
| <b>BT40</b> | 16        | 100  | 38   | 17   | M8   | 6531-BT40FMH16X100 |
| <b>BT40</b> | 22        | 100  | 48   | 19   | M10  | 6531-BT40FMH22X100 |
| <b>BT40</b> | 27        | 100  | 58   | 21   | M12  | 6531-BT40FMH27X100 |
| <b>BT40</b> | 32        | 100  | 78   | 24   | M16  | 6531-BT40FMH32X100 |
| <b>BT40</b> | 40        | 100  | 88   | 27   | M20  | 6531-BT40FMH40X100 |
|             |           |      |      |      |      |                    |
| <b>BT40</b> | 16        | 160  | 38   | 17   | M8   | 6531-BT40FMH16X160 |
| <b>BT40</b> | 22        | 160  | 48   | 19   | M10  | 6531-BT40FMH22X160 |
| <b>BT40</b> | 27        | 160  | 58   | 21   | M12  | 6531-BT40FMH27X160 |
| <b>BT40</b> | 32        | 160  | 78   | 24   | M16  | 6531-BT40FMH32X160 |
| <b>BT40</b> | 40        | 160  | 88   | 27   | M20  | 6531-BT40FMH40X160 |
|             |           |      |      |      |      |                    |
| <b>BT40</b> | 22        | 200  | 48   | 19   | M10  | 6531-BT40FMH22X200 |
| <b>BT40</b> | 27        | 200  | 58   | 21   | M12  | 6531-BT40FMH27X200 |
| <b>BT40</b> | 32        | 200  | 78   | 24   | M16  | 6531-BT40FMH32X200 |
| <b>BT40</b> | 40        | 200  | 88   | 27   | M20  | 6531-BT40FMH40X200 |
|             |           |      |      |      |      |                    |
| <b>BT40</b> | 22        | 300  | 48   | 19   | M10  | 6531-BT40FMH22X300 |

## FACE MILL HOLDER



Shank



DIN 6357



≤0.005



15000



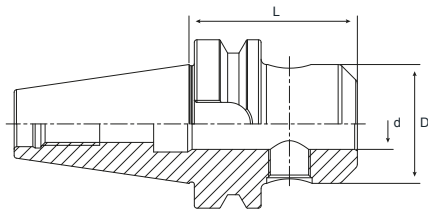
AD

## GROUP

TOHO

| SHANK | SIZE d MM | L MM | D MM | H MM | M MM | PART NUMBER        |
|-------|-----------|------|------|------|------|--------------------|
| BT50  | 16        | 40   | 38   | 17   | M8   | 6531-BT50FMH16X40  |
| BT50  | 22        | 40   | 48   | 19   | M10  | 6531-BT50FMH22X40  |
| BT50  | 27        | 40   | 58   | 21   | M12  | 6531-BT50FMH27X40  |
| BT50  | 32        | 50   | 78   | 24   | M16  | 6531-BT50FMH32X50  |
| BT50  | 40        | 50   | 88   | 27   | M20  | 6531-BT50FMH40X50  |
| BT50  | 60        | 75   | 129  | 25   | M30  | 6531-BT50FMH60X75  |
|       |           |      |      |      |      |                    |
| BT50  | 16        | 100  | 38   | 17   | M8   | 6531-BT50FMH16X100 |
| BT50  | 22        | 100  | 48   | 19   | M10  | 6531-BT50FMH22X100 |
| BT50  | 27        | 100  | 58   | 21   | M12  | 6531-BT50FMH27X100 |
| BT50  | 32        | 100  | 78   | 24   | M16  | 6531-BT50FMH32X100 |
| BT50  | 40        | 100  | 88   | 27   | M20  | 6531-BT50FMH40X100 |
|       |           |      |      |      |      |                    |
| BT50  | 22        | 160  | 48   | 19   | M10  | 6531-BT50FMH22X160 |
| BT50  | 27        | 160  | 58   | 21   | M12  | 6531-BT50FMH27X160 |
| BT50  | 32        | 160  | 78   | 24   | M16  | 6531-BT50FMH32X160 |
| BT50  | 40        | 160  | 88   | 27   | M20  | 6531-BT50FMH40X160 |
|       |           |      |      |      |      |                    |
| BT50  | 22        | 200  | 48   | 19   | M10  | 6531-BT50FMH22X200 |
| BT50  | 27        | 200  | 58   | 21   | M12  | 6531-BT50FMH27X200 |
| BT50  | 32        | 200  | 78   | 24   | M16  | 6531-BT50FMH32X200 |
| BT50  | 40        | 200  | 88   | 27   | M20  | 6531-BT50FMH40X200 |
|       |           |      |      |      |      |                    |
| BT50  | 22        | 250  | 48   | 19   | M10  | 6531-BT50FMH22X250 |
| BT50  | 27        | 250  | 58   | 21   | M12  | 6531-BT50FMH27X250 |
| BT50  | 32        | 250  | 78   | 24   | M16  | 6531-BT50FMH32X250 |
| BT50  | 40        | 250  | 88   | 27   | M20  | 6531-BT50FMH40X250 |
|       |           |      |      |      |      |                    |
| BT50  | 22        | 300  | 48   | 19   | M10  | 6531-BT50FMH22X300 |
| BT50  | 27        | 300  | 58   | 21   | M12  | 6531-BT50FMH27X300 |
| BT50  | 32        | 300  | 78   | 24   | M16  | 6531-BT50FMH32X300 |
| BT50  | 40        | 300  | 88   | 27   | M20  | 6531-BT50FMH40X300 |

## SIDE LOCK HOLDER



Shank


 DIN 6359  
DIN 1835 B

 $\leq 0.005$ 

**G6.3**

15000

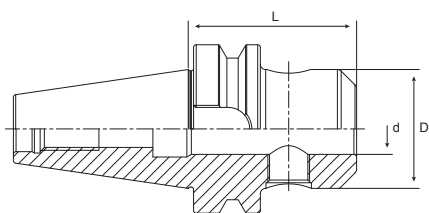


AD

**GROUP**
**TOHO**

| SHANK | SIZE d MM | L MM | D MM | PART NUMBER        |
|-------|-----------|------|------|--------------------|
| BT30  | 6         | 50   | 25   | 6532-BT30SLH06X50  |
| BT30  | 8         | 50   | 28   | 6532-BT30SLH08X50  |
| BT30  | 10        | 50   | 35   | 6532-BT30SLH10X50  |
| BT30  | 12        | 50   | 42   | 6532-BT30SLH12X50  |
| BT30  | 14        | 50   | 44   | 6532-BT30SLH14X50  |
| BT30  | 16        | 63   | 48   | 6532-BT30SLH16X63  |
| BT30  | 18        | 63   | 50   | 6532-BT30SLH18X63  |
| BT30  | 20        | 63   | 52   | 6532-BT30SLH20X63  |
| BT30  | 25        | 90   | 65   | 6532-BT30SLH25X90  |
|       |           |      |      |                    |
| BT40  | 6         | 50   | 25   | 6532-BT40SLH06X50  |
| BT40  | 8         | 50   | 28   | 6532-BT40SLH08X50  |
| BT40  | 10        | 63   | 35   | 6532-BT40SLH10X63  |
| BT40  | 12        | 63   | 42   | 6532-BT40SLH12X63  |
| BT40  | 14        | 63   | 44   | 6532-BT40SLH14X63  |
| BT40  | 16        | 63   | 48   | 6532-BT40SLH16X63  |
| BT40  | 18        | 63   | 50   | 6532-BT40SLH18X63  |
| BT40  | 20        | 63   | 52   | 6532-BT40SLH20X63  |
| BT40  | 25        | 90   | 65   | 6532-BT40SLH25X90  |
| BT40  | 32        | 100  | 72   | 6532-BT40SLH32X100 |
| BT40  | 40        | 120  | 80   | 6532-BT40SLH40X120 |
|       |           |      |      |                    |
| BT40  | 6         | 100  | 25   | 6532-BT40SLH06X100 |
| BT40  | 8         | 100  | 28   | 6532-BT40SLH08X100 |
| BT40  | 10        | 100  | 35   | 6532-BT40SLH10X100 |
| BT40  | 12        | 100  | 42   | 6532-BT40SLH12X100 |
| BT40  | 14        | 100  | 44   | 6532-BT40SLH14X100 |
| BT40  | 16        | 100  | 48   | 6532-BT40SLH16X100 |
| BT40  | 18        | 100  | 50   | 6532-BT40SLH18X100 |
| BT40  | 20        | 100  | 52   | 6532-BT40SLH20X100 |
|       |           |      |      |                    |
| BT40  | 6         | 160  | 25   | 6532-BT40SLH06X160 |
| BT40  | 8         | 160  | 28   | 6532-BT40SLH08X160 |
| BT40  | 10        | 160  | 35   | 6532-BT40SLH10X160 |

## SIDE LOCK HOLDER



Shank

DIN 6359  
DIN 1835 B

≤0.005



15000



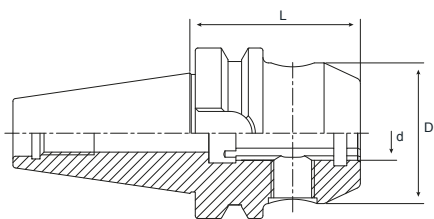
AD

GROUP

TOHO

| SHANK | SIZE d MM | L MM | D MM | PART NUMBER        |
|-------|-----------|------|------|--------------------|
| BT40  | 12        | 160  | 42   | 6532-BT40SLH12X160 |
| BT40  | 14        | 160  | 44   | 6532-BT40SLH14X160 |
| BT40  | 16        | 160  | 48   | 6532-BT40SLH16X160 |
| BT40  | 18        | 160  | 50   | 6532-BT40SLH18X160 |
| BT40  | 20        | 160  | 52   | 6532-BT40SLH20X160 |
| BT40  | 25        | 160  | 65   | 6532-BT40SLH25X160 |
| BT40  | 32        | 160  | 72   | 6532-BT40SLH32X160 |
| BT40  | 40        | 160  | 80   | 6532-BT40SLH40X160 |
| BT50  | 6         | 63   | 25   | 6532-BT50SLH06X63  |
| BT50  | 8         | 63   | 28   | 6532-BT50SLH08X63  |
| BT50  | 10        | 63   | 35   | 6532-BT50SLH10X63  |
| BT50  | 12        | 80   | 42   | 6532-BT50SLH12X80  |
| BT50  | 14        | 80   | 44   | 6532-BT50SLH14X80  |
| BT50  | 16        | 80   | 48   | 6532-BT50SLH16X80  |
| BT50  | 18        | 80   | 50   | 6532-BT50SLH18X80  |
| BT50  | 20        | 80   | 52   | 6532-BT50SLH20X80  |
| BT50  | 25        | 100  | 65   | 6532-BT50SLH25X100 |
| BT50  | 32        | 105  | 72   | 6532-BT50SLH32X105 |
| BT50  | 40        | 110  | 80   | 6532-BT50SLH40X110 |
| BT50  | 50        | 125  | 98   | 6532-BT50SLH50X125 |
| BT50  | 6         | 160  | 25   | 6532-BT50SLH06X160 |
| BT50  | 8         | 160  | 28   | 6532-BT50SLH08X160 |
| BT50  | 10        | 160  | 35   | 6532-BT50SLH10X160 |
| BT50  | 12        | 160  | 42   | 6532-BT50SLH12X160 |
| BT50  | 14        | 160  | 44   | 6532-BT50SLH14X160 |
| BT50  | 16        | 160  | 48   | 6532-BT50SLH16X160 |
| BT50  | 18        | 160  | 50   | 6532-BT50SLH18X160 |
| BT50  | 20        | 160  | 52   | 6532-BT50SLH20X160 |
| BT50  | 25        | 160  | 65   | 6532-BT50SLH25X160 |
| BT50  | 32        | 160  | 72   | 6532-BT50SLH32X160 |
| BT50  | 40        | 160  | 80   | 6532-BT50SLH40X160 |

## SIDE LOCK HOLDER WITH COOLANT CHANNELS



Shank


 DIN 6359  
DIN 1835 B

 $\leq 0.005$ 


15000

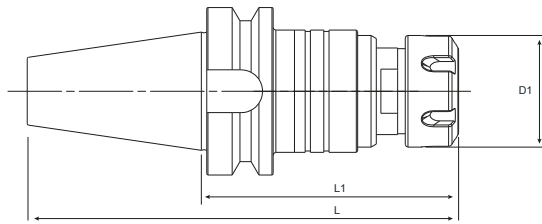


AD

**GROUP**
**TOHO**

| SHANK | SIZE d MM | L MM | D MM | PART NUMBER         |
|-------|-----------|------|------|---------------------|
| BT40  | 6         | 50   | 25   | 6532-BT40SLH06X50K  |
| BT40  | 8         | 50   | 28   | 6532-BT40SLH08X50K  |
| BT40  | 10        | 63   | 35   | 6532-BT40SLH10X63K  |
| BT40  | 12        | 63   | 42   | 6532-BT40SLH12X63K  |
| BT40  | 14        | 63   | 44   | 6532-BT40SLH14X63K  |
| BT40  | 16        | 63   | 48   | 6532-BT40SLH16X63K  |
| BT40  | 18        | 63   | 50   | 6532-BT40SLH18X63K  |
| BT40  | 20        | 63   | 52   | 6532-BT40SLH20X63K  |
| BT40  | 25        | 90   | 65   | 6532-BT40SLH25X90K  |
| BT40  | 32        | 100  | 72   | 6532-BT40SLH32X100K |
| BT40  | 40        | 120  | 80   | 6532-BT40SLH40X120K |
|       |           |      |      |                     |
| BT40  | 6         | 100  | 25   | 6532-BT40SLH06X100K |
| BT40  | 8         | 100  | 28   | 6532-BT40SLH08X100K |
| BT40  | 10        | 100  | 35   | 6532-BT40SLH10X100K |
| BT40  | 12        | 100  | 42   | 6532-BT40SLH12X100K |
| BT40  | 14        | 100  | 44   | 6532-BT40SLH14X100K |
| BT40  | 16        | 100  | 48   | 6532-BT40SLH16X100K |
| BT40  | 18        | 100  | 50   | 6532-BT40SLH18X100K |
| BT40  | 20        | 100  | 52   | 6532-BT40SLH20X100K |

# SYNCHRO TAP HOLDER



Shank



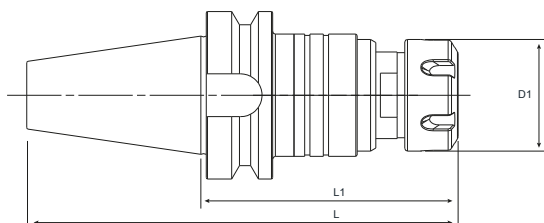
≤0.02

GROUP

TOHO

| SHANK | TAP COLLET | L MM | L1 MM | D MM | D1 MM | TAPPING RANGE MM | PART NUMBER        |
|-------|------------|------|-------|------|-------|------------------|--------------------|
| BT30  | ER20G      | 90   | 37.5  | 34   | 34    | M4-M12           | 6541-BT30ER20GX90  |
| BT30  | ER32G      | 120  | 43.5  | 50   | 50    | M4-M20           | 6541-BT30ER32GX120 |
| BT40  | ER20G      | 95   | 37.5  | 34   | 34    | M4-M12           | 6541-BT40ER20GX95  |
| BT40  | ER32G      | 110  | 43.5  | 50   | 50    | M4-M20           | 6541-BT40ER32GX110 |
| BT50  | ER20G      | 110  | 37.5  | 34   | 34    | M4-M12           | 6541-BT50ER20GX110 |
| BT50  | ER32G      | 120  | 43.5  | 50   | 50    | M4-M20           | 6541-BT50ER32GX120 |
| BT50  | ER40G      | 140  | 50.3  | 58.5 | 63    | M10-M30          | 6541-BT50ER40GX140 |

## TAP HOLDER TENSION & COMPRESSION



Shank



3.0mm

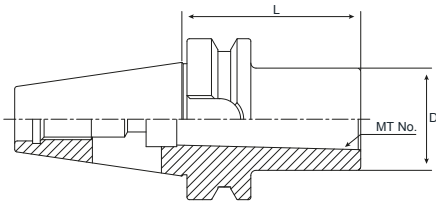


3.0mm

**GROUP**
**TOHO**

| SHANK       | TAP COLLET | L MM | L1 MM | D1 MM | TAPPING RANGE MM | PART NUMBER        |
|-------------|------------|------|-------|-------|------------------|--------------------|
| <b>BT30</b> | ER16G      | 148  | 100   | 28    | M2-M12           | 6542-BT30ER16GX100 |
| <b>BT30</b> | ER20G      | 148  | 100   | 34    | M2-M16           | 6542-BT30ER20GX100 |
| <b>BT30</b> | ER25G      | 148  | 100   | 42    | M2-M22           | 6542-BT30ER25GX100 |
| <b>BT30</b> | ER32G      | 148  | 100   | 50    | M2-M24           | 6542-BT30ER32GX100 |
| <b>BT30</b> | ER40G      | 148  | 100   | 63    | M2-M24           | 6542-BT30ER40GX100 |
| <b>BT40</b> | ER16G      | 165  | 100   | 28    | M2-M12           | 6542-BT40ER16GX100 |
| <b>BT40</b> | ER20G      | 165  | 100   | 34    | M2-M16           | 6542-BT40ER20GX100 |
| <b>BT40</b> | ER25G      | 165  | 100   | 42    | M2-M22           | 6542-BT40ER25GX100 |
| <b>BT40</b> | ER32G      | 165  | 100   | 50    | M2-M24           | 6542-BT40ER32GX100 |
| <b>BT40</b> | ER40G      | 185  | 140   | 63    | M2-M24           | 6542-BT40ER40GX140 |
| <b>BT50</b> | ER16G      | 211  | 120   | 28    | M2-M12           | 6542-BT50ER16GX120 |
| <b>BT50</b> | ER20G      | 211  | 120   | 34    | M2-M16           | 6542-BT50ER20GX120 |
| <b>BT50</b> | ER25G      | 211  | 120   | 42    | M2-M22           | 6542-BT50ER25GX120 |
| <b>BT50</b> | ER32G      | 222  | 120   | 50    | M2-M24           | 6542-BT50ER32GX120 |
| <b>BT50</b> | ER40G      | 232  | 140   | 63    | M2-M24           | 6542-BT50ER40GX140 |

## MORSE TAPER ADAPTOR WITH TANG



Shank



DIN 6383



≤0.005



G6.3

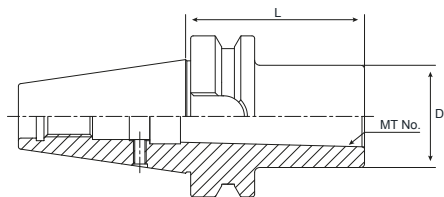
15000

## GROUP

TOHO

| SHANK       | MT No. | L MM | D MM | PART NUMBER       |
|-------------|--------|------|------|-------------------|
| <b>BT30</b> | 1      | 45   | 25   | 6533-BT30MT1AX45  |
| <b>BT30</b> | 2      | 60   | 32   | 6533-BT30MT2AX60  |
| <b>BT30</b> | 3      | 75   | 40   | 6533-BT30MT3AX75  |
| <b>BT40</b> | 1      | 50   | 25   | 6533-BT40MT1AX50  |
| <b>BT40</b> | 2      | 50   | 32   | 6533-BT40MT2AX50  |
| <b>BT40</b> | 3      | 70   | 40   | 6533-BT40MT3AX70  |
| <b>BT40</b> | 4      | 95   | 48   | 6533-BT40MT4AX95  |
| <b>BT50</b> | 1      | 45   | 25   | 6533-BT50MT1AX45  |
| <b>BT50</b> | 2      | 60   | 32   | 6533-BT50MT2AX60  |
| <b>BT50</b> | 3      | 65   | 40   | 6533-BT50MT3AX65  |
| <b>BT50</b> | 3      | 180  | 40   | 6533-BT50MT3AX180 |
| <b>BT50</b> | 4      | 95   | 48   | 6533-BT50MT4AX95  |
| <b>BT50</b> | 4      | 180  | 48   | 6533-BT50MT4AX180 |
| <b>BT50</b> | 5      | 105  | 63   | 6533-BT50MT5AX105 |

## MORSE TAPER ADAPTOR WITH DRAWBAR



Shank



DIN 6383

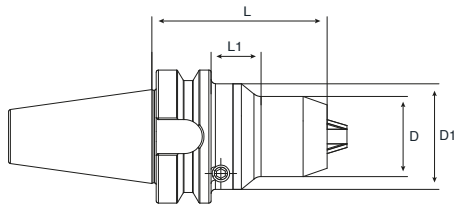

 $\leq 0.005$ 


15000

**GROUP**
**TOHO**

| SHANK       | MT No. | L MM | D MM | PART NUMBER       |
|-------------|--------|------|------|-------------------|
| <b>BT40</b> | 1      | 50   | 25   | 6533-BT40MT1BX50  |
| <b>BT40</b> | 2      | 50   | 32   | 6533-BT40MT2BX50  |
| <b>BT40</b> | 3      | 70   | 40   | 6533-BT40MT3BX70  |
| <b>BT40</b> | 4      | 95   | 48   | 6533-BT40MT4BX95  |
| <b>BT50</b> | 1      | 45   | 25   | 6533-BT50MT1BX45  |
| <b>BT50</b> | 2      | 60   | 32   | 6533-BT50MT2BX60  |
| <b>BT50</b> | 3      | 65   | 40   | 6533-BT50MT3BX65  |
| <b>BT50</b> | 4      | 70   | 48   | 6533-BT50MT4BX70  |
| <b>BT50</b> | 5      | 120  | 63   | 6533-BT50MT5BX120 |

**PRECISION DRILL CHUCK HOLDER**



Shank



≤0.005



G6.3

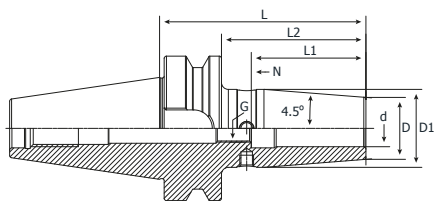
15000

**GROUP**

**TOHO**

| SHANK       | CAPACITY MM | L MM | L1 MM | D MM | D1 MM | PART NUMBER        |
|-------------|-------------|------|-------|------|-------|--------------------|
| <b>BT40</b> | 1-13        | 90   | –     | 50   | –     | 6534-BT40DCH13X90  |
| <b>BT40</b> | 1-16        | 90   | –     | 50   | –     | 6534-BT40DCH16X90  |
| <b>BT50</b> | 1-13        | 100  | –     | 50   | –     | 6534-BT50DCH13X100 |
| <b>BT50</b> | 1-16        | 100  | –     | 50   | –     | 6534-BT50DCH16X100 |

## SHRINK FIT CHUCK 4.5°


**BT**  
Shank

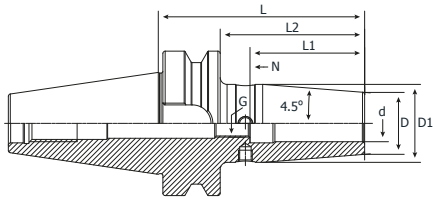
 $\leq 0.003$ 

**G2.5**  
25000

**AD**
**GROUP**
**TOHO**

| SHANK       | SIZE d MM | L MM | D MM | D1 MM | L2 MM | L1 MM | N MM | G MM  | PART NUMBER        |
|-------------|-----------|------|------|-------|-------|-------|------|-------|--------------------|
| <b>BT30</b> | 3         | 80   | 15   | 20    | 58    | -     | -    | -     | 6535-BT30SFC03X80  |
| <b>BT30</b> | 4         | 80   | 15   | 20    | 58    | -     | -    | -     | 6535-BT30SFC04X80  |
| <b>BT30</b> | 5         | 80   | 15   | 20    | 58    | -     | -    | -     | 6535-BT30SFC05X80  |
| <b>BT30</b> | 6         | 80   | 21   | 27    | 58    | 36    | 10   | M5    | 6535-BT30SFC06X80  |
| <b>BT30</b> | 8         | 80   | 21   | 27    | 58    | 36    | 10   | M6    | 6535-BT30SFC08X80  |
| <b>BT30</b> | 10        | 80   | 24   | 30.5  | 58    | 42    | 10   | M8X1  | 6535-BT30SFC10X80  |
| <b>BT30</b> | 12        | 80   | 24   | 30.5  | 58    | 47    | 10   | M10X1 | 6535-BT30SFC12X80  |
| <b>BT30</b> | 14        | 80   | 27   | 33.5  | 58    | 47    | 10   | M10X1 | 6535-BT30SFC14X80  |
| <b>BT30</b> | 16        | 80   | 27   | 33.5  | 58    | 50    | 10   | M12X1 | 6535-BT30SFC16X80  |
| <b>BT30</b> | 18        | 80   | 33   | 39.5  | 58    | 50    | 10   | M12X1 | 6535-BT30SFC18X80  |
| <b>BT30</b> | 20        | 80   | 33   | 39.5  | 58    | 52    | 10   | M16X1 | 6535-BT30SFC20X80  |
|             |           |      |      |       |       |       |      |       |                    |
| <b>BT40</b> | 3         | 80   | 15   | 20    | 53    | -     | -    | -     | 6535-BT40SFC03X80  |
| <b>BT40</b> | 4         | 80   | 15   | 20    | 53    | -     | -    | -     | 6535-BT40SFC04X80  |
| <b>BT40</b> | 5         | 80   | 15   | 20    | 53    | -     | -    | -     | 6535-BT40SFC05X80  |
| <b>BT40</b> | 6         | 90   | 21   | 27    | 63    | 36    | 10   | M5    | 6535-BT40SFC06X90  |
| <b>BT40</b> | 8         | 90   | 21   | 27    | 63    | 36    | 10   | M6    | 6535-BT40SFC08X90  |
| <b>BT40</b> | 10        | 90   | 24   | 31    | 63    | 42    | 10   | M8X1  | 6535-BT40SFC10X90  |
| <b>BT40</b> | 12        | 90   | 24   | 31    | 63    | 47    | 10   | M10X1 | 6535-BT40SFC12X90  |
| <b>BT40</b> | 14        | 90   | 27   | 34    | 63    | 47    | 10   | M10X1 | 6535-BT40SFC14X90  |
| <b>BT40</b> | 16        | 90   | 27   | 34    | 63    | 50    | 10   | M12X1 | 6535-BT40SFC16X90  |
| <b>BT40</b> | 18        | 90   | 33   | 40    | 63    | 50    | 10   | M12X1 | 6535-BT40SFC18X90  |
| <b>BT40</b> | 20        | 90   | 33   | 40    | 63    | 52    | 10   | M16X1 | 6535-BT40SFC20X90  |
| <b>BT40</b> | 25        | 100  | 44   | 53    | 73    | 58    | 10   | M16X1 | 6535-BT40SFC25X100 |
| <b>BT40</b> | 32        | 100  | 44   | 53    | 73    | 62    | 10   | M16X1 | 6535-BT40SFC32X100 |
|             |           |      |      |       |       |       |      |       |                    |
| <b>BT40</b> | 3         | 120  | 15   | 20    | 93    | -     | -    | -     | 6535-BT40SFC03X120 |
| <b>BT40</b> | 4         | 120  | 15   | 20    | 93    | -     | -    | -     | 6535-BT40SFC04X120 |
| <b>BT40</b> | 5         | 120  | 15   | 20    | 93    | -     | -    | -     | 6535-BT40SFC05X120 |
| <b>BT40</b> | 6         | 120  | 21   | 27    | 93    | 36    | 10   | M5    | 6535-BT40SFC06X120 |
| <b>BT40</b> | 8         | 120  | 21   | 27    | 93    | 36    | 10   | M6    | 6535-BT40SFC08X120 |
| <b>BT40</b> | 10        | 120  | 24   | 32    | 93    | 42    | 10   | M8X1  | 6535-BT40SFC10X120 |

**SHRINK FIT CHUCK 4.5°**



Shank



≤0.003



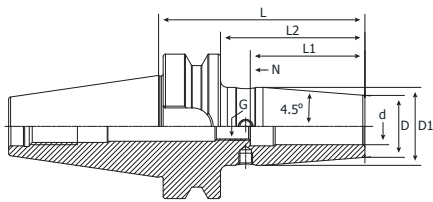
25000



AD

| GROUP |           |      |      |       |       |       |      |       | TOHO               |
|-------|-----------|------|------|-------|-------|-------|------|-------|--------------------|
| SHANK | SIZE d MM | L MM | D MM | D1 MM | L2 MM | L1 MM | N MM | G MM  | PART NUMBER        |
| BT40  | 12        | 120  | 24   | 32    | 93    | 47    | 10   | M10X1 | 6535-BT40SFC12X120 |
| BT40  | 14        | 120  | 27   | 34    | 93    | 47    | 10   | M10X1 | 6535-BT40SFC14X120 |
| BT40  | 16        | 120  | 27   | 34    | 93    | 50    | 10   | M12X1 | 6535-BT40SFC16X120 |
| BT40  | 18        | 120  | 33   | 42    | 93    | 50    | 10   | M12X1 | 6535-BT40SFC18X120 |
| BT40  | 20        | 120  | 33   | 42    | 93    | 52    | 10   | M16X1 | 6535-BT40SFC20X120 |
| BT40  | 25        | 120  | 44   | 53    | 93    | 58    | 10   | M16X1 | 6535-BT40SFC25X120 |
| BT40  | 32        | 120  | 44   | 53    | 93    | 62    | 10   | M16X1 | 6535-BT40SFC32X120 |
| BT40  | 3         | 160  | 15   | 25    | 133   | -     | -    | -     | 6535-BT40SFC03X160 |
| BT40  | 4         | 160  | 15   | 25    | 133   | -     | -    | -     | 6535-BT40SFC04X160 |
| BT40  | 5         | 160  | 15   | 25    | 133   | -     | -    | -     | 6535-BT40SFC05X160 |
| BT40  | 6         | 160  | 21   | 32    | 133   | 36    | 10   | M5    | 6535-BT40SFC06X160 |
| BT40  | 8         | 160  | 21   | 32    | 133   | 36    | 10   | M6    | 6535-BT40SFC08X160 |
| BT40  | 10        | 160  | 24   | 34    | 133   | 42    | 10   | M8X1  | 6535-BT40SFC10X160 |
| BT40  | 12        | 160  | 24   | 34    | 133   | 47    | 10   | M10X1 | 6535-BT40SFC12X160 |
| BT40  | 14        | 160  | 27   | 42    | 133   | 47    | 10   | M10X1 | 6535-BT40SFC14X160 |
| BT40  | 16        | 160  | 27   | 42    | 133   | 50    | 10   | M12X1 | 6535-BT40SFC16X160 |
| BT40  | 18        | 160  | 33   | 51    | 133   | 50    | 10   | M12X1 | 6535-BT40SFC18X160 |
| BT40  | 20        | 160  | 33   | 51    | 133   | 52    | 10   | M16X1 | 6535-BT40SFC20X160 |
| BT40  | 25        | 160  | 44   | 53    | 133   | 58    | 10   | M16X1 | 6535-BT40SFC25X160 |
| BT40  | 32        | 160  | 44   | 60    | 133   | 62    | 10   | M16X1 | 6535-BT40SFC32X160 |
| BT40  | 6         | 200  | 21   | 32    | 173   | 36    | 10   | M5    | 6535-BT40SFC06X200 |
| BT40  | 8         | 200  | 21   | 32    | 173   | 36    | 10   | M6    | 6535-BT40SFC08X200 |
| BT40  | 10        | 200  | 24   | 34    | 173   | 42    | 10   | M8X1  | 6535-BT40SFC10X200 |
| BT40  | 12        | 200  | 24   | 34    | 173   | 47    | 10   | M10X1 | 6535-BT40SFC12X200 |
| BT40  | 14        | 200  | 27   | 42    | 173   | 47    | 10   | M10X1 | 6535-BT40SFC14X200 |
| BT40  | 16        | 200  | 27   | 42    | 173   | 50    | 10   | M12X1 | 6535-BT40SFC16X200 |
| BT40  | 18        | 200  | 33   | 51    | 173   | 50    | 10   | M12X1 | 6535-BT40SFC18X200 |
| BT40  | 20        | 200  | 33   | 51    | 173   | 52    | 10   | M16X1 | 6535-BT40SFC20X200 |
| BT40  | 25        | 200  | 44   | 53    | 173   | 58    | 10   | M16X1 | 6535-BT40SFC25X200 |
| BT40  | 32        | 200  | 44   | 60    | 173   | 62    | 10   | M16X1 | 6535-BT40SFC32X200 |

## SHRINK FIT CHUCK 4.5°


**BT**  
Shank

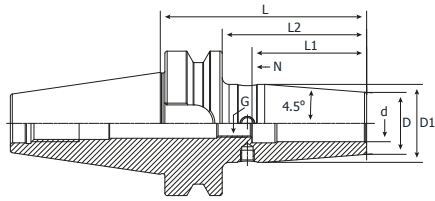
 $\leq 0.003$ 

**G2.5**  
25000

**AD**
**GROUP**
**TOHO**

| SHANK | SIZE d MM | L MM | D MM | D1 MM | L2 MM | L1 MM | N MM | G MM  | PART NUMBER        |
|-------|-----------|------|------|-------|-------|-------|------|-------|--------------------|
| BT50  | 3         | 100  | 15   | 20    | 62    | -     | -    | -     | 6535-BT50SFC03X100 |
| BT50  | 4         | 100  | 15   | 20    | 62    | -     | -    | -     | 6535-BT50SFC04X100 |
| BT50  | 5         | 100  | 15   | 20    | 62    | -     | -    | -     | 6535-BT50SFC05X100 |
| BT50  | 6         | 100  | 21   | 27    | 62    | 36    | 10   | M5    | 6535-BT50SFC06X100 |
| BT50  | 8         | 100  | 21   | 27    | 62    | 36    | 10   | M6    | 6535-BT50SFC08X100 |
| BT50  | 10        | 100  | 24   | 30.5  | 62    | 42    | 10   | M8X1  | 6535-BT50SFC10X100 |
| BT50  | 12        | 100  | 24   | 30.5  | 62    | 47    | 10   | M10X1 | 6535-BT50SFC12X100 |
| BT50  | 14        | 100  | 27   | 34    | 62    | 47    | 10   | M10X1 | 6535-BT50SFC14X100 |
| BT50  | 16        | 100  | 27   | 34    | 62    | 50    | 10   | M12X1 | 6535-BT50SFC16X100 |
| BT50  | 18        | 100  | 33   | 40    | 62    | 50    | 10   | M12X1 | 6535-BT50SFC18X100 |
| BT50  | 20        | 100  | 33   | 40    | 62    | 52    | 10   | M16X1 | 6535-BT50SFC20X100 |
| BT50  | 25        | 120  | 44   | 53    | 82    | 58    | 10   | M16X1 | 6535-BT50SFC25X120 |
| BT50  | 32        | 120  | 44   | 53    | 82    | 62    | 10   | M16X1 | 6535-BT50SFC32X120 |
|       |           |      |      |       |       |       |      |       |                    |
| BT50  | 3         | 120  | 15   | 20    | 82    | -     | -    | -     | 6535-BT50SFC03X120 |
| BT50  | 4         | 120  | 15   | 20    | 82    | -     | -    | -     | 6535-BT50SFC04X120 |
| BT50  | 5         | 120  | 15   | 20    | 82    | -     | -    | -     | 6535-BT50SFC05X120 |
| BT50  | 6         | 120  | 21   | 27    | 82    | 36    | 10   | M5    | 6535-BT50SFC06X120 |
| BT50  | 8         | 120  | 21   | 27    | 82    | 36    | 10   | M6    | 6535-BT50SFC08X120 |
| BT50  | 10        | 120  | 24   | 32    | 82    | 42    | 10   | M8X1  | 6535-BT50SFC10X120 |
| BT50  | 12        | 120  | 24   | 32    | 82    | 47    | 10   | M10X1 | 6535-BT50SFC12X120 |
| BT50  | 14        | 120  | 27   | 34    | 82    | 47    | 10   | M10X1 | 6535-BT50SFC14X120 |
| BT50  | 16        | 120  | 27   | 34    | 82    | 50    | 10   | M12X1 | 6535-BT50SFC16X120 |
| BT50  | 18        | 120  | 33   | 42    | 82    | 50    | 10   | M12X1 | 6535-BT50SFC18X120 |
| BT50  | 20        | 120  | 33   | 42    | 82    | 52    | 10   | M16X1 | 6535-BT50SFC20X120 |

**SHRINK FIT CHUCK 4.5°**



Shank



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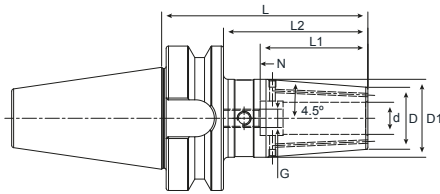
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AD

| GROUP |           |      |      |       |       |       |      |       | TOHO               |
|-------|-----------|------|------|-------|-------|-------|------|-------|--------------------|
| SHANK | SIZE d MM | L MM | D MM | D1 MM | L2 MM | L1 MM | N MM | G MM  | PART NUMBER        |
| BT50  | 3         | 160  | 15   | 25    | 122   | -     | -    | -     | 6535-BT50SFC03X160 |
| BT50  | 4         | 160  | 15   | 25    | 122   | -     | -    | -     | 6535-BT50SFC04X160 |
| BT50  | 5         | 160  | 15   | 25    | 122   | -     | -    | -     | 6535-BT50SFC05X160 |
| BT50  | 6         | 160  | 21   | 32    | 122   | 36    | 10   | M5    | 6535-BT50SFC06X160 |
| BT50  | 8         | 160  | 21   | 32    | 122   | 36    | 10   | M6    | 6535-BT50SFC08X160 |
| BT50  | 10        | 160  | 24   | 34    | 122   | 42    | 10   | M8X1  | 6535-BT50SFC10X160 |
| BT50  | 12        | 160  | 24   | 34    | 122   | 47    | 10   | M10X1 | 6535-BT50SFC12X160 |
| BT50  | 14        | 160  | 27   | 42    | 122   | 47    | 10   | M10X1 | 6535-BT50SFC14X160 |
| BT50  | 16        | 160  | 27   | 42    | 122   | 50    | 10   | M12X1 | 6535-BT50SFC16X160 |
| BT50  | 18        | 160  | 33   | 49    | 122   | 50    | 10   | M12X1 | 6535-BT50SFC18X160 |
| BT50  | 20        | 160  | 33   | 49    | 122   | 52    | 10   | M16X1 | 6535-BT50SFC20X160 |
| BT50  | 25        | 160  | 44   | 60    | 122   | 58    | 10   | M16X1 | 6535-BT50SFC25X160 |
| BT50  | 32        | 160  | 44   | 60    | 122   | 62    | 10   | M16X1 | 6535-BT50SFC32X160 |
| BT50  | 6         | 200  | 21   | 32    | 162   | 36    | 10   | M5    | 6535-BT50SFC06X200 |
| BT50  | 8         | 200  | 21   | 32    | 162   | 36    | 10   | M6    | 6535-BT50SFC08X200 |
| BT50  | 10        | 200  | 24   | 34    | 162   | 42    | 10   | M8X1  | 6535-BT50SFC10X200 |
| BT50  | 12        | 200  | 24   | 34    | 162   | 47    | 10   | M10X1 | 6535-BT50SFC12X200 |
| BT50  | 14        | 200  | 27   | 42    | 162   | 47    | 10   | M10X1 | 6535-BT50SFC14X200 |
| BT50  | 16        | 200  | 27   | 42    | 162   | 50    | 10   | M12X1 | 6535-BT50SFC16X200 |
| BT50  | 18        | 200  | 33   | 51    | 162   | 50    | 10   | M12X1 | 6535-BT50SFC18X200 |
| BT50  | 20        | 200  | 33   | 51    | 162   | 52    | 10   | M16X1 | 6535-BT50SFC20X200 |
| BT50  | 25        | 200  | 44   | 60    | 162   | 58    | 10   | M16X1 | 6535-BT50SFC25X200 |

## SHRINK FIT CHUCK 4.5° WITH COOLANT CHANNELS



Shank


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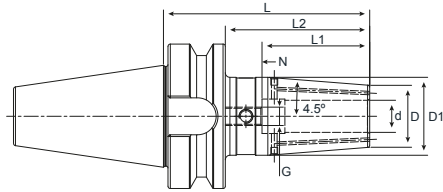


AD

**GROUP**
**TOHO**

| SHANK | SIZE d MM | L MM | D MM | D1 MM | L2 MM | L1 MM | N MM | G MM  | PART NUMBER         |
|-------|-----------|------|------|-------|-------|-------|------|-------|---------------------|
| BT40  | 3         | 80   | 15   | 20    | 53    | -     | -    | -     | 6535-BT40SFC03X80K  |
| BT40  | 4         | 80   | 15   | 20    | 53    | -     | -    | -     | 6535-BT40SFC04X80K  |
| BT40  | 5         | 80   | 15   | 20    | 53    | -     | -    | -     | 6535-BT40SFC05X80K  |
| BT40  | 6         | 90   | 21   | 27    | 63    | 36    | 10   | M5    | 6535-BT40SFC06X90K  |
| BT40  | 8         | 90   | 21   | 27    | 63    | 36    | 10   | M6    | 6535-BT40SFC08X90K  |
| BT40  | 10        | 90   | 24   | 31    | 63    | 42    | 10   | M8X1  | 6535-BT40SFC10X90K  |
| BT40  | 12        | 90   | 24   | 31    | 63    | 47    | 10   | M10X1 | 6535-BT40SFC12X90K  |
| BT40  | 14        | 90   | 27   | 34    | 63    | 47    | 10   | M10X1 | 6535-BT40SFC14X90K  |
| BT40  | 16        | 90   | 27   | 34    | 63    | 50    | 10   | M12X1 | 6535-BT40SFC16X90K  |
| BT40  | 18        | 90   | 33   | 40    | 63    | 50    | 10   | M12X1 | 6535-BT40SFC18X90K  |
| BT40  | 20        | 90   | 33   | 40    | 63    | 52    | 10   | M16X1 | 6535-BT40SFC20X90K  |
| BT40  | 25        | 100  | 44   | 53    | 73    | 58    | 10   | M16X1 | 6535-BT40SFC25X100K |
| BT40  | 32        | 100  | 44   | 53    | 73    | 62    | 10   | M16X1 | 6535-BT40SFC32X100K |
|       |           |      |      |       |       |       |      |       |                     |
| BT40  | 6         | 120  | 21   | 27    | 93    | 36    | 10   | M5    | 6535-BT40SFC06X120K |
| BT40  | 8         | 120  | 21   | 27    | 93    | 36    | 10   | M6    | 6535-BT40SFC08X120K |
| BT40  | 10        | 120  | 24   | 32    | 93    | 42    | 10   | M8X1  | 6535-BT40SFC10X120K |
| BT40  | 12        | 120  | 24   | 32    | 93    | 47    | 10   | M10X1 | 6535-BT40SFC12X120K |
| BT40  | 14        | 120  | 27   | 34    | 93    | 47    | 10   | M10X1 | 6535-BT40SFC14X120K |
| BT40  | 16        | 120  | 27   | 34    | 93    | 50    | 10   | M12X1 | 6535-BT40SFC16X120K |
| BT40  | 18        | 120  | 33   | 42    | 93    | 50    | 10   | M12X1 | 6535-BT40SFC18X120K |
| BT40  | 20        | 120  | 33   | 42    | 93    | 52    | 10   | M16X1 | 6535-BT40SFC20X120K |
| BT40  | 25        | 120  | 44   | 53    | 93    | 58    | 10   | M16X1 | 6535-BT40SFC25X120K |
| BT40  | 32        | 120  | 44   | 53    | 93    | 62    | 10   | M16X1 | 6535-BT40SFC32X120K |
|       |           |      |      |       |       |       |      |       |                     |
| BT40  | 6         | 160  | 21   | 32    | 133   | 36    | 10   | M5    | 6535-BT40SFC06X160K |
| BT40  | 8         | 160  | 21   | 32    | 133   | 36    | 10   | M6    | 6535-BT40SFC08X160K |
| BT40  | 10        | 160  | 24   | 34    | 133   | 42    | 10   | M8X1  | 6535-BT40SFC10X160K |
| BT40  | 12        | 160  | 24   | 34    | 133   | 47    | 10   | M10X1 | 6535-BT40SFC12X160K |
| BT40  | 14        | 160  | 27   | 42    | 133   | 47    | 10   | M10X1 | 6535-BT40SFC14X160K |
| BT40  | 16        | 160  | 27   | 42    | 133   | 50    | 10   | M12X1 | 6535-BT40SFC16X160K |
| BT40  | 18        | 160  | 33   | 51    | 133   | 50    | 10   | M12X1 | 6535-BT40SFC18X160K |
| BT40  | 20        | 160  | 33   | 51    | 133   | 52    | 10   | M16X1 | 6535-BT40SFC20X160K |
| BT40  | 25        | 160  | 44   | 53    | 133   | 58    | 10   | M16X1 | 6535-BT40SFC25X160K |
| BT40  | 32        | 160  | 44   | 60    | 133   | 62    | 10   | M16X1 | 6535-BT40SFC32X160K |

# SHRINK FIT CHUCK 4.5° WITH COOLANT CHANNELS



Shank



≤0.003



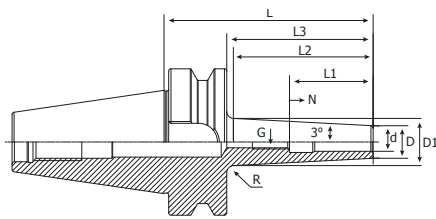
25000



AD

| GROUP |           |      |      |       |       |       |      |       | TOHO                |
|-------|-----------|------|------|-------|-------|-------|------|-------|---------------------|
| SHANK | SIZE d MM | L MM | D MM | D1 MM | L2 MM | L1 MM | N MM | G MM  | PART NUMBER         |
| BT50  | 6         | 100  | 21   | 27    | 62    | 36    | 10   | M5    | 6535-BT50SFC06X100K |
| BT50  | 8         | 100  | 21   | 27    | 62    | 36    | 10   | M6    | 6535-BT50SFC08X100K |
| BT50  | 10        | 100  | 24   | 32    | 62    | 42    | 10   | M8X1  | 6535-BT50SFC10X100K |
| BT50  | 12        | 100  | 24   | 32    | 62    | 47    | 10   | M10X1 | 6535-BT50SFC12X100K |
| BT50  | 14        | 100  | 27   | 34    | 62    | 47    | 10   | M10X1 | 6535-BT50SFC14X100K |
| BT50  | 16        | 100  | 27   | 34    | 62    | 50    | 10   | M12X1 | 6535-BT50SFC16X100K |
| BT50  | 18        | 100  | 33   | 42    | 62    | 50    | 10   | M12X1 | 6535-BT50SFC18X100K |
| BT50  | 20        | 100  | 33   | 42    | 62    | 52    | 10   | M16X1 | 6535-BT50SFC20X100K |
| BT50  | 25        | 110  | 44   | 53    | 72    | 58    | 10   | M16X1 | 6535-BT50SFC25X110K |
| BT50  | 32        | 110  | 44   | 53    | 72    | 62    | 10   | M16X1 | 6535-BT50SFC32X110K |
| BT50  | 6         | 120  | 21   | 27    | 82    | 36    | 10   | M5    | 6535-BT50SFC06X120K |
| BT50  | 8         | 120  | 21   | 27    | 82    | 36    | 10   | M6    | 6535-BT50SFC08X120K |
| BT50  | 10        | 120  | 24   | 32    | 82    | 42    | 10   | M8X1  | 6535-BT50SFC10X120K |
| BT50  | 12        | 120  | 24   | 32    | 82    | 47    | 10   | M10X1 | 6535-BT50SFC12X120K |
| BT50  | 14        | 120  | 27   | 34    | 82    | 47    | 10   | M10X1 | 6535-BT50SFC14X120K |
| BT50  | 16        | 120  | 27   | 34    | 82    | 50    | 10   | M12X1 | 6535-BT50SFC16X120K |
| BT50  | 18        | 120  | 33   | 42    | 82    | 50    | 10   | M12X1 | 6535-BT50SFC18X120K |
| BT50  | 20        | 120  | 33   | 42    | 82    | 52    | 10   | M16X1 | 6535-BT50SFC20X120K |
| BT50  | 25        | 120  | 44   | 53    | 82    | 58    | 10   | M16X1 | 6535-BT50SFC25X120K |
| BT50  | 32        | 120  | 44   | 53    | 82    | 62    | 10   | M16X1 | 6535-BT50SFC32X120K |
| BT50  | 6         | 160  | 21   | 32    | 122   | 36    | 10   | M5    | 6535-BT50SFC06X160K |
| BT50  | 8         | 160  | 21   | 32    | 122   | 36    | 10   | M6    | 6535-BT50SFC08X160K |
| BT50  | 10        | 160  | 24   | 34    | 122   | 42    | 10   | M8X1  | 6535-BT50SFC10X160K |
| BT50  | 12        | 160  | 24   | 34    | 122   | 47    | 10   | M10X1 | 6535-BT50SFC12X160K |
| BT50  | 14        | 160  | 27   | 42    | 122   | 47    | 10   | M10X1 | 6535-BT50SFC14X160K |
| BT50  | 16        | 160  | 27   | 42    | 122   | 50    | 10   | M12X1 | 6535-BT50SFC16X160K |
| BT50  | 18        | 160  | 33   | 51    | 122   | 50    | 10   | M12X1 | 6535-BT50SFC18X160K |
| BT50  | 20        | 160  | 33   | 51    | 122   | 52    | 10   | M16X1 | 6535-BT50SFC20X160K |
| BT50  | 25        | 160  | 44   | 60    | 122   | 58    | 10   | M16X1 | 6535-BT50SFC25X160K |
| BT50  | 32        | 160  | 44   | 60    | 122   | 62    | 10   | M16X1 | 6535-BT50SFC32X160K |

## SHRINK FIT CHUCK 3.0°


**BT**  
Shank

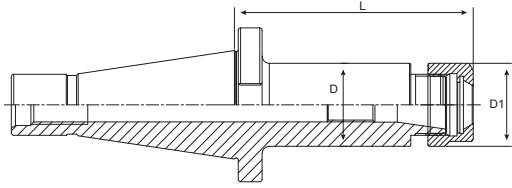
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**G2.5**  
25000

**AD**

| GROUP       |           |      |      |       |       |      |       | TOHO                |
|-------------|-----------|------|------|-------|-------|------|-------|---------------------|
| SHANK       | SIZE d MM | L MM | D MM | L2 MM | L1 MM | N MM | G MM  | PART NUMBER         |
| <b>BT30</b> | 3         | 80   | 9    | 58    | -     | -    | -     | 6535-BT30SFCS03X80  |
| <b>BT30</b> | 4         | 80   | 10   | 58    | -     | -    | -     | 6535-BT30SFCS04X80  |
| <b>BT30</b> | 6         | 80   | 12   | 58    | 36    | 10   | M5    | 6535-BT30SFCS06X80  |
| <b>BT30</b> | 8         | 80   | 14   | 58    | 36    | 10   | M6    | 6535-BT30SFCS08X80  |
| <b>BT30</b> | 10        | 80   | 16   | 58    | 42    | 10   | M8X1  | 6535-BT30SFCS10X80  |
| <b>BT30</b> | 12        | 80   | 18   | 58    | 47    | 10   | M10X1 | 6535-BT30SFCS12X80  |
| <b>BT30</b> | 16        | 80   | 22   | 58    | 50    | 10   | M12X1 | 6535-BT30SFCS16X80  |
| <b>BT40</b> | 3         | 90   | 9    | 63    | -     | -    | -     | 6535-BT40SFCS03X90  |
| <b>BT40</b> | 4         | 90   | 10   | 63    | -     | -    | -     | 6535-BT40SFCS04X90  |
| <b>BT40</b> | 6         | 90   | 12   | 63    | 36    | 10   | M5    | 6535-BT40SFCS06X90  |
| <b>BT40</b> | 8         | 90   | 14   | 63    | 36    | 10   | M6    | 6535-BT40SFCS08X90  |
| <b>BT40</b> | 10        | 90   | 16   | 63    | 42    | 10   | M8X1  | 6535-BT40SFCS10X90  |
| <b>BT40</b> | 12        | 90   | 18   | 63    | 47    | 10   | M10X1 | 6535-BT40SFCS12X90  |
| <b>BT40</b> | 16        | 90   | 22   | 63    | 50    | 10   | M12X1 | 6535-BT40SFCS16X90  |
| <b>BT40</b> | 3         | 120  | 9    | 93    | -     | -    | -     | 6535-BT40SFCS03X120 |
| <b>BT40</b> | 4         | 120  | 10   | 93    | -     | -    | -     | 6535-BT40SFCS04X120 |
| <b>BT40</b> | 6         | 120  | 12   | 93    | 36    | 10   | M5    | 6535-BT40SFCS06X120 |
| <b>BT40</b> | 8         | 120  | 14   | 93    | 36    | 10   | M6    | 6535-BT40SFCS08X120 |
| <b>BT40</b> | 10        | 120  | 16   | 93    | 42    | 10   | M8X1  | 6535-BT40SFCS10X120 |
| <b>BT40</b> | 12        | 120  | 18   | 93    | 47    | 10   | M10X1 | 6535-BT40SFCS12X120 |
| <b>BT40</b> | 16        | 120  | 22   | 93    | 50    | 10   | M12X1 | 6535-BT40SFCS16X120 |
| <b>BT40</b> | 3         | 160  | 9    | 133   | -     | -    | -     | 6535-BT40SFCS03X160 |
| <b>BT40</b> | 4         | 160  | 10   | 133   | -     | -    | -     | 6535-BT40SFCS04X160 |
| <b>BT40</b> | 6         | 160  | 12   | 133   | 36    | 10   | M5    | 6535-BT40SFCS06X160 |
| <b>BT40</b> | 8         | 160  | 14   | 133   | 36    | 10   | M6    | 6535-BT40SFCS08X160 |
| <b>BT40</b> | 10        | 160  | 16   | 133   | 42    | 10   | M8X1  | 6535-BT40SFCS10X160 |
| <b>BT40</b> | 12        | 160  | 18   | 133   | 47    | 10   | M10X1 | 6535-BT40SFCS12X160 |
| <b>BT40</b> | 16        | 160  | 22   | 133   | 50    | 10   | M12X1 | 6535-BT40SFCS16X160 |

# ER COLLET CHUCK WITH UM NUT



Shank



DIN 6359  
1835 B



≤0.005



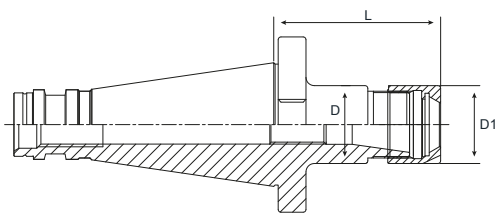
AD

GROUP

TOHO

| SHANK | SIZE | L MM | D MM | D1 MM | CAPACITY MM | PART NUMBER      |
|-------|------|------|------|-------|-------------|------------------|
| NT30  | ER16 | 50   | 28   | 28    | 1-10        | 6530-NT30ER16X50 |
| NT30  | ER20 | 50   | 34   | 34    | 1-13        | 6530-NT30ER20X50 |
| NT30  | ER25 | 50   | 42   | 42    | 1-16        | 6530-NT30ER25X50 |
| NT30  | ER32 | 50   | 40   | 50    | 1-20        | 6530-NT30ER32X50 |
| NT30  | ER40 | 80   | 50   | 63    | 2-26        | 6530-NT30ER40X80 |
| NT40  | ER16 | 50   | 28   | 28    | 1-10        | 6530-NT40ER16X50 |
| NT40  | ER20 | 50   | 34   | 34    | 1-13        | 6530-NT40ER20X50 |
| NT40  | ER25 | 50   | 42   | 42    | 1-16        | 6530-NT40ER25X50 |
| NT40  | ER32 | 50   | 50   | 50    | 1-20        | 6530-NT40ER32X50 |
| NT40  | ER40 | 80   | 50   | 63    | 2-26        | 6530-NT40ER40X80 |
| NT50  | ER25 | 60   | 42   | 42    | 1-16        | 6530-NT50ER25X60 |
| NT50  | ER32 | 70   | 50   | 50    | 1-20        | 6530-NT50ER32X70 |
| NT50  | ER40 | 70   | 63   | 63    | 2-26        | 6530-NT50ER40X80 |
| NT50  | ER50 | 90   | 70   | 78    | 4-34        | 6530-NT50ER50X90 |

## ER COLLET CHUCK WITH MINI NUT



Shank


 DIN 6359  
1835 B

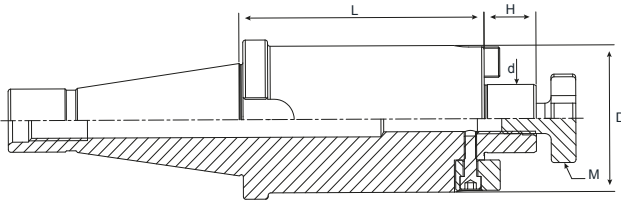
 $\leq 0.005$ 


AD

**GROUP**
**TOHO**

| SHANK       | SIZE | L MM | D MM | D1 MM | CAPACITY MM | PART NUMBER       |
|-------------|------|------|------|-------|-------------|-------------------|
| <b>NT30</b> | ER16 | 70   | 22   | 22    | 1-10        | 6530-NT30ER16MX70 |
| <b>NT30</b> | ER20 | 70   | 28   | 28    | 1-13        | 6530-NT30ER20MX70 |
| <b>NT30</b> | ER25 | 70   | 35   | 35    | 1-16        | 6530-NT30ER25MX70 |
| <b>NT40</b> | ER16 | 60   | 22   | 22    | 1-10        | 6530-NT40ER16MX60 |
| <b>NT40</b> | ER20 | 60   | 28   | 28    | 1-13        | 6530-NT40ER20MX60 |
| <b>NT40</b> | ER25 | 60   | 35   | 35    | 1-16        | 6530-NT40ER25MX60 |

FACE MILL HOLDER



Shank



DIN 6357



≤0.005



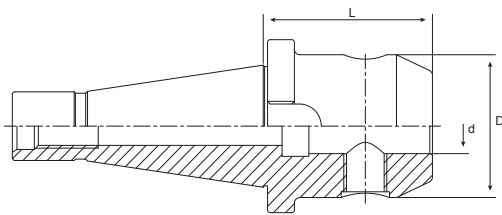
AD

GROUP

TOHO

| SHANK | SIZE d MM | L MM | D MM | H MM | M MM | PART NUMBER       |
|-------|-----------|------|------|------|------|-------------------|
| NT30  | 16        | 30   | 38   | 17   | M8   | 6531-NT30FMH16X30 |
| NT30  | 22        | 30   | 48   | 19   | M10  | 6531-NT30FMH22X30 |
| NT30  | 27        | 45   | 58   | 21   | M12  | 6531-NT30FMH27X45 |
| NT30  | 32        | 50   | 78   | 24   | M16  | 6531-NT30FMH32X50 |
| NT40  | 16        | 30   | 38   | 17   | M8   | 6531-NT40FMH16X30 |
| NT40  | 22        | 30   | 48   | 19   | M10  | 6531-NT40FMH22X30 |
| NT40  | 27        | 30   | 58   | 21   | M12  | 6531-NT40FMH27X30 |
| NT40  | 32        | 30   | 78   | 24   | M16  | 6531-NT40FMH32X30 |
| NT40  | 40        | 30   | 88   | 27   | M20  | 6531-NT40FMH40X30 |
| NT50  | 16        | 30   | 38   | 17   | M8   | 6531-NT50FMH16X30 |
| NT50  | 22        | 35   | 48   | 19   | M10  | 6531-NT50FMH22X35 |
| NT50  | 27        | 35   | 58   | 21   | M12  | 6531-NT50FMH27X35 |
| NT50  | 32        | 40   | 78   | 24   | M16  | 6531-NT50FMH32X40 |
| NT50  | 40        | 40   | 88   | 27   | M20  | 6531-NT50FMH40X40 |

## SIDE LOCK HOLDER



Shank


 DIN 6359  
1835 B

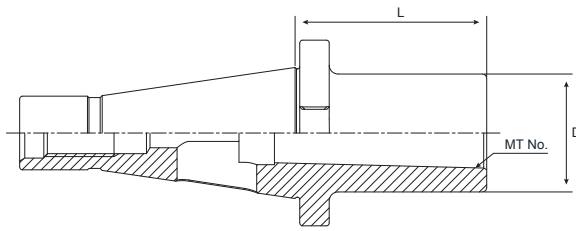
 $\leq 0.005$ 


AD

**GROUP**
**TOHO**

| SHANK | SIZE d MM | L MM | D MM | PART NUMBER       |
|-------|-----------|------|------|-------------------|
| NT30  | 6         | 40   | 25   | 6532-NT30SLH06X40 |
| NT30  | 8         | 40   | 28   | 6532-NT30SLH08X40 |
| NT30  | 10        | 40   | 35   | 6532-NT30SLH10X40 |
| NT30  | 12        | 40   | 42   | 6532-NT30SLH12X40 |
| NT30  | 16        | 50   | 48   | 6532-NT30SLH16X50 |
| NT30  | 18        | 50   | 50   | 6532-NT30SLH18X50 |
| NT30  | 20        | 63   | 52   | 6532-NT30SLH20X63 |
|       |           |      |      |                   |
| NT40  | 6         | 50   | 25   | 6532-NT40SLH06X50 |
| NT40  | 8         | 50   | 28   | 6532-NT40SLH08X50 |
| NT40  | 10        | 50   | 35   | 6532-NT40SLH10X50 |
| NT40  | 12        | 50   | 42   | 6532-NT40SLH12X50 |
| NT40  | 14        | 50   | 44   | 6532-NT40SLH14X50 |
| NT40  | 16        | 63   | 48   | 6532-NT40SLH16X63 |
| NT40  | 18        | 63   | 50   | 6532-NT40SLH18X63 |
| NT40  | 20        | 63   | 52   | 6532-NT40SLH20X63 |
| NT40  | 25        | 80   | 65   | 6532-NT40SLH25X80 |
| NT40  | 32        | 80   | 72   | 6532-NT40SLH32X80 |
| NT40  | 40        | 90   | 80   | 6532-NT40SLH40X90 |
|       |           |      |      |                   |
| NT50  | 6         | 63   | 25   | 6532-NT50SLH06X63 |
| NT50  | 8         | 63   | 28   | 6532-NT50SLH08X63 |
| NT50  | 10        | 63   | 35   | 6532-NT50SLH10X63 |
| NT50  | 12        | 63   | 42   | 6532-NT50SLH12X63 |
| NT50  | 14        | 63   | 44   | 6532-NT50SLH14X63 |
| NT50  | 16        | 63   | 48   | 6532-NT50SLH16X63 |
| NT50  | 18        | 63   | 50   | 6532-NT50SLH18X63 |
| NT50  | 20        | 63   | 52   | 6532-NT50SLH20X63 |
| NT50  | 25        | 80   | 65   | 6532-NT50SLH25X80 |
| NT50  | 32        | 80   | 72   | 6532-NT50SLH32X80 |
| NT50  | 40        | 90   | 80   | 6532-NT50SLH40X90 |

MORSE TAPER ADAPTOR WITH TANG



Shank



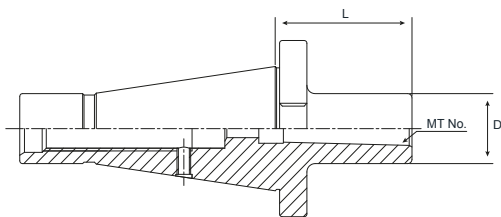
DIN 6383



≤0.005

| GROUP |        |      |      | TOHO              |
|-------|--------|------|------|-------------------|
| SHANK | MT No. | L MM | D MM | PART NUMBER       |
| NT30  | 1      | 50   | 25   | 6533-NT30MT1AX50  |
| NT30  | 2      | 50   | 32   | 6533-NT30MT2AX50  |
| NT30  | 3      | 75   | 40   | 6533-NT30MT3AX75  |
| NT40  | 1      | 50   | 25   | 6533-NT40MT1AX50  |
| NT40  | 2      | 50   | 32   | 6533-NT40MT2AX50  |
| NT40  | 3      | 65   | 40   | 6533-NT40MT3AX65  |
| NT40  | 4      | 95   | 48   | 6533-NT40MT4AX95  |
| NT50  | 1      | 45   | 25   | 6533-NT50MT1AX45  |
| NT50  | 2      | 60   | 32   | 6533-NT50MT2AX60  |
| NT50  | 3      | 65   | 40   | 6533-NT50MT3AX65  |
| NT50  | 4      | 70   | 48   | 6533-NT50MT4AX70  |
| NT50  | 5      | 105  | 63   | 6533-NT50MT5AX105 |

## MORSE TAPER ADAPTOR WITH DRAWBAR

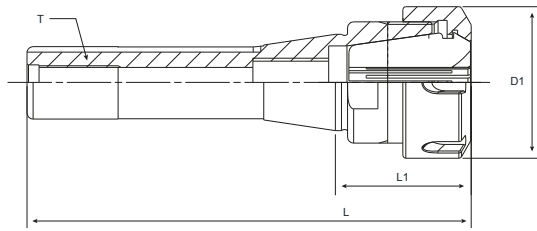

**NT**  
Shank


DIN 6383


 $\leq 0.005$ 

| GROUP       |        |      |      | TOHO              |
|-------------|--------|------|------|-------------------|
| SHANK       | MT No. | L MM | D MM | PART NUMBER       |
| <b>NT30</b> | 1      | 45   | 25   | 6533-NT30MT1BX45  |
| <b>NT30</b> | 2      | 60   | 32   | 6533-NT30MT2BX60  |
| <b>NT30</b> | 3      | 70   | 40   | 6533-NT30MT3BX70  |
| <b>NT40</b> | 1      | 50   | 25   | 6533-NT40MT1BX50  |
| <b>NT40</b> | 2      | 50   | 32   | 6533-NT40MT2BX50  |
| <b>NT40</b> | 3      | 65   | 40   | 6533-NT40MT3BX65  |
| <b>NT40</b> | 4      | 95   | 48   | 6533-NT40MT4BX95  |
| <b>NT50</b> | 1      | 60   | 25   | 6533-NT50MT1BX60  |
| <b>NT50</b> | 2      | 60   | 32   | 6533-NT50MT2BX60  |
| <b>NT50</b> | 3      | 65   | 40   | 6533-NT50MT3BX65  |
| <b>NT50</b> | 4      | 65   | 48   | 6533-NT50MT4BX65  |
| <b>NT50</b> | 5      | 120  | 63   | 6533-NT50MT5BX120 |

## ER COLLET CHUCK



R8

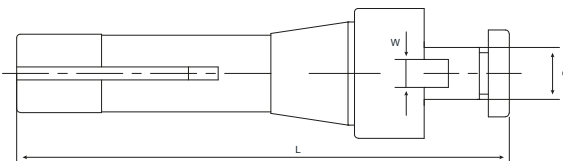
Shank

GROUP

TOHO

| SHANK | SIZE | L MM | L1 MM | D1 MM | T          | CAPACITY MM | PART NUMBER    |
|-------|------|------|-------|-------|------------|-------------|----------------|
| R8    | ER16 | 140  | 38    | 28    | 7/16-20UNF | 1-10        | 6530-R8ER16X38 |
| R8    | ER20 | 140  | 38    | 34    | 7/16-20UNF | 1-13        | 6530-R8ER20X38 |
| R8    | ER25 | 142  | 40    | 42    | 7/16-20UNF | 2-16        | 6530-R8ER25X40 |
| R8    | ER32 | 142  | 40    | 50    | 7/16-20UNF | 2-20        | 6530-R8ER32X40 |
| R8    | ER32 | 172  | 70    | 50    | 7/16-20UNF | 2-20        | 6530-R8ER32X70 |
| R8    | ER40 | 172  | 70    | 63    | 7/16-20UNF | 3-26        | 6530-R8ER40X70 |

## FACE MILL HOLDER



R8

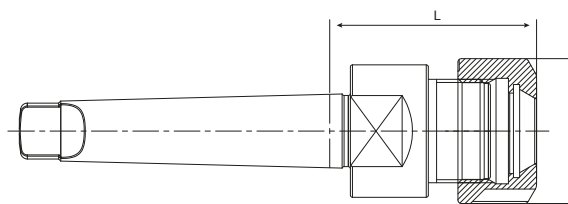
Shank

GROUP

TOHO

| SHANK | SIZE d MM | L MM | W MM | PART NUMBER  |
|-------|-----------|------|------|--------------|
| R8    | 16        | 148  | 8    | 6531-R8FMH16 |
| R8    | 22        | 155  | 10   | 6531-R8FMH22 |
| R8    | 27        | 160  | 12   | 6531-R8FMH27 |
| R8    | 32        | 166  | 14   | 6531-R8FMH32 |
| R8    | 40        | 170  | 16   | 6531-R8FMH40 |

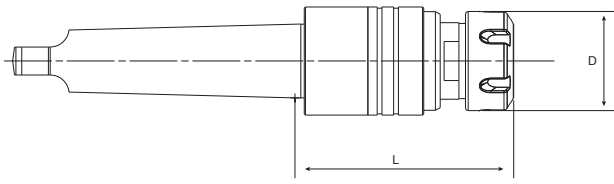
## ER COLLET CHUCK WITH TANG



Shank

| GROUP      |      |      |      |             | TOHO              |
|------------|------|------|------|-------------|-------------------|
| SHANK      | SIZE | L MM | D MM | CAPACITY MM | PART NUMBER       |
| <b>MT2</b> | ER16 | 50   | 22   | 1-10        | 6530-MTA2ER16MX50 |
| <b>MT2</b> | ER20 | 50   | 28   | 1-13        | 6530-MTA2ER20MX50 |
| <b>MT2</b> | ER25 | 60   | 42   | 1-16        | 6530-MTA2ER25X60  |
| <b>MT2</b> | ER32 | 60   | 50   | 1-20        | 6530-MTA2ER32X60  |
| <b>MT3</b> | ER16 | 60   | 22   | 1-10        | 6530-MTA3ER16MX60 |
| <b>MT3</b> | ER20 | 60   | 28   | 1-13        | 6530-MTA3ER20MX60 |
| <b>MT3</b> | ER25 | 60   | 42   | 1-16        | 6530-MTA3ER25X60  |
| <b>MT3</b> | ER32 | 70   | 50   | 1-20        | 6530-MTA3ER32X70  |
| <b>MT3</b> | ER40 | 80   | 63   | 2-26        | 6530-MTA3ER40X80  |
| <b>MT4</b> | ER25 | 60   | 42   | 1-16        | 6530-MTA4ER25X60  |
| <b>MT4</b> | ER32 | 70   | 50   | 1-20        | 6530-MTA4ER32X70  |
| <b>MT4</b> | ER40 | 80   | 63   | 2-26        | 6530-MTA4ER40X80  |
| <b>MT5</b> | ER40 | 80   | 63   | 2-26        | 6530-MTA5ER40X80  |

TAP HOLDER TENSION AND COMPRESSION



Shank



8.0mm



5.0mm

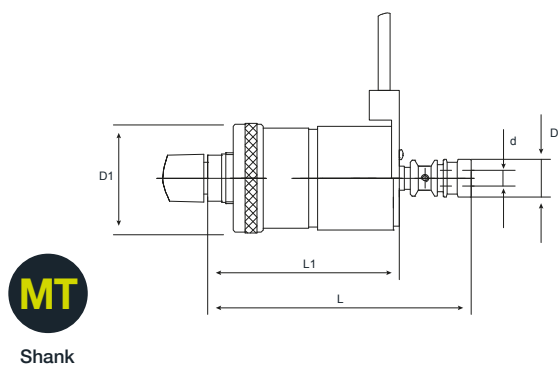


GROUP

TOHO

| SHANK | TAP COLLET | L MM | D MM | TAPPING RANGE MM | PART NUMBER    |
|-------|------------|------|------|------------------|----------------|
| MT2   | ER16G      | 97   | 46   | M2-M12           | 6542-MTA2ER16G |
| MT2   | ER20G      | 99   | 46   | M2-M16           | 6542-MTA2ER20G |
| MT2   | ER25G      | 101  | 46   | M2-M22           | 6542-MTA2ER25G |
| MT3   | ER16G      | 97   | 50   | M2-M12           | 6542-MTA3ER16G |
| MT3   | ER20G      | 99   | 50   | M2-M16           | 6542-MTA3ER20G |
| MT3   | ER25G      | 101  | 50   | M2-M22           | 6542-MTA3ER25G |
| MT3   | ER32G      | 104  | 50   | M2-M24           | 6542-MTA3ER32G |
| MT4   | ER16G      | 97   | 66   | M2-M12           | 6542-MTA4ER16G |
| MT4   | ER20G      | 99   | 66   | M2-M16           | 6542-MTA4ER20G |
| MT4   | ER25G      | 101  | 66   | M2-M22           | 6542-MTA4ER25G |
| MT4   | ER32G      | 104  | 66   | M2-M24           | 6542-MTA4ER16G |
| MT5   | ER32G      | 104  | 66   | M2-M24           | 6530-MTA5ER32G |

## REVERSIBLE TAPPING CHUCK

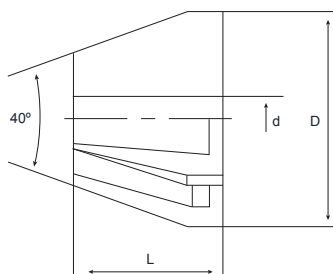


Shank


**GROUP** **TOHO**

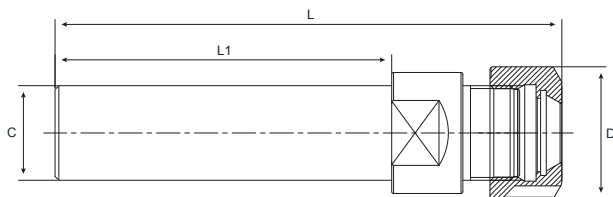
| SHANK              | d MM    | D MM | D1 MM | L MM | L1 MM | COLLETS   | TAPPING RANGE MM | PART NUMBER    |
|--------------------|---------|------|-------|------|-------|-----------|------------------|----------------|
| <b>MT2 &amp; 3</b> | 2.5-6.5 | 23   | 55    | 135  | 95    | RF1 & RF2 | M2-M7            | 6542-RTCM2XM7  |
| <b>MT3 &amp; 4</b> | 3.5-10  | 28   | 75    | 164  | 114.5 | RF3 & RF4 | M5-M12           | 6542-RTCM5XM12 |
| <b>MT3 &amp; 4</b> | 6.0-14  | 38   | 90.5  | 205  | 135   | RF5 & RF6 | M8-M20           | 6542-RTCM8XM20 |

## RUBBER FLEX COLLETS


**GROUP** **TOHO**

| SIZE       | D MM | d MM       | L MM | PART NUMBER |
|------------|------|------------|------|-------------|
| <b>RF1</b> | 15   | 2.5-4.2    | 11   | 6542-RF1    |
| <b>RF2</b> | 15   | 4.2-6.5    | 11   | 6542-RF2    |
| <b>RF3</b> | 21   | 3.5-7.0    | 13   | 6542-RF3    |
| <b>RF4</b> | 21   | 7.0-10     | 13   | 6542-RF4    |
| <b>RF5</b> | 26.5 | 6.0-9.0    | 15   | 6542-RF5    |
| <b>RF6</b> | 26.5 | 9.0-14     | 15   | 6542-RF6    |
| <b>RF7</b> | 26.9 | 12.7-19.05 | 12   | 6542-RF7    |

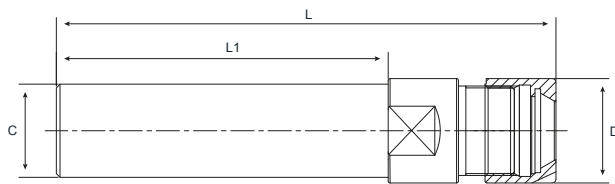
**ER COLLET CHUCK WITH UM NUT**



Shank

| GROUP     |      |       |      |      |             | TOHO               |
|-----------|------|-------|------|------|-------------|--------------------|
| SHANK (C) | SIZE | L1 MM | L MM | D MM | CAPACITY MM | PART NUMBER        |
| 20        | ER25 | 100   | 144  | 42   | 1-16        | 6530-C20ER25UMX100 |
| 25        | ER25 | 100   | 144  | 42   | 1-16        | 6530-C25ER25UMX100 |
| 25        | ER25 | 150   | 194  | 42   | 1-16        | 6530-C25ER25UMX150 |
| 25        | ER25 | 200   | 244  | 42   | 1-16        | 6530-C25ER25UMX200 |
| 25        | ER32 | 100   | 148  | 50   | 1-20        | 6530-C25ER32UMX100 |
| 32        | ER25 | 100   | 144  | 42   | 1-16        | 6530-C32ER25UMX100 |
| 32        | ER25 | 150   | 194  | 42   | 1-16        | 6530-C32ER25UMX150 |
| 32        | ER32 | 100   | 148  | 50   | 1-20        | 6530-C32ER32UMX100 |
| 32        | ER32 | 150   | 194  | 50   | 1-20        | 6530-C32ER32UMX150 |
| 32        | ER32 | 200   | 248  | 50   | 1-20        | 6530-C32ER32UMX200 |
| 32        | ER40 | 100   | 151  | 63   | 2-26        | 6530-C32ER40UMX100 |
| 40        | ER32 | 100   | 148  | 50   | 1-20        | 6530-C40ER32UMX100 |
| 40        | ER40 | 100   | 151  | 63   | 2-26        | 6530-C40ER40UMX100 |
| 40        | ER40 | 150   | 201  | 63   | 2-26        | 6530-C40ER40UMX150 |

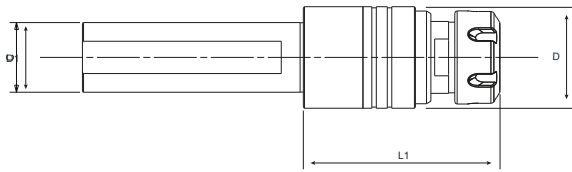
## ER COLLET CHUCK WITH MINI NUT



Shank

| GROUP     |      |       |      |      |             | TOHO              |
|-----------|------|-------|------|------|-------------|-------------------|
| SHANK (C) | SIZE | L1 MM | L MM | D MM | CAPACITY MM | PART NUMBER       |
| <b>8</b>  | ER8  | 100   | 125  | 12   | 1-5         | 6530-C8ER8MX100   |
| <b>10</b> | ER8  | 100   | 125  | 12   | 1-5         | 6530-C10ER8MX100  |
| <b>10</b> | ER8  | 150   | 175  | 12   | 1-5         | 6530-C10ER8MX150  |
| <b>12</b> | ER11 | 100   | 125  | 16   | 1-7         | 6530-C12ER11MX100 |
| <b>16</b> | ER11 | 100   | 125  | 16   | 1-7         | 6530-C16ER11MX100 |
| <b>16</b> | ER11 | 150   | 175  | 16   | 1-7         | 6530-C16ER11MX150 |
| <b>16</b> | ER16 | 100   | 131  | 22   | 1-10        | 6530-C16ER16MX100 |
| <b>16</b> | ER16 | 150   | 181  | 22   | 1-10        | 6530-C16ER16MX150 |
| <b>20</b> | ER16 | 100   | 131  | 22   | 1-10        | 6530-C20ER16MX100 |
| <b>20</b> | ER16 | 150   | 181  | 22   | 1-10        | 6530-C20ER16MX150 |
| <b>20</b> | ER20 | 100   | 137  | 28   | 1-13        | 6530-C20ER20MX100 |
| <b>20</b> | ER20 | 150   | 187  | 28   | 1-13        | 6530-C20ER20MX150 |
| <b>25</b> | ER16 | 100   | 131  | 22   | 1-10        | 6530-C25ER16MX100 |
| <b>25</b> | ER16 | 150   | 181  | 22   | 1-10        | 6530-C25ER16MX150 |
| <b>25</b> | ER20 | 100   | 137  | 28   | 1-13        | 6530-C25ER20MX100 |
| <b>25</b> | ER20 | 150   | 187  | 28   | 1-13        | 6530-C25ER20MX150 |

**TAP HOLDER TENSION AND COMPRESSION**



Shank



8.0mm



5.0mm

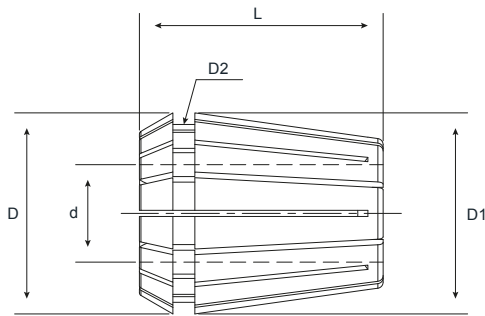


**GROUP**

**TOHO**

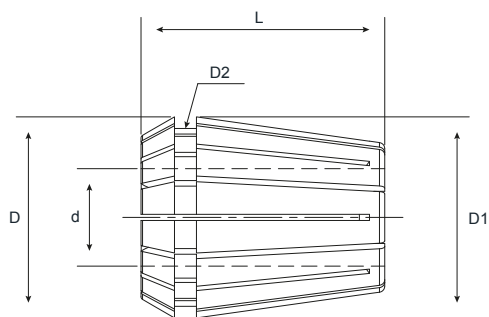
| SHANK (D1) | TAP COLLET | L1 MM | D MM | D1 MM | TAPPING RANGE MM | PART NUMBER      |
|------------|------------|-------|------|-------|------------------|------------------|
| 20         | ER16G      | 80    | 46   | 20    | M2-M12           | 6542-C20ER16GX80 |
| 20         | ER20G      | 80    | 46   | 20    | M2-M16           | 6542-C20ER20GX80 |
| 20         | ER25G      | 80    | 46   | 20    | M2-M22           | 6542-C20ER25GX80 |
| 20         | ER32G      | 80    | 46   | 20    | M2-M24           | 6542-C20ER32GX80 |
| 25         | ER16G      | 80    | 46   | 25    | M2-M12           | 6542-C25ER16GX80 |
| 25         | ER20G      | 80    | 46   | 25    | M2-M16           | 6542-C25ER20GX80 |
| 25         | ER25G      | 80    | 46   | 25    | M2-M22           | 6542-C25ER25GX80 |
| 25         | ER32G      | 80    | 46   | 25    | M2-M24           | 6542-C25ER32GX80 |

## ER COLLET



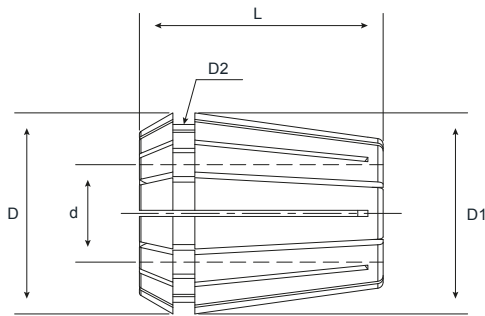
| GROUP |           |       |      |       |      | TOHO           |
|-------|-----------|-------|------|-------|------|----------------|
| ER    | SIZE d MM | D1 MM | D MM | D2 MM | L MM | PART NUMBER    |
| ER8   | 1-0.5     | 8     | 8.45 | 6.5   | 13.5 | 6536-ER8X01    |
| ER8   | 1.5-1     | 8     | 8.45 | 6.5   | 13.5 | 6536-ER8X01.5  |
| ER8   | 2-1.5     | 8     | 8.45 | 6.5   | 13.5 | 6536-ER8X02    |
| ER8   | 2.5-2     | 8     | 8.45 | 6.5   | 13.5 | 6536-ER8X02.5  |
| ER8   | 3-2.5     | 8     | 8.45 | 6.5   | 13.5 | 6536-ER8X03    |
| ER8   | 3.5-3     | 8     | 8.45 | 6.5   | 13.5 | 6536-ER8X03.5  |
| ER8   | 4-3.5     | 8     | 8.45 | 6.5   | 13.5 | 6536-ER8X04    |
| ER8   | 4.5-4     | 8     | 8.45 | 6.5   | 13.5 | 6536-ER8X04.5  |
| ER8   | 5-4.5     | 8     | 8.45 | 6.5   | 13.5 | 6536-ER8X05    |
|       |           |       |      |       |      |                |
| ER11  | 1-0.5     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X01   |
| ER11  | 1.5-1     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X01.5 |
| ER11  | 2-1.5     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X02   |
| ER11  | 2.5-2     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X02.5 |
| ER11  | 3-2.5     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X03   |
| ER11  | 3.5-3     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X03.5 |
| ER11  | 4-3.5     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X04   |
| ER11  | 4.5-4     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X04.5 |
| ER11  | 5-4.5     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X05   |
| ER11  | 5.5-5     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X05.5 |
| ER11  | 6-5.5     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X06   |
| ER11  | 6.5-6     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X06.5 |
| ER11  | 7-6.5     | 11    | 11.5 | 9.5   | 18   | 6536-ER11X07   |
|       |           |       |      |       |      |                |
| ER16  | 1-0.5     | 16    | 17   | 13.8  | 27.5 | 6536-ER16X01   |
| ER16  | 2-1       | 16    | 17   | 13.8  | 27.5 | 6536-ER16X02   |
| ER16  | 3-2       | 16    | 17   | 13.8  | 27.5 | 6536-ER16X03   |
| ER16  | 4-3       | 16    | 17   | 13.8  | 27.5 | 6536-ER16X04   |
| ER16  | 5-4       | 16    | 17   | 13.8  | 27.5 | 6536-ER16X05   |
| ER16  | 6-5       | 16    | 17   | 13.8  | 27.5 | 6536-ER16X06   |
| ER16  | 7-6       | 16    | 17   | 13.8  | 27.5 | 6536-ER16X07   |
| ER16  | 8-7       | 16    | 17   | 13.8  | 27.5 | 6536-ER16X08   |
| ER16  | 9-8       | 16    | 17   | 13.8  | 27.5 | 6536-ER16X09   |
| ER16  | 10-9      | 16    | 17   | 13.8  | 27.5 | 6536-ER16X10   |

## ER COLLET



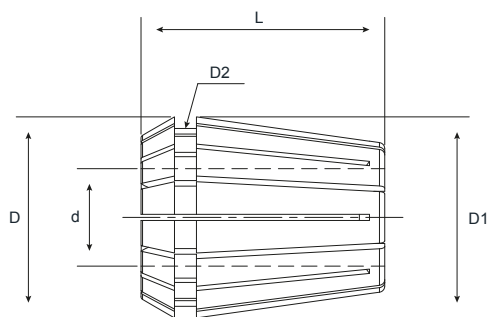
| GROUP |           |       |      |       |      | TOHO         |
|-------|-----------|-------|------|-------|------|--------------|
| ER    | SIZE d MM | D1 MM | D MM | D2 MM | L MM | PART NUMBER  |
| ER20  | 1-0.5     | 20    | 21   | 17.4  | 31.5 | 6536-ER20X01 |
| ER20  | 2-1       | 20    | 21   | 17.4  | 31.5 | 6536-ER20X02 |
| ER20  | 3-2       | 20    | 21   | 17.4  | 31.5 | 6536-ER20X03 |
| ER20  | 4-3       | 20    | 21   | 17.4  | 31.5 | 6536-ER20X04 |
| ER20  | 5-4       | 20    | 21   | 17.4  | 31.5 | 6536-ER20X05 |
| ER20  | 6-5       | 20    | 21   | 17.4  | 31.5 | 6536-ER20X06 |
| ER20  | 7-6       | 20    | 21   | 17.4  | 31.5 | 6536-ER20X07 |
| ER20  | 8-7       | 20    | 21   | 17.4  | 31.5 | 6536-ER20X08 |
| ER20  | 9-8       | 20    | 21   | 17.4  | 31.5 | 6536-ER20X09 |
| ER20  | 10-9      | 20    | 21   | 17.4  | 31.5 | 6536-ER20X10 |
| ER20  | 11-10     | 20    | 21   | 17.4  | 31.5 | 6536-ER20X11 |
| ER20  | 12-11     | 20    | 21   | 17.4  | 31.5 | 6536-ER20X12 |
| ER20  | 13-12     | 20    | 21   | 17.4  | 31.5 | 6536-ER20X13 |
| ER25  | 1-0.5     | 25    | 26   | 22    | 34   | 6536-ER25X01 |
| ER25  | 2-1       | 25    | 26   | 22    | 34   | 6536-ER25X02 |
| ER25  | 3-2       | 25    | 26   | 22    | 34   | 6536-ER25X03 |
| ER25  | 4-3       | 25    | 26   | 22    | 34   | 6536-ER25X04 |
| ER25  | 5-4       | 25    | 26   | 22    | 34   | 6536-ER25X05 |
| ER25  | 6-5       | 25    | 26   | 22    | 34   | 6536-ER25X06 |
| ER25  | 7-6       | 25    | 26   | 22    | 34   | 6536-ER25X07 |
| ER25  | 8-7       | 25    | 26   | 22    | 34   | 6536-ER25X08 |
| ER25  | 9-8       | 25    | 26   | 22    | 34   | 6536-ER25X09 |
| ER25  | 10-9      | 25    | 26   | 22    | 34   | 6536-ER25X10 |
| ER25  | 11-10     | 25    | 26   | 22    | 34   | 6536-ER25X11 |
| ER25  | 12-11     | 25    | 26   | 22    | 34   | 6536-ER25X12 |
| ER25  | 13-12     | 25    | 26   | 22    | 34   | 6536-ER25X13 |
| ER25  | 14-13     | 25    | 26   | 22    | 34   | 6536-ER25X14 |
| ER25  | 15-14     | 25    | 26   | 22    | 34   | 6536-ER25X15 |
| ER25  | 16-15     | 25    | 26   | 22    | 34   | 6536-ER25X16 |

## ER COLLET



| GROUP |           |       |      |       |      | TOHO         |
|-------|-----------|-------|------|-------|------|--------------|
| ER    | SIZE d MM | D1 MM | D MM | D2 MM | L MM | PART NUMBER  |
| ER32  | 2-1       | 32    | 33   | 29.2  | 40   | 6536-ER32X02 |
| ER32  | 3-2       | 32    | 33   | 29.2  | 40   | 6536-ER32X03 |
| ER32  | 4-3       | 32    | 33   | 29.2  | 40   | 6536-ER32X04 |
| ER32  | 5-4       | 32    | 33   | 29.2  | 40   | 6536-ER32X05 |
| ER32  | 6-5       | 32    | 33   | 29.2  | 40   | 6536-ER32X06 |
| ER32  | 7-6       | 32    | 33   | 29.2  | 40   | 6536-ER32X07 |
| ER32  | 8-7       | 32    | 33   | 29.2  | 40   | 6536-ER32X08 |
| ER32  | 9-8       | 32    | 33   | 29.2  | 40   | 6536-ER32X09 |
| ER32  | 10-9      | 32    | 33   | 29.2  | 40   | 6536-ER32X10 |
| ER32  | 11-10     | 32    | 33   | 29.2  | 40   | 6536-ER32X11 |
| ER32  | 12-11     | 32    | 33   | 29.2  | 40   | 6536-ER32X12 |
| ER32  | 13-12     | 32    | 33   | 29.2  | 40   | 6536-ER32X13 |
| ER32  | 14-13     | 32    | 33   | 29.2  | 40   | 6536-ER32X14 |
| ER32  | 15-14     | 32    | 33   | 29.2  | 40   | 6536-ER32X15 |
| ER32  | 16-15     | 32    | 33   | 29.2  | 40   | 6536-ER32X16 |
| ER32  | 17-16     | 32    | 33   | 29.2  | 40   | 6536-ER32X17 |
| ER32  | 18-17     | 32    | 33   | 29.2  | 40   | 6536-ER32X18 |
| ER32  | 19-18     | 32    | 33   | 29.2  | 40   | 6536-ER32X19 |
| ER32  | 20-19     | 32    | 33   | 29.2  | 40   | 6536-ER32X20 |
|       |           |       |      |       |      |              |
| ER40  | 3-2       | 40    | 41   | 36.2  | 46   | 6536-ER40X03 |
| ER40  | 4-3       | 40    | 41   | 36.2  | 46   | 6536-ER40X04 |
| ER40  | 5-4       | 40    | 41   | 36.2  | 46   | 6536-ER40X05 |
| ER40  | 6-5       | 40    | 41   | 36.2  | 46   | 6536-ER40X06 |
| ER40  | 7-6       | 40    | 41   | 36.2  | 46   | 6536-ER40X07 |
| ER40  | 8-7       | 40    | 41   | 36.2  | 46   | 6536-ER40X08 |
| ER40  | 9-8       | 40    | 41   | 36.2  | 46   | 6536-ER40X09 |
| ER40  | 10-9      | 40    | 41   | 36.2  | 46   | 6536-ER40X10 |
| ER40  | 11-10     | 40    | 41   | 36.2  | 46   | 6536-ER40X11 |
| ER40  | 12-11     | 40    | 41   | 36.2  | 46   | 6536-ER40X12 |
| ER40  | 13-12     | 40    | 41   | 36.2  | 46   | 6536-ER40X13 |
| ER40  | 14-13     | 40    | 41   | 36.2  | 46   | 6536-ER40X14 |
| ER40  | 15-14     | 40    | 41   | 36.2  | 46   | 6536-ER40X15 |
| ER40  | 16-15     | 40    | 41   | 36.2  | 46   | 6536-ER40X16 |

## ER COLLET



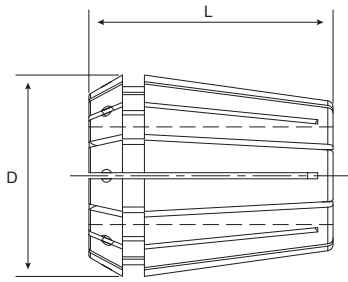
| GROUP |           |       |      |       |      | TOHO         |
|-------|-----------|-------|------|-------|------|--------------|
| ER    | SIZE d MM | D1 MM | D MM | D2 MM | L MM | PART NUMBER  |
| ER40  | 17-16     | 40    | 41   | 36.2  | 46   | 6536-ER40X17 |
| ER40  | 18-17     | 40    | 41   | 36.2  | 46   | 6536-ER40X18 |
| ER40  | 19-18     | 40    | 41   | 36.2  | 46   | 6536-ER40X19 |
| ER40  | 20-19     | 40    | 41   | 36.2  | 46   | 6536-ER40X20 |
| ER40  | 21-20     | 40    | 41   | 36.2  | 46   | 6536-ER40X21 |
| ER40  | 22-21     | 40    | 41   | 36.2  | 46   | 6536-ER40X22 |
| ER40  | 23-22     | 40    | 41   | 36.2  | 46   | 6536-ER40X23 |
| ER40  | 24-23     | 40    | 41   | 36.2  | 46   | 6536-ER40X24 |
| ER40  | 25-24     | 40    | 41   | 36.2  | 46   | 6536-ER40X25 |
| ER40  | 26-25     | 40    | 41   | 36.2  | 46   | 6536-ER40X26 |
| ER50  | 6-4       | 50    | 52   | 46    | 60   | 6536-ER50X06 |
| ER50  | 8-6       | 50    | 52   | 46    | 60   | 6536-ER50X08 |
| ER50  | 10-8      | 50    | 52   | 46    | 60   | 6536-ER50X10 |
| ER50  | 12-10     | 50    | 52   | 46    | 60   | 6536-ER50X12 |
| ER50  | 14-12     | 50    | 52   | 46    | 60   | 6536-ER50X14 |
| ER50  | 16-14     | 50    | 52   | 46    | 60   | 6536-ER50X16 |
| ER50  | 18-16     | 50    | 52   | 46    | 60   | 6536-ER50X18 |
| ER50  | 20-18     | 50    | 52   | 46    | 60   | 6536-ER50X20 |
| ER50  | 22-20     | 50    | 52   | 46    | 60   | 6536-ER50X22 |
| ER50  | 24-22     | 50    | 52   | 46    | 60   | 6536-ER50X24 |
| ER50  | 26-24     | 50    | 52   | 46    | 60   | 6536-ER50X26 |
| ER50  | 28-26     | 50    | 52   | 46    | 60   | 6536-ER50X28 |
| ER50  | 30-28     | 50    | 52   | 46    | 60   | 6536-ER50X30 |
| ER50  | 32-30     | 50    | 52   | 46    | 60   | 6536-ER50X32 |
| ER50  | 34-32     | 50    | 52   | 46    | 60   | 6536-ER50X34 |

## ER COLLET SETS

**ER COLLET**
**SETS**


| GROUP       |  |        | TOHO            |
|-------------|--|--------|-----------------|
| ER          | SIZES MM   | PIECES | PART NUMBER     |
| <b>ER8</b>  | 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5  | 9      | 6536-ER8X9SET   |
| <b>ER8</b>  | 1, 2, 3, 4, 5  | 5      | 6536-ER8X5SET   |
| <b>ER11</b> | 1, 2, 3, 4, 5, 6, 7  | 7      | 6536-ER11X7SET  |
| <b>ER11</b> | 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7                                    | 13     | 6536-ER11X13SET |
| <b>ER16</b> | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10  | 10     | 6536-ER16X10SET |
| <b>ER20</b> | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13  | 13     | 6536-ER20X13SET |
| <b>ER25</b> | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16                                   | 15     | 6536-ER25X15SET |
| <b>ER32</b> | 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20                      | 18     | 6536-ER32X18SET |
| <b>ER40</b> | 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 | 23     | 6536-ER40X23SET |

## ER COLLET SEALED

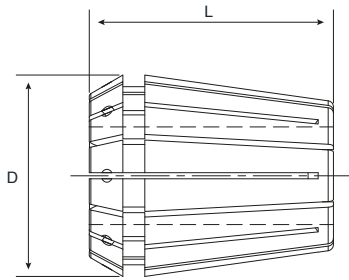


GROUP

TOHO

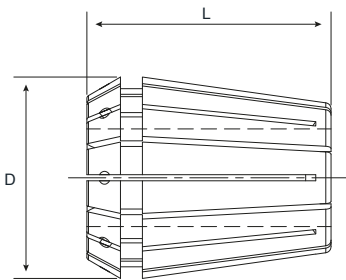
| ER   | SIZE DIAMETER MM | D MM  | L MM | PART NUMBER      |
|------|------------------|-------|------|------------------|
| ER11 | 3                | 11.3  | 18   | 6536-ER11SCX03   |
| ER11 | 3.5              | 11.3  | 18   | 6536-ER11SCX03.5 |
| ER11 | 4                | 11.3  | 18   | 6536-ER11SCX04   |
| ER11 | 4.5              | 11.3  | 18   | 6536-ER11SCX04.5 |
| ER11 | 5                | 11.3  | 18   | 6536-ER11SCX05   |
| ER11 | 5.5              | 11.3  | 18   | 6536-ER11SCX05.5 |
| ER11 | 6                | 11.3  | 18   | 6536-ER11SCX06   |
| ER11 | 6.5              | 11.3  | 18   | 6536-ER11SCX06.5 |
| ER11 | 7                | 11.3  | 18   | 6536-ER11SCX07   |
| ER16 | 3                | 16.74 | 27.5 | 6536-ER16SCX03   |
| ER16 | 4                | 16.74 | 27.5 | 6536-ER16SCX04   |
| ER16 | 5                | 16.74 | 27.5 | 6536-ER16SCX05   |
| ER16 | 6                | 16.74 | 27.5 | 6536-ER16SCX06   |
| ER16 | 7                | 16.74 | 27.5 | 6536-ER16SCX07   |
| ER16 | 8                | 16.74 | 27.5 | 6536-ER16SCX08   |
| ER16 | 9                | 16.74 | 27.5 | 6536-ER16SCX09   |
| ER16 | 10               | 16.74 | 27.5 | 6536-ER16SCX10   |
| ER20 | 3                | 20.74 | 31.5 | 6536-ER20SCX03   |
| ER20 | 4                | 20.74 | 31.5 | 6536-ER20SCX04   |
| ER20 | 5                | 20.74 | 31.5 | 6536-ER20SCX05   |
| ER20 | 6                | 20.74 | 31.5 | 6536-ER20SCX06   |
| ER20 | 7                | 20.74 | 31.5 | 6536-ER20SCX07   |
| ER20 | 8                | 20.74 | 31.5 | 6536-ER20SCX08   |
| ER20 | 9                | 20.74 | 31.5 | 6536-ER20SCX09   |
| ER20 | 10               | 20.74 | 31.5 | 6536-ER20SCX10   |
| ER20 | 11               | 20.74 | 31.5 | 6536-ER20SCX11   |
| ER20 | 12               | 20.74 | 31.5 | 6536-ER20SCX12   |
| ER20 | 13               | 20.74 | 31.5 | 6536-ER20SCX13   |

## ER COLLET SEALED

**ER COLLET**
**SEALED**


| GROUP |                  |       |      | TOHO           |
|-------|------------------|-------|------|----------------|
| ER    | SIZE DIAMETER MM | D MM  | L MM | PART NUMBER    |
| ER25  | 3                | 25.74 | 34   | 6536-ER25SCX03 |
| ER25  | 4                | 25.74 | 34   | 6536-ER25SCX04 |
| ER25  | 5                | 25.74 | 34   | 6536-ER25SCX05 |
| ER25  | 6                | 25.74 | 34   | 6536-ER25SCX06 |
| ER25  | 7                | 25.74 | 34   | 6536-ER25SCX07 |
| ER25  | 8                | 25.74 | 34   | 6536-ER25SCX08 |
| ER25  | 9                | 25.74 | 34   | 6536-ER25SCX09 |
| ER25  | 10               | 25.74 | 34   | 6536-ER25SCX10 |
| ER25  | 11               | 25.74 | 34   | 6536-ER25SCX11 |
| ER25  | 12               | 25.74 | 34   | 6536-ER25SCX12 |
| ER25  | 13               | 25.74 | 34   | 6536-ER25SCX13 |
| ER25  | 14               | 25.74 | 34   | 6536-ER25SCX14 |
| ER25  | 15               | 25.74 | 34   | 6536-ER25SCX15 |
| ER25  | 16               | 25.74 | 34   | 6536-ER25SCX16 |
|       |                  |       |      |                |
| ER32  | 3                | 32.74 | 40   | 6536-ER32SCX03 |
| ER32  | 4                | 32.74 | 40   | 6536-ER32SCX04 |
| ER32  | 5                | 32.74 | 40   | 6536-ER32SCX05 |
| ER32  | 6                | 32.74 | 40   | 6536-ER32SCX06 |
| ER32  | 7                | 32.74 | 40   | 6536-ER32SCX07 |
| ER32  | 8                | 32.74 | 40   | 6536-ER32SCX08 |
| ER32  | 9                | 32.74 | 40   | 6536-ER32SCX09 |
| ER32  | 10               | 32.74 | 40   | 6536-ER32SCX10 |
| ER32  | 11               | 32.74 | 40   | 6536-ER32SCX11 |
| ER32  | 12               | 32.74 | 40   | 6536-ER32SCX12 |
| ER32  | 13               | 32.74 | 40   | 6536-ER32SCX13 |
| ER32  | 14               | 32.74 | 40   | 6536-ER32SCX14 |
| ER32  | 15               | 32.74 | 40   | 6536-ER32SCX15 |
| ER32  | 16               | 32.74 | 40   | 6536-ER32SCX16 |
| ER32  | 17               | 32.74 | 40   | 6536-ER32SCX17 |
| ER32  | 18               | 32.74 | 40   | 6536-ER32SCX18 |
| ER32  | 19               | 32.74 | 40   | 6536-ER32SCX19 |
| ER32  | 20               | 32.74 | 40   | 6536-ER32SCX20 |

## ER COLLET SEALED

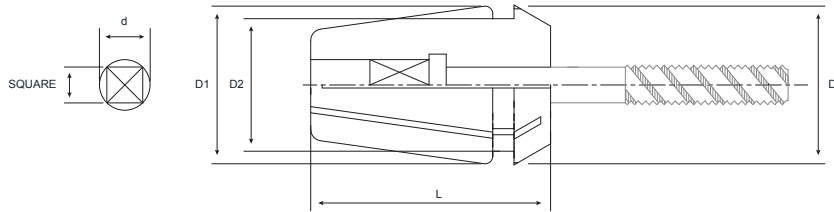


GROUP

TOHO

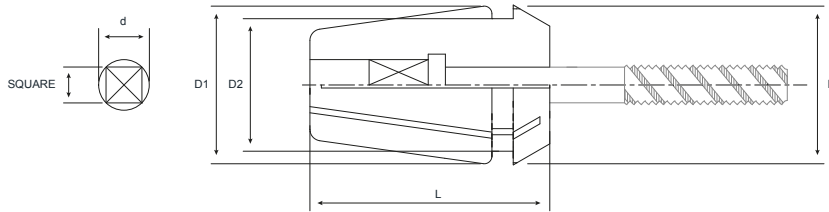
| ER   | SIZE DIAMETER MM | D MM  | L MM | PART NUMBER    |
|------|------------------|-------|------|----------------|
| ER40 | 4                | 40.74 | 46   | 6536-ER40SCX04 |
| ER40 | 5                | 40.74 | 46   | 6536-ER40SCX05 |
| ER40 | 6                | 40.74 | 46   | 6536-ER40SCX06 |
| ER40 | 7                | 40.74 | 46   | 6536-ER40SCX07 |
| ER40 | 8                | 40.74 | 46   | 6536-ER40SCX08 |
| ER40 | 9                | 40.74 | 46   | 6536-ER40SCX09 |
| ER40 | 10               | 40.74 | 46   | 6536-ER40SCX10 |
| ER40 | 11               | 40.74 | 46   | 6536-ER40SCX11 |
| ER40 | 12               | 40.74 | 46   | 6536-ER40SCX12 |
| ER40 | 13               | 40.74 | 46   | 6536-ER40SCX13 |
| ER40 | 14               | 40.74 | 46   | 6536-ER40SCX14 |
| ER40 | 15               | 40.74 | 46   | 6536-ER40SCX15 |
| ER40 | 16               | 40.74 | 46   | 6536-ER40SCX16 |
| ER40 | 17               | 40.74 | 46   | 6536-ER40SCX17 |
| ER40 | 18               | 40.74 | 46   | 6536-ER40SCX18 |
| ER40 | 19               | 40.74 | 46   | 6536-ER40SCX19 |
| ER40 | 20               | 40.74 | 46   | 6536-ER40SCX20 |
| ER40 | 21               | 40.74 | 46   | 6536-ER40SCX21 |
| ER40 | 22               | 40.74 | 46   | 6536-ER40SCX22 |
| ER40 | 23               | 40.74 | 46   | 6536-ER40SCX23 |
| ER40 | 24               | 40.74 | 46   | 6536-ER40SCX24 |
| ER40 | 25               | 40.74 | 46   | 6536-ER40SCX25 |
| ER40 | 26               | 40.74 | 46   | 6536-ER40SCX26 |

## ER TAPPING COLLET



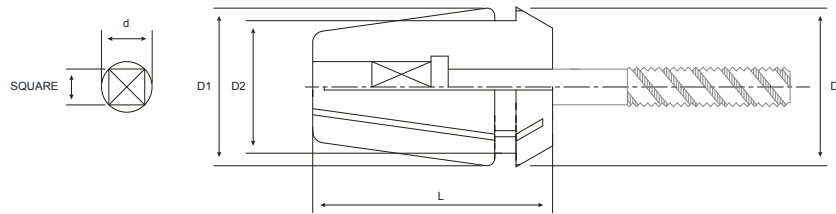
| GROUP |           |           |       |      |       |      |            |                | TOHO                |
|-------|-----------|-----------|-------|------|-------|------|------------|----------------|---------------------|
| ER    | SIZE d MM | SQUARE MM | D1 MM | D MM | D2 MM | L MM | TAP MM     | STANDARD       | PART NUMBER         |
| ER16G | 2.5       | 2.0       | 16    | 17   | 13.8  | 27.5 | M2         | ISO529         | 6543-ER16GX2.5X2.0  |
| ER16G | 2.5       | 2.1       | 16    | 17   | 13.8  | 27.5 | M1         | DIN371         | 6543-ER16GX2.5X2.1  |
| ER16G | 2.8       | 2.1       | 16    | 17   | 13.8  | 27.5 | M2, M2.5   | DIN371         | 6543-ER16GX2.8X2.1  |
| ER16G | 3.15      | 2.5       | 16    | 17   | 13.8  | 27.5 | M3         | ISO529         | 6543-ER16GX3.15X2.5 |
| ER16G | 3.5       | 2.7       | 16    | 17   | 13.8  | 27.5 | M3, M5     | DIN371, DIN376 | 6543-ER16GX3.5X2.7  |
| ER16G | 3.55      | 2.8       | 16    | 17   | 13.8  | 27.5 | M3.5       | ISO529         | 6543-ER16GX3.55X2.8 |
| ER16G | 4.0       | 3.0       | 16    | 17   | 13.8  | 27.5 | M3.5       | DIN371         | 6543-ER16GX4.0X3.0  |
| ER16G | 4.0       | 3.15      | 16    | 17   | 13.8  | 27.5 | M4         | ISO529         | 6543-ER16GX4.0X3.15 |
| ER16G | 4.5       | 3.4       | 16    | 17   | 13.8  | 27.5 | M4, M6     | DIN371, DIN376 | 6543-ER16GX4.5X3.4  |
| ER16G | 4.5       | 3.55      | 16    | 17   | 13.8  | 27.5 | M4.5       | ISO529         | 6543-ER16GX4.5X3.55 |
| ER16G | 5.0       | 4.0       | 16    | 17   | 13.8  | 27.5 | M5         | ISO529         | 6543-ER16GX5.0X4.0  |
| ER16G | 6.0       | 4.9       | 16    | 17   | 13.8  | 27.5 | M5, M6, M8 | DIN371, DIN376 | 6543-ER16GX6.0X4.9  |
| ER16G | 6.3       | 5.0       | 16    | 17   | 13.8  | 27.5 | M6         | ISO529         | 6543-ER16GX6.3X5.0  |
| ER16G | 7.0       | 5.5       | 16    | 17   | 13.8  | 27.5 | M7, M10    | DIN371, DIN376 | 6543-ER16GX7.0X5.5  |
| ER16G | 8.0       | 6.2       | 16    | 17   | 13.8  | 27.5 | M8         | DIN371         | 6543-ER16GX8.0X6.2  |
| ER16G | 8.0       | 6.3       | 16    | 17   | 13.8  | 27.5 | M8         | ISO529         | 6543-ER16GX8.0X6.3  |
| ER16G | 9.0       | 7.0       | 16    | 17   | 13.8  | 27.5 | M12        | DIN376         | 6543-ER16GX9.0X7.0  |
| ER16G | 9.0       | 7.1       | 16    | 17   | 13.8  | 27.5 | M9, M12    | ISO529         | 6543-ER16GX9.0X7.1  |
| ER16G | 10.0      | 8.0       | 16    | 17   | 13.8  | 27.5 | M10, M10   | ISO529, DIN371 | 6543-ER16GX10.0X8.0 |

# ER TAPPING COLLET



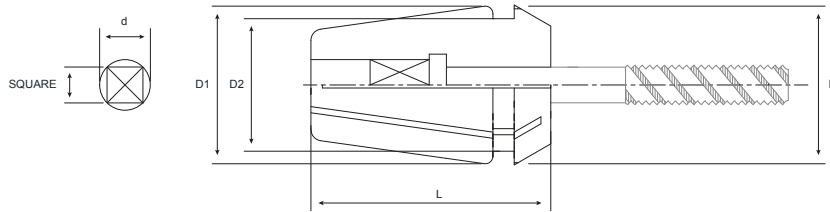
| GROUP |           |           |       |      |       |      |            |                | TOHO                 |
|-------|-----------|-----------|-------|------|-------|------|------------|----------------|----------------------|
| ER    | SIZE d MM | SQUARE MM | D1 MM | D MM | D2 MM | L MM | TAP MM     | STANDARD       | PART NUMBER          |
| ER20G | 2.5       | 2.0       | 20    | 21   | 17.4  | 31.5 | M2         | ISO529         | 6543-ER20GX2.5X2.0   |
| ER20G | 2.5       | 2.1       | 20    | 21   | 17.4  | 31.5 | M1         | DIN371         | 6543-ER20GX2.5X2.1   |
| ER20G | 2.8       | 2.1       | 20    | 21   | 17.4  | 31.5 | M2, M2.5   | DIN371         | 6543-ER20GX2.8X2.1   |
| ER20G | 3.15      | 2.5       | 20    | 21   | 17.4  | 31.5 | M3         | ISO529         | 6543-ER20GX3.15X2.5  |
| ER20G | 3.5       | 2.7       | 20    | 21   | 17.4  | 31.5 | M3, M5     | DIN371, DIN376 | 6543-ER20GX3.5X2.7   |
| ER20G | 3.55      | 2.8       | 20    | 21   | 17.4  | 31.5 | M3.5       | ISO529         | 6543-ER20GX3.55X2.8  |
| ER20G | 4.0       | 3.0       | 20    | 21   | 17.4  | 31.5 | M3.5       | DIN371         | 6543-ER20GX4.0X3.0   |
| ER20G | 4.0       | 3.15      | 20    | 21   | 17.4  | 31.5 | M4         | ISO529         | 6543-ER20GX4.0X3.15  |
| ER20G | 4.5       | 3.4       | 20    | 21   | 17.4  | 31.5 | M4, M6     | DIN371, DIN376 | 6543-ER20GX4.5X3.4   |
| ER20G | 4.5       | 3.55      | 20    | 21   | 17.4  | 31.5 | M4.5       | ISO529         | 6543-ER20GX4.5X3.55  |
| ER20G | 5.0       | 4.0       | 20    | 21   | 17.4  | 31.5 | M5         | ISO529         | 6543-ER20GX5.0X4.0   |
| ER20G | 6.0       | 4.9       | 20    | 21   | 17.4  | 31.5 | M5, M6, M8 | DIN371, DIN376 | 6543-ER20GX6.0X4.9   |
| ER20G | 6.3       | 5.0       | 20    | 21   | 17.4  | 31.5 | M6         | ISO529         | 6543-ER20GX6.3X5.0   |
| ER20G | 7.0       | 5.5       | 20    | 21   | 17.4  | 31.5 | M7, M10    | DIN371, DIN376 | 6543-ER20GX7.0X5.5   |
| ER20G | 8.0       | 6.2       | 20    | 21   | 17.4  | 31.5 | M8         | DIN371         | 6543-ER20GX8.0X6.2   |
| ER20G | 8.0       | 6.3       | 20    | 21   | 17.4  | 31.5 | M8         | ISO529         | 6543-ER20GX8.0X6.3   |
| ER20G | 9.0       | 7.0       | 20    | 21   | 17.4  | 31.5 | M12        | DIN376         | 6543-ER20GX9.0X7.0   |
| ER20G | 9.0       | 7.1       | 20    | 21   | 17.4  | 31.5 | M9, M12    | ISO529         | 6543-ER20GX9.0X7.1   |
| ER20G | 10.0      | 8.0       | 20    | 21   | 17.4  | 31.5 | M10, M10   | ISO529, DIN371 | 6543-ER20GX10.0X8.0  |
| ER20G | 11.0      | 9.0       | 20    | 21   | 17.4  | 31.5 | M14        | DIN376         | 6543-ER20GX11.0X9.0  |
| ER20G | 11.2      | 9.0       | 20    | 21   | 17.4  | 31.5 | M14        | ISO529         | 6543-ER20GX11.2X9.0  |
| ER20G | 12.0      | 9.0       | 20    | 21   | 17.4  | 31.5 | M16        | DIN376         | 6543-ER20GX12.0X9.0  |
| ER20G | 12.5      | 10.0      | 20    | 21   | 17.4  | 31.5 | M16        | ISO529         | 6543-ER20GX12.5X10.0 |

## ER TAPPING COLLET



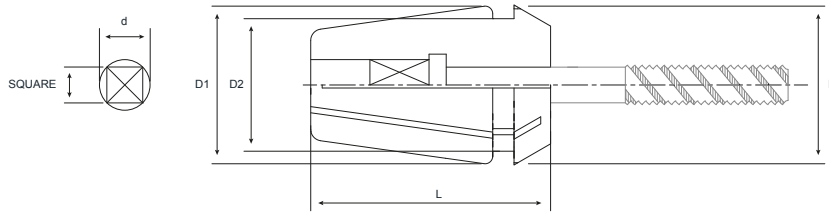
| GROUP |           |           |       |      |       |      |            |                | TOHO                 |
|-------|-----------|-----------|-------|------|-------|------|------------|----------------|----------------------|
| ER    | SIZE d MM | SQUARE MM | D1 MM | D MM | D2 MM | L MM | TAP MM     | STANDARD       | PART NUMBER          |
| ER25G | 2.5       | 2.0       | 25    | 26   | 22    | 34   | M2         | ISO529         | 6543-ER25GX2.5X2.0   |
| ER25G | 2.5       | 2.1       | 25    | 26   | 22    | 34   | M1         | DIN371         | 6543-ER25GX2.5X2.1   |
| ER25G | 2.8       | 2.1       | 25    | 26   | 22    | 34   | M2, M2.5   | DIN371         | 6543-ER25GX2.8X2.1   |
| ER25G | 3.15      | 2.5       | 25    | 26   | 22    | 34   | M3         | ISO529         | 6543-ER25GX3.15X2.5  |
| ER25G | 3.5       | 2.7       | 25    | 26   | 22    | 34   | M3, M5     | DIN371, DIN376 | 6543-ER25GX3.5X2.7   |
| ER25G | 3.55      | 2.8       | 25    | 26   | 22    | 34   | M3.5       | ISO529         | 6543-ER25GX3.55X2.8  |
| ER25G | 4.0       | 3.0       | 25    | 26   | 22    | 34   | M3.5       | DIN371         | 6543-ER25GX4.0X3.0   |
| ER25G | 4.0       | 3.15      | 25    | 26   | 22    | 34   | M4         | ISO529         | 6543-ER25GX4.0X3.15  |
| ER25G | 4.5       | 3.4       | 25    | 26   | 22    | 34   | M4, M6     | DIN371, DIN376 | 6543-ER25GX4.5X3.4   |
| ER25G | 4.5       | 3.55      | 25    | 26   | 22    | 34   | M4.5       | ISO529         | 6543-ER25GX4.5X3.55  |
| ER25G | 5.0       | 4.0       | 25    | 26   | 22    | 34   | M5         | ISO529         | 6543-ER25GX5.0X4.0   |
| ER25G | 6.0       | 4.9       | 25    | 26   | 22    | 34   | M5, M6, M8 | DIN371, DIN376 | 6543-ER25GX6.0X4.9   |
| ER25G | 6.3       | 5.0       | 25    | 26   | 22    | 34   | M6         | ISO529         | 6543-ER25GX6.3X5.0   |
| ER25G | 7.0       | 5.5       | 25    | 26   | 22    | 34   | M7, M10    | DIN371, DIN376 | 6543-ER25GX7.0X5.5   |
| ER25G | 8.0       | 6.2       | 25    | 26   | 22    | 34   | M8         | DIN371         | 6543-ER25GX8.0X6.2   |
| ER25G | 8.0       | 6.3       | 25    | 26   | 22    | 34   | M8         | ISO529         | 6543-ER25GX8.0X6.3   |
| ER25G | 9.0       | 7.0       | 25    | 26   | 22    | 34   | M12        | DIN376         | 6543-ER25GX9.0X7.0   |
| ER25G | 9.0       | 7.1       | 25    | 26   | 22    | 34   | M9, M12    | ISO529         | 6543-ER25GX9.0X7.1   |
| ER25G | 10.0      | 8.0       | 25    | 26   | 22    | 34   | M10, M10   | ISO529, DIN371 | 6543-ER25GX10.0X8.0  |
| ER25G | 11.0      | 9.0       | 25    | 26   | 22    | 34   | M14        | DIN376         | 6543-ER25GX11.0X9.0  |
| ER25G | 11.2      | 9.0       | 25    | 26   | 22    | 34   | M14        | ISO529         | 6543-ER25GX11.2X9.0  |
| ER25G | 12.0      | 9.0       | 25    | 26   | 22    | 34   | M16        | DIN376         | 6543-ER25GX12.0X9.0  |
| ER25G | 12.5      | 10.0      | 25    | 26   | 22    | 34   | M16        | ISO529         | 6543-ER25GX12.5X10.0 |
| ER25G | 14.0      | 11.0      | 25    | 26   | 22    | 34   | M18        | DIN376         | 6543-ER25GX14.0X11.0 |
| ER25G | 14.0      | 11.2      | 25    | 26   | 22    | 34   | M18, M20   | ISO529         | 6543-ER25GX14.0X11.2 |
| ER25G | 16.0      | 12.0      | 25    | 26   | 22    | 34   | M20        | DIN376         | 6543-ER25GX16.0X12.0 |
| ER25G | 16.0      | 12.5      | 25    | 26   | 22    | 34   | M22        | ISO529         | 6543-ER25GX16.0X12.5 |

# ER TAPPING COLLET



| GROUP |           |           |       |      |       |      |            |                | TOHO                 |
|-------|-----------|-----------|-------|------|-------|------|------------|----------------|----------------------|
| ER    | SIZE d MM | SQUARE MM | D1 MM | D MM | D2 MM | L MM | TAP MM     | STANDARD       | PART NUMBER          |
| ER32G | 2.5       | 2.0       | 32    | 33   | 29.2  | 40   | M2         | ISO529         | 6543-ER32GX2.5X2.0   |
| ER32G | 2.5       | 2.1       | 32    | 33   | 29.2  | 40   | M1         | DIN371         | 6543-ER32GX2.5X2.1   |
| ER32G | 2.8       | 2.1       | 32    | 33   | 29.2  | 40   | M2, M2.5   | DIN371         | 6543-ER32GX2.8X2.1   |
| ER32G | 3.15      | 2.5       | 32    | 33   | 29.2  | 40   | M3         | ISO529         | 6543-ER32GX3.15X2.5  |
| ER32G | 3.5       | 2.7       | 32    | 33   | 29.2  | 40   | M3, M5     | DIN371, DIN376 | 6543-ER32GX3.5X2.7   |
| ER32G | 3.55      | 2.8       | 32    | 33   | 29.2  | 40   | M3.5       | ISO529         | 6543-ER32GX3.55X2.8  |
| ER32G | 4.0       | 3.0       | 32    | 33   | 29.2  | 40   | M3.5       | DIN371         | 6543-ER32GX4.0X3.0   |
| ER32G | 4.0       | 3.15      | 32    | 33   | 29.2  | 40   | M4         | ISO529         | 6543-ER32GX4.0X3.15  |
| ER32G | 4.5       | 3.4       | 32    | 33   | 29.2  | 40   | M4, M6     | DIN371, DIN376 | 6543-ER32GX4.5X3.4   |
| ER32G | 4.5       | 3.55      | 32    | 33   | 29.2  | 40   | M4.5       | ISO529         | 6543-ER32GX4.5X3.55  |
| ER32G | 5.0       | 4.0       | 32    | 33   | 29.2  | 40   | M5         | ISO529         | 6543-ER32GX5.0X4.0   |
| ER32G | 6.0       | 4.9       | 32    | 33   | 29.2  | 40   | M5, M6, M8 | DIN371, DIN376 | 6543-ER32GX6.0X4.9   |
| ER32G | 6.3       | 5.0       | 32    | 33   | 29.2  | 40   | M6         | ISO529         | 6543-ER32GX6.3X5.0   |
| ER32G | 7.0       | 5.5       | 32    | 33   | 29.2  | 40   | M7, M10    | DIN371, DIN376 | 6543-ER32GX7.0X5.5   |
| ER32G | 8.0       | 6.2       | 32    | 33   | 29.2  | 40   | M8         | DIN371         | 6543-ER32GX8.0X6.2   |
| ER32G | 8.0       | 6.3       | 32    | 33   | 29.2  | 40   | M8         | ISO529         | 6543-ER32GX8.0X6.3   |
| ER32G | 9.0       | 7.0       | 32    | 33   | 29.2  | 40   | M12        | DIN376         | 6543-ER32GX9.0X7.0   |
| ER32G | 9.0       | 7.1       | 32    | 33   | 29.2  | 40   | M9, M12    | ISO529         | 6543-ER32GX9.0X7.1   |
| ER32G | 10.0      | 8.0       | 32    | 33   | 29.2  | 40   | M10, M10   | ISO529, DIN371 | 6543-ER32GX10.0X8.0  |
| ER32G | 11.0      | 9.0       | 32    | 33   | 29.2  | 40   | M14        | DIN376         | 6543-ER32GX11.0X9.0  |
| ER32G | 11.2      | 9.0       | 32    | 33   | 29.2  | 40   | M14        | ISO529         | 6543-ER32GX11.2X9.0  |
| ER32G | 12.0      | 9.0       | 32    | 33   | 29.2  | 40   | M16        | DIN376         | 6543-ER32GX12.0X9.0  |
| ER32G | 12.5      | 10.0      | 32    | 33   | 29.2  | 40   | M16        | ISO529         | 6543-ER32GX12.5X10.0 |
| ER32G | 14.0      | 11.0      | 32    | 33   | 29.2  | 40   | M18        | DIN376         | 6543-ER32GX14.0X11.0 |
| ER32G | 14.0      | 11.2      | 32    | 33   | 29.2  | 40   | M18, M20   | ISO529         | 6543-ER32GX14.0X11.2 |
| ER32G | 16.0      | 12.0      | 32    | 33   | 29.2  | 40   | M20        | DIN376         | 6543-ER32GX16.0X12.0 |
| ER32G | 16.0      | 12.5      | 32    | 33   | 29.2  | 40   | M22        | ISO529         | 6543-ER32GX16.0X12.5 |
| ER32G | 18.0      | 14.0      | 32    | 33   | 29.2  | 40   | M24        | ISO529         | 6543-ER32GX18.0X14.0 |
| ER32G | 18.0      | 14.5      | 32    | 33   | 29.2  | 40   | M24        | DIN376         | 6543-ER32GX18.0X14.5 |

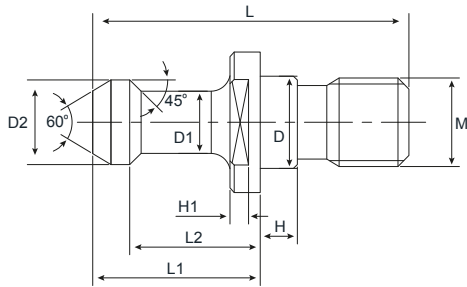
## ER TAPPING COLLET



| GROUP | TOHO |  |  |  |  |  |  |  |  |
|-------|------|--|--|--|--|--|--|--|--|
|-------|------|--|--|--|--|--|--|--|--|

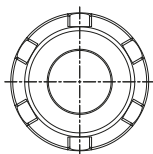
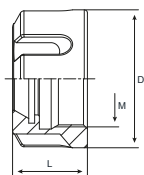
| ER    | SIZE d MM | SQUARE MM | D1 MM | D MM | D2 MM | L MM | TAP MM     | STANDARD       | PART NUMBER          |
|-------|-----------|-----------|-------|------|-------|------|------------|----------------|----------------------|
| ER40G | 2.5       | 2.0       | 40    | 42   | 36.2  | 46   | M2         | ISO529         | 6543-ER40GX2.5X2.0   |
| ER40G | 2.5       | 2.1       | 40    | 42   | 36.2  | 46   | M1         | DIN371         | 6543-ER40GX2.5X2.1   |
| ER40G | 2.8       | 2.1       | 40    | 42   | 36.2  | 46   | M2, M2.5   | DIN371         | 6543-ER40GX2.8X2.1   |
| ER40G | 3.15      | 2.5       | 40    | 42   | 36.2  | 46   | M3         | ISO529         | 6543-ER40GX3.15X2.5  |
| ER40G | 3.5       | 2.7       | 40    | 42   | 36.2  | 46   | M3, M5     | DIN371, DIN376 | 6543-ER40GX3.5X2.7   |
| ER40G | 3.55      | 2.8       | 40    | 42   | 36.2  | 46   | M3.5       | ISO529         | 6543-ER40GX3.55X2.8  |
| ER40G | 4.0       | 3.0       | 40    | 42   | 36.2  | 46   | M3.5       | DIN371         | 6543-ER40GX4.0X3.0   |
| ER40G | 4.0       | 3.15      | 40    | 42   | 36.2  | 46   | M4         | ISO529         | 6543-ER40GX4.0X3.15  |
| ER40G | 4.5       | 3.4       | 40    | 42   | 36.2  | 46   | M4, M6     | DIN371, DIN376 | 6543-ER40GX4.5X3.4   |
| ER40G | 4.5       | 3.55      | 40    | 42   | 36.2  | 46   | M4.5       | ISO529         | 6543-ER40GX4.5X3.55  |
| ER40G | 5.0       | 4.0       | 40    | 42   | 36.2  | 46   | M5         | ISO529         | 6543-ER40GX5.0X4.0   |
| ER40G | 6.0       | 4.9       | 40    | 42   | 36.2  | 46   | M5, M6, M8 | DIN371, DIN376 | 6543-ER40GX6.0X4.9   |
| ER40G | 6.3       | 5.0       | 40    | 42   | 36.2  | 46   | M6         | ISO529         | 6543-ER40GX6.3X5.0   |
| ER40G | 7.0       | 5.5       | 40    | 42   | 36.2  | 46   | M7, M10    | DIN371, DIN376 | 6543-ER40GX7.0X5.5   |
| ER40G | 8.0       | 6.2       | 40    | 42   | 36.2  | 46   | M8         | DIN371         | 6543-ER40GX8.0X6.2   |
| ER40G | 8.0       | 6.3       | 40    | 42   | 36.2  | 46   | M8         | ISO529         | 6543-ER40GX8.0X6.3   |
| ER40G | 9.0       | 7.0       | 40    | 42   | 36.2  | 46   | M12        | DIN376         | 6543-ER40GX9.0X7.0   |
| ER40G | 9.0       | 7.1       | 40    | 42   | 36.2  | 46   | M9, M12    | ISO529         | 6543-ER40GX9.0X7.1   |
| ER40G | 10.0      | 8.0       | 40    | 42   | 36.2  | 46   | M10, M10   | ISO529, DIN371 | 6543-ER40GX10.0X8.0  |
| ER40G | 11.0      | 9.0       | 40    | 42   | 36.2  | 46   | M14        | DIN376         | 6543-ER40GX11.0X9.0  |
| ER40G | 11.2      | 9.0       | 40    | 42   | 36.2  | 46   | M14        | ISO529         | 6543-ER40GX11.2X9.0  |
| ER40G | 12.0      | 9.0       | 40    | 42   | 36.2  | 46   | M16        | DIN376         | 6543-ER40GX12.0X9.0  |
| R40G  | 12.5      | 10.0      | 40    | 42   | 36.2  | 46   | M16        | ISO529         | 6543-ER40GX12.5X10.0 |
| ER40G | 14.0      | 11.0      | 40    | 42   | 36.2  | 46   | M18        | DIN376         | 6543-ER40GX14.0X11.0 |
| ER40G | 14.0      | 11.2      | 40    | 42   | 36.2  | 46   | M18, M20   | ISO529         | 6543-ER40GX14.0X11.2 |
| ER40G | 16.0      | 12.0      | 40    | 42   | 36.2  | 46   | M20        | DIN376         | 6543-ER40GX16.0X12.0 |
| ER40G | 16.0      | 12.5      | 40    | 42   | 36.2  | 46   | M22        | ISO529         | 6543-ER40GX16.0X12.5 |
| ER40G | 18.0      | 14.0      | 40    | 42   | 36.2  | 46   | M24        | ISO529         | 6543-ER40GX18.0X14.0 |
| ER40G | 18.0      | 14.5      | 40    | 42   | 36.2  | 46   | M24        | DIN376         | 6543-ER40GX18.0X14.5 |

PULL STUDS

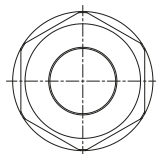
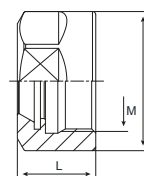


| GROUP                           |      |       |       |      |      |       |       |      |       |         | TOHO           |
|---------------------------------|------|-------|-------|------|------|-------|-------|------|-------|---------|----------------|
| SIZE                            | D MM | D1 MM | D2 MM | M MM | L MM | L1 MM | L2 MM | H MM | H1 MM | ANGLE ° | PART NUMBER    |
| BT30-45                         | 12.5 | 7     | 11    | M12  | 43   | 23    | 18    | 4    | 3.5   | 45      | 6537-BT30X45   |
| BT30-60                         | 12.5 | 7     | 11    | M12  | 43   | 23    | 18    | 4    | 3.5   | 60      | 6537-BT30X60   |
| BT30-90                         | 12.5 | 7     | 11    | M12  | 43   | 23    | 18    | 4    | 3.5   | 90      | 6537-BT30X90   |
| BT40-45                         | 17   | 10    | 15    | M16  | 60   | 35    | 28    | 5    | 4     | 45      | 6537-BT40X45   |
| BT40-60                         | 17   | 10    | 15    | M16  | 60   | 35    | 28    | 5    | 4     | 60      | 6537-BT40X60   |
| BT40-90                         | 17   | 10    | 15    | M16  | 60   | 35    | 28    | 5    | 4     | 90      | 6537-BT40X90   |
| BT50-45                         | 25   | 17    | 23    | M24  | 85   | 45    | 35    | 8    | 8     | 45      | 6537-BT50X45   |
| BT50-60                         | 25   | 17    | 23    | M24  | 85   | 45    | 35    | 8    | 8     | 60      | 6537-BT50X60   |
| BT50-90                         | 25   | 17    | 23    | M24  | 85   | 45    | 35    | 8    | 8     | 90      | 6537-BT50X90   |
| <b>THROUGH HOLE</b>             |      |       |       |      |      |       |       |      |       |         |                |
| BT30T-45                        | 12.5 | 7     | 11    | M12  | 43   | 23    | 18    | 4    | 3.5   | 45      | 6537-BT30TX45  |
| BT30T-60                        | 12.5 | 7     | 11    | M12  | 43   | 23    | 18    | 4    | 3.5   | 60      | 6537-BT30TX60  |
| BT30T-90                        | 12.5 | 7     | 11    | M12  | 43   | 23    | 18    | 4    | 3.5   | 90      | 6537-BT30TX90  |
| BT40T-45                        | 17   | 10    | 15    | M16  | 60   | 35    | 28    | 5    | 4     | 45      | 6537-BT40TX45  |
| BT40T-60                        | 17   | 10    | 15    | M16  | 60   | 35    | 28    | 5    | 4     | 60      | 6537-BT40TX60  |
| BT40T-90                        | 17   | 10    | 15    | M16  | 60   | 35    | 28    | 5    | 4     | 90      | 6537-BT40TX90  |
| BT50T-45                        | 25   | 17    | 23    | M24  | 85   | 45    | 35    | 8    | 8     | 45      | 6537-BT50TX45  |
| BT50T-60                        | 25   | 17    | 23    | M24  | 85   | 45    | 35    | 8    | 8     | 60      | 6537-BT50TX60  |
| BT50T-90                        | 25   | 17    | 23    | M24  | 85   | 45    | 35    | 8    | 8     | 90      | 6537-BT50TX90  |
| <b>THROUGH HOLE WITH O-RING</b> |      |       |       |      |      |       |       |      |       |         |                |
| BT30TO-45                       | 12.5 | 7     | 11    | M12  | 43   | 23    | 18    | 4    | 3.5   | 45      | 6537-BT30TOX45 |
| BT30TO-60                       | 12.5 | 7     | 11    | M12  | 43   | 23    | 18    | 4    | 3.5   | 60      | 6537-BT30TOX60 |
| BT30TO-90                       | 12.5 | 7     | 11    | M12  | 43   | 23    | 18    | 4    | 3.5   | 90      | 6537-BT30TOX90 |
| BT40TO-45                       | 17   | 10    | 15    | M16  | 60   | 35    | 28    | 5    | 4     | 45      | 6537-BT40TOX45 |
| BT40TO-60                       | 17   | 10    | 15    | M16  | 60   | 35    | 28    | 5    | 4     | 60      | 6537-BT40TOX60 |
| BT40TO-90                       | 17   | 10    | 15    | M16  | 60   | 35    | 28    | 5    | 4     | 90      | 6537-BT40TOX90 |
| BT50TO-45                       | 25   | 17    | 23    | M24  | 85   | 45    | 35    | 8    | 8     | 45      | 6537-BT50TOX45 |
| BT50TO-60                       | 25   | 17    | 23    | M24  | 85   | 45    | 35    | 8    | 8     | 60      | 6537-BT50TOX60 |
| BT50TO-90                       | 25   | 17    | 23    | M24  | 85   | 45    | 35    | 8    | 8     | 90      | 6537-BT50TOX90 |

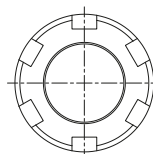
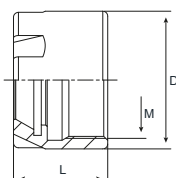
## ER NUTS

**GROUP**
**TOHO**

**UM NUTS**

| SIZE          | D MM | L MM | M MM    | PART NUMBER |
|---------------|------|------|---------|-------------|
| <b>ER16UM</b> | 32   | 17.5 | M22X1.5 | 6538-ER16UM |
| <b>ER20UM</b> | 35   | 19   | M25X1.5 | 6538-ER20UM |
| <b>ER25UM</b> | 42   | 20   | M32X1.5 | 6538-ER25UM |
| <b>ER32UM</b> | 50   | 22.5 | M40X1.5 | 6538-ER32UM |
| <b>ER40UM</b> | 63   | 25.5 | M50X1.5 | 6538-ER40UM |
| <b>ER50UM</b> | 78   | 35.5 | M64X2   | 6538-ER50UM |


**HEX NUTS**

| SIZE         | D MM | L MM | M MM     | PART NUMBER |
|--------------|------|------|----------|-------------|
| <b>ER11A</b> | 19   | 11.3 | M14X0.75 | 6538-ER11A  |
| <b>ER16A</b> | 28   | 17.5 | M22X1.5  | 6538-ER16A  |
| <b>ER20A</b> | 34   | 19   | M25X1.5  | 6538-ER20A  |

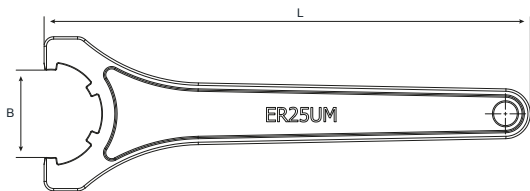

**MINI NUTS**

| SIZE         | D MM | L MM | M MM     | PART NUMBER |
|--------------|------|------|----------|-------------|
| <b>ER8M</b>  | 12   | 10   | M10X0.75 | 6538-ER8M   |
| <b>ER11M</b> | 16   | 12   | M13X0.75 | 6538-ER11M  |
| <b>ER16M</b> | 22   | 18   | M19X1    | 6538-ER16M  |
| <b>ER20M</b> | 28   | 19   | M24X1    | 6538-ER20M  |
| <b>ER25M</b> | 35   | 20   | M30X1    | 6538-ER25M  |

## ER SPANNERS

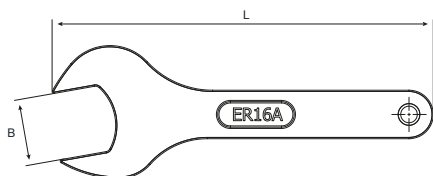
GROUP

TOHO



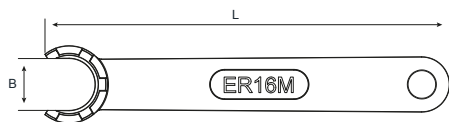
## UM SPANNERS

| SIZE   | B MM | L MM | NUT    | PART NUMBER |
|--------|------|------|--------|-------------|
| ER16UM | 26   | 180  | ER16UM | 6539-ER16UM |
| ER20UM | 29   | 190  | ER20UM | 6539-ER20UM |
| ER25UM | 37   | 210  | ER25UM | 6539-ER25UM |
| ER32UM | 45   | 250  | ER32UM | 6539-ER32UM |
| ER40UM | 58   | 290  | ER40UM | 6539-ER40UM |
| ER50UM | 71   | 350  | ER50UM | 6539-ER50UM |



## HEX SPANNERS

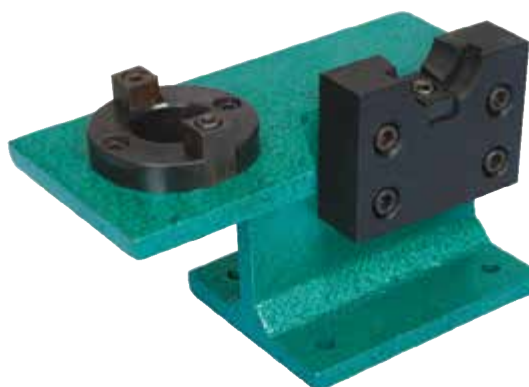
| SIZE  | B MM | L MM | NUT   | PART NUMBER |
|-------|------|------|-------|-------------|
| ER11A | 17   | 110  | ER11A | 6539-ER11A  |
| ER16A | 25   | 120  | ER16A | 6539-ER16A  |
| ER20A | 30   | 130  | ER20A | 6539-ER20A  |



## MINI SPANNERS

| SIZE  | B MM | L MM | NUT   | PART NUMBER |
|-------|------|------|-------|-------------|
| ER8M  | 12.9 | 70   | ER8M  | 6539-ER8M   |
| ER11M | 16.7 | 90   | ER11M | 6539-ER11M  |
| ER16M | 22.4 | 110  | ER16M | 6539-ER16M  |
| ER20M | 28.9 | 120  | ER20M | 6539-ER20M  |
| ER25M | 35.8 | 130  | ER25M | 6539-ER25M  |

## TOOL SEAT



| GROUP       |                  |           | TOHO        |
|-------------|------------------|-----------|-------------|
| TAPER       | DIMENSIONS MM    | WEIGHT KG | PART NUMBER |
| <b>BT30</b> | 205 X 98.5 X 128 | 3.7       | 6540-BT30   |
| <b>BT40</b> | 205 X 98.5 X 128 | 3.8       | 6540-BT40   |
| <b>BT50</b> | 275 X 150 X 198  | 11.4      | 6540-BT50   |

DECIMAL

EQUIVALENTS

| Imperial | Inch   | Gauge | Metric |
|----------|--------|-------|--------|
|          | 0.0039 |       | 0.100  |
|          | 0.0059 | 97    | 0.150  |
|          | 0.0063 | 96    | 0.160  |
|          | 0.0067 | 95    | 0.170  |
|          | 0.0071 | 94    | 0.180  |
|          | 0.0075 | 93    | 0.190  |
| 1/128    | 0.0078 |       | 0.198  |
|          | 0.0079 | 92    | 0.200  |
|          | 0.0083 | 91    | 0.210  |
|          | 0.0087 | 90    | 0.220  |
|          | 0.0091 | 89    | 0.230  |
|          | 0.0094 | 88    | 0.240  |
|          | 0.0098 |       | 0.250  |
|          | 0.0100 | 87    | 0.254  |
|          | 0.0102 |       | 0.260  |
|          | 0.0106 | 86    | 0.270  |
|          | 0.0110 | 85    | 0.280  |
|          | 0.0114 | 84    | 0.290  |
|          | 0.0118 |       | 0.300  |
|          | 0.0120 | 83    | 0.305  |
|          | 0.0122 |       | 0.310  |
|          | 0.0125 | 82    | 0.317  |
|          | 0.0126 |       | 0.320  |
|          | 0.0130 | 81    | 0.330  |
|          | 0.0134 |       | 0.340  |
|          | 0.0135 | 80    | 0.343  |
|          | 0.0138 |       | 0.350  |
|          | 0.0142 |       | 0.360  |
|          | 0.0145 | 79    | 0.368  |
|          | 0.0146 |       | 0.370  |
|          | 0.0150 |       | 0.380  |
|          | 0.0154 |       | 0.390  |
| 1/64     | 0.0156 |       | 0.397  |
|          | 0.0157 |       | 0.400  |
|          | 0.0160 | 78    | 0.406  |
|          | 0.0161 |       | 0.410  |
|          | 0.0165 |       | 0.420  |
|          | 0.0169 |       | 0.430  |
|          | 0.0173 |       | 0.440  |
|          | 0.0177 |       | 0.450  |
|          | 0.0180 | 77    | 0.457  |
|          | 0.0181 |       | 0.460  |
|          | 0.0185 |       | 0.470  |
|          | 0.0189 |       | 0.480  |
|          | 0.0193 |       | 0.490  |
|          | 0.0197 |       | 0.500  |
|          | 0.0200 | 76    | 0.508  |
|          | 0.0201 |       | 0.510  |
|          | 0.0205 |       | 0.520  |
|          | 0.0209 |       | 0.530  |
|          | 0.0210 | 75    | 0.533  |
|          | 0.0213 |       | 0.540  |
|          | 0.0217 |       | 0.550  |
|          | 0.0220 |       | 0.560  |
|          | 0.0224 |       | 0.570  |
|          | 0.0225 | 74    | 0.572  |
|          | 0.0228 |       | 0.580  |
|          | 0.0232 |       | 0.590  |
|          | 0.0236 |       | 0.600  |
|          | 0.0240 | 73    | 0.610  |
|          | 0.0244 |       | 0.620  |
|          | 0.0248 |       | 0.630  |
|          | 0.0250 | 72    | 0.635  |
|          | 0.0252 |       | 0.640  |
|          | 0.0256 |       | 0.650  |
|          | 0.0260 | 71    | 0.660  |
|          | 0.0264 |       | 0.670  |
|          | 0.0268 |       | 0.680  |
|          | 0.0272 |       | 0.690  |
|          | 0.0276 |       | 0.700  |
|          | 0.0279 |       | 0.710  |
|          | 0.0280 | 70    | 0.711  |
|          | 0.0283 |       | 0.720  |
|          | 0.0287 |       | 0.730  |
|          | 0.0291 |       | 0.740  |
|          | 0.0292 | 69    | 0.742  |
|          | 0.0295 |       | 0.750  |

| Imperial | Inch   | Gauge | Metric |
|----------|--------|-------|--------|
|          | 0.0299 |       | 0.760  |
|          | 0.0303 |       | 0.770  |
|          | 0.0307 |       | 0.780  |
|          | 0.0310 | 68    | 0.787  |
|          | 0.0311 |       | 0.790  |
| 1/32     | 0.0313 |       | 0.794  |
|          | 0.0315 |       | 0.800  |
|          | 0.0319 |       | 0.810  |
|          | 0.0320 | 67    | 0.813  |
|          | 0.0323 |       | 0.820  |
|          | 0.0327 |       | 0.830  |
|          | 0.0330 | 66    | 0.838  |
|          | 0.0331 |       | 0.840  |
|          | 0.0335 |       | 0.850  |
|          | 0.0339 |       | 0.860  |
|          | 0.0343 |       | 0.870  |
|          | 0.0346 |       | 0.880  |
|          | 0.0350 | 65    | 0.889  |
|          | 0.0350 |       | 0.890  |
|          | 0.0354 |       | 0.900  |
|          | 0.0358 |       | 0.910  |
|          | 0.0360 | 64    | 0.914  |
|          | 0.0362 |       | 0.920  |
|          | 0.0366 |       | 0.930  |
|          | 0.0370 | 63    | 0.940  |
|          | 0.0374 |       | 0.950  |
|          | 0.0378 |       | 0.960  |
|          | 0.0380 | 62    | 0.965  |
|          | 0.0382 |       | 0.970  |
|          | 0.0386 |       | 0.980  |
|          | 0.0390 |       | 0.990  |
|          | 0.0390 | 61    | 0.991  |
|          | 0.0394 |       | 1.000  |
|          | 0.0400 | 60    | 1.016  |
|          | 0.0410 | 59    | 1.041  |
|          | 0.0413 |       | 1.050  |
|          | 0.0420 | 58    | 1.067  |
|          | 0.0430 | 57    | 1.092  |
|          | 0.0433 |       | 1.100  |
|          | 0.0453 |       | 1.150  |
|          | 0.0465 | 56    | 1.181  |
| 3/64     | 0.0469 |       | 1.191  |
|          | 0.0472 |       | 1.200  |
|          | 0.0492 |       | 1.250  |
|          | 0.0512 |       | 1.300  |
|          | 0.0520 | 55    | 1.321  |
|          | 0.0531 |       | 1.350  |
|          | 0.0550 | 54    | 1.397  |
|          | 0.0551 |       | 1.400  |
|          | 0.0571 |       | 1.450  |
|          | 0.0591 |       | 1.500  |
|          | 0.0595 | 53    | 1.511  |
|          | 0.0610 |       | 1.550  |
| 1/16     | 0.0625 |       | 1.588  |
|          | 0.0630 |       | 1.600  |
|          | 0.0635 | 52    | 1.613  |
|          | 0.0650 |       | 1.650  |
|          | 0.0669 |       | 1.700  |
|          | 0.0670 | 51    | 1.702  |
|          | 0.0689 |       | 1.750  |
|          | 0.0700 | 50    | 1.778  |
|          | 0.0709 |       | 1.800  |
|          | 0.0728 |       | 1.850  |
|          | 0.0730 | 49    | 1.854  |
|          | 0.0748 |       | 1.900  |
|          | 0.0760 | 48    | 1.930  |
|          | 0.0768 |       | 1.950  |
| 5/64     | 0.0781 |       | 1.984  |
|          | 0.0785 | 47    | 1.994  |
|          | 0.0787 |       | 2.000  |
|          | 0.0807 |       | 2.050  |
|          | 0.0810 | 46    | 2.057  |
|          | 0.0820 | 45    | 2.083  |
|          | 0.0827 |       | 2.100  |
|          | 0.0846 |       | 2.150  |
|          | 0.0860 | 44    | 2.184  |
|          | 0.0866 |       | 2.200  |

| Imperial | Inch   | Gauge | Metric |
|----------|--------|-------|--------|
|          | 0.0886 |       | 2.250  |
|          | 0.0890 | 43    | 2.261  |
|          | 0.0906 |       | 2.300  |
|          | 0.0925 |       | 2.350  |
|          | 0.0935 | 42    | 2.375  |
| 3/32     | 0.0937 |       | 2.381  |
|          | 0.0945 |       | 2.400  |
|          | 0.0960 | 41    | 2.438  |
|          | 0.0965 |       | 2.450  |
|          | 0.0980 | 40    | 2.489  |
|          | 0.0984 |       | 2.500  |
|          | 0.0995 | 39    | 2.527  |
|          | 0.1004 |       | 2.550  |
|          | 0.1015 | 38    | 2.578  |
|          | 0.1024 |       | 2.600  |
|          | 0.1040 | 37    | 2.642  |
|          | 0.1043 |       | 2.650  |
|          | 0.1063 |       | 2.700  |
|          | 0.1065 | 36    | 2.705  |
|          | 0.1083 |       | 2.750  |
| 7/64     | 0.1094 |       | 2.778  |
|          | 0.1100 | 35    | 2.794  |
|          | 0.1102 |       | 2.800  |
|          | 0.1110 | 34    | 2.819  |
|          | 0.1122 |       | 2.850  |
|          | 0.1130 | 33    | 2.870  |
|          | 0.1142 |       | 2.900  |
|          | 0.1160 | 32    | 2.946  |
|          | 0.1161 |       | 2.950  |
|          | 0.1181 |       | 3.000  |
|          | 0.1200 | 31    | 3.048  |
|          | 0.1220 |       | 3.100  |
| 1/8      | 0.1250 |       | 3.175  |
|          | 0.1260 |       | 3.200  |
|          | 0.1285 | 30    | 3.264  |
|          | 0.1299 |       | 3.300  |
|          | 0.1339 |       | 3.400  |
|          | 0.1360 | 29    | 3.454  |
|          | 0.1378 |       | 3.500  |
|          | 0.1405 | 28    | 3.569  |
| 9/64     | 0.1406 |       | 3.572  |
|          | 0.1417 |       | 3.600  |
|          | 0.1440 | 27    | 3.658  |
|          | 0.1457 |       | 3.700  |
|          | 0.1470 | 26    | 3.734  |
|          | 0.1495 | 25    | 3.797  |
|          | 0.1496 |       | 3.800  |
|          | 0.1520 | 24    | 3.861  |
|          | 0.1535 |       | 3.900  |
|          | 0.1540 | 23    | 3.912  |
| 5/32     | 0.1563 |       | 3.969  |
|          | 0.1570 | 22    | 3.988  |
|          | 0.1575 |       | 4.000  |
|          | 0.1590 | 21    | 4.039  |
|          | 0.1610 | 20    | 4.089  |
|          | 0.1614 |       | 4.100  |
|          | 0.1654 |       | 4.200  |
|          | 0.1660 | 19    | 4.216  |
|          | 0.1693 |       | 4.300  |
|          | 0.1695 | 18    | 4.305  |
| 11/64    | 0.1719 |       | 4.366  |
|          | 0.1730 | 17    | 4.394  |
|          | 0.1732 |       | 4.400  |
|          | 0.1770 | 16    | 4.496  |
|          | 0.1772 |       | 4.500  |
|          | 0.1800 | 15    | 4.572  |
|          | 0.1811 |       | 4.600  |
|          | 0.1820 | 14    | 4.623  |
|          | 0.1850 | 13    | 4.700  |
| 3/16     | 0.1875 |       | 4.762  |
|          | 0.1890 | 12    | 4.800  |
|          | 0.1910 | 11    | 4.851  |
|          | 0.1929 |       | 4.900  |
|          | 0.1935 | 10    | 4.915  |
|          | 0.1960 | 9     | 4.978  |
|          | 0.1969 |       | 5.000  |
|          | 0.1990 | 8     | 5.055  |

| Imperial | Inch   | Gauge | Metric |
|----------|--------|-------|--------|
|          | 0.2008 |       | 5.100  |
|          | 0.2010 | 7     | 5.105  |
| 13/64    | 0.2031 |       | 5.159  |
|          | 0.2040 | 6     | 5.182  |
|          | 0.2047 |       | 5.200  |
|          | 0.2055 | 5     | 5.220  |
|          | 0.2087 |       | 5.300  |
|          | 0.2090 | 4     | 5.309  |
|          | 0.2126 |       | 5.400  |
|          | 0.2130 | 3     | 5.410  |
|          | 0.2165 |       | 5.500  |
| 7/32     | 0.2187 |       | 5.556  |
|          | 0.2205 |       | 5.600  |
|          | 0.2210 | 2     | 5.613  |
|          | 0.2244 |       | 5.700  |
|          | 0.2280 | 1     | 5.791  |
|          | 0.2283 |       | 5.800  |
|          | 0.2323 |       | 5.900  |
|          | 0.2340 | A     | 5.944  |
| 15/64    | 0.2344 |       | 5.953  |
|          | 0.2362 |       | 6.000  |
|          | 0.2380 | B     | 6.045  |
|          | 0.2402 |       | 6.100  |
|          | 0.2420 | C     | 6.147  |
|          | 0.2441 |       | 6.200  |
|          | 0.2460 | D     | 6.248  |
|          | 0.2480 |       | 6.300  |
| 1/4      | 0.2500 | E     | 6.350  |
|          | 0.2520 |       | 6.400  |
|          | 0.2559 |       | 6.500  |
|          | 0.2570 | F     | 6.528  |
|          | 0.2598 |       | 6.600  |
|          | 0.2610 | G     | 6.629  |
|          | 0.2638 |       | 6.700  |
| 17/64    | 0.2656 |       | 6.747  |
|          | 0.2660 | H     | 6.756  |
|          | 0.2677 |       | 6.800  |
|          | 0.2717 |       | 6.900  |
|          | 0.2720 | I     | 6.909  |
|          | 0.2756 |       | 7.000  |
|          | 0.2770 | J     | 7.036  |
|          | 0.2795 |       | 7.100  |
|          | 0.2810 | K     | 7.137  |
| 9/32     | 0.2813 |       | 7.144  |
|          | 0.2835 |       | 7.200  |
|          | 0.2874 |       | 7.300  |
|          | 0.2900 | L     | 7.366  |
|          | 0.2913 |       | 7.400  |
|          | 0.2950 | M     | 7.493  |
|          | 0.2953 |       | 7.500  |
| 19/64    | 0.2969 |       | 7.541  |
|          | 0.2992 |       | 7.600  |
|          | 0.3020 | N     | 7.671  |
|          | 0.3031 |       | 7.700  |
|          | 0.3071 |       | 7.800  |
|          | 0.3110 |       | 7.900  |
| 5/16     | 0.3125 |       | 7.938  |
|          | 0.3150 |       | 8.000  |
|          | 0.3160 | O     | 8.026  |
|          | 0.3189 |       | 8.100  |
|          | 0.3228 |       | 8.200  |
|          | 0.3230 | P     | 8.204  |
|          | 0.3268 |       | 8.300  |
| 21/64    | 0.3281 |       | 8.334  |
|          | 0.3307 |       | 8.400  |
|          | 0.3320 | Q     | 8.433  |
|          | 0.3346 |       | 8.500  |
|          | 0.3386 |       | 8.600  |
|          | 0.3390 | R     | 8.611  |
|          | 0.3425 |       | 8.700  |
| 11/32    | 0.3437 |       | 8.731  |
|          | 0.3465 |       | 8.800  |
|          | 0.3480 | S     | 8.839  |
|          | 0.3504 |       | 8.900  |
|          | 0.3543 |       | 9.000  |
|          | 0.3580 | T     | 9.093  |
|          | 0.3583 |       | 9.100  |

| Imperial     | Inch   | Gauge    | Metric |
|--------------|--------|----------|--------|
| <b>23/64</b> | 0.3594 |          | 9.128  |
|              | 0.3622 |          | 9.200  |
|              | 0.3661 |          | 9.300  |
|              | 0.3680 | <b>U</b> | 9.347  |
|              | 0.3701 |          | 9.400  |
|              | 0.3740 |          | 9.500  |
| <b>3/8</b>   | 0.3750 |          | 9.525  |
|              | 0.3770 | <b>V</b> | 9.576  |
|              | 0.3780 |          | 9.600  |
|              | 0.3819 |          | 9.700  |
|              | 0.3858 |          | 9.800  |
|              | 0.3860 | <b>W</b> | 9.804  |
|              | 0.3898 |          | 9.900  |
| <b>25/64</b> | 0.3906 |          | 9.922  |
|              | 0.3937 |          | 10.000 |
|              | 0.3970 | <b>X</b> | 10.084 |
|              | 0.3976 |          | 10.100 |
|              | 0.4016 |          | 10.200 |
|              | 0.4040 | <b>Y</b> | 10.262 |
|              | 0.4055 |          | 10.300 |
| <b>13/32</b> | 0.4063 |          | 10.319 |
|              | 0.4094 |          | 10.400 |
|              | 0.4130 | <b>Z</b> | 10.490 |
|              | 0.4134 |          | 10.500 |
|              | 0.4173 |          | 10.600 |
|              | 0.4213 |          | 10.700 |
| <b>27/64</b> | 0.4219 |          | 10.716 |
|              | 0.4252 |          | 10.800 |
|              | 0.4291 |          | 10.900 |
|              | 0.4331 |          | 11.000 |
|              | 0.4370 |          | 11.100 |
| <b>7/16</b>  | 0.4375 |          | 11.112 |
|              | 0.4409 |          | 11.200 |
|              | 0.4449 |          | 11.300 |
|              | 0.4488 |          | 11.400 |
|              | 0.4528 |          | 11.500 |
| <b>29/64</b> | 0.4531 |          | 11.509 |
|              | 0.4567 |          | 11.600 |
|              | 0.4606 |          | 11.700 |
|              | 0.4646 |          | 11.800 |
|              | 0.4685 |          | 11.900 |
| <b>15/32</b> | 0.4687 |          | 11.906 |
|              | 0.4724 |          | 12.000 |
|              | 0.4764 |          | 12.100 |
|              | 0.4803 |          | 12.200 |
|              | 0.4843 |          | 12.300 |
| <b>31/64</b> | 0.4844 |          | 12.303 |
|              | 0.4882 |          | 12.400 |
|              | 0.4921 |          | 12.500 |
|              | 0.4961 |          | 12.600 |
| <b>1/2</b>   | 0.5000 |          | 12.700 |
|              | 0.5039 |          | 12.800 |
|              | 0.5079 |          | 12.900 |
|              | 0.5118 |          | 13.000 |
| <b>33/64</b> | 0.5156 |          | 13.097 |
|              | 0.5157 |          | 13.100 |
|              | 0.5197 |          | 13.200 |
|              | 0.5236 |          | 13.300 |
|              | 0.5276 |          | 13.400 |
| <b>17/32</b> | 0.5313 |          | 13.494 |
|              | 0.5315 |          | 13.500 |
|              | 0.5354 |          | 13.600 |
|              | 0.5394 |          | 13.700 |
|              | 0.5433 |          | 13.800 |
| <b>35/64</b> | 0.5469 |          | 13.891 |
|              | 0.5472 |          | 13.900 |
|              | 0.5512 |          | 14.000 |
|              | 0.5610 |          | 14.250 |
| <b>9/16</b>  | 0.5625 |          | 14.288 |
|              | 0.5709 |          | 14.500 |
| <b>37/64</b> | 0.5781 |          | 14.684 |
|              | 0.5807 |          | 14.750 |
|              | 0.5906 |          | 15.000 |
| <b>19/32</b> | 0.5937 |          | 15.081 |
|              | 0.6004 |          | 15.250 |
| <b>39/64</b> | 0.6094 |          | 15.478 |
|              | 0.6102 |          | 15.500 |

| Imperial      | Inch   | Metric |
|---------------|--------|--------|
|               | 0.6201 | 15.750 |
| <b>5/8</b>    | 0.6250 | 15.875 |
|               | 0.6299 | 16.000 |
|               | 0.6398 | 16.250 |
| <b>41/64</b>  | 0.6406 | 16.272 |
|               | 0.6496 | 16.500 |
| <b>21/32</b>  | 0.6563 | 16.669 |
|               | 0.6594 | 16.750 |
|               | 0.6693 | 17.000 |
| <b>43/64</b>  | 0.6719 | 17.066 |
|               | 0.6791 | 17.250 |
| <b>11/16</b>  | 0.6875 | 17.462 |
|               | 0.6890 | 17.500 |
|               | 0.6988 | 17.750 |
| <b>45/64</b>  | 0.7031 | 17.859 |
|               | 0.7087 | 18.000 |
|               | 0.7185 | 18.250 |
| <b>23/32</b>  | 0.7187 | 18.256 |
|               | 0.7283 | 18.500 |
| <b>47/64</b>  | 0.7344 | 18.653 |
|               | 0.7382 | 18.750 |
|               | 0.7480 | 19.000 |
| <b>3/4</b>    | 0.7500 | 19.050 |
|               | 0.7579 | 19.250 |
| <b>49/64</b>  | 0.7656 | 19.447 |
|               | 0.7677 | 19.500 |
|               | 0.7776 | 19.750 |
| <b>25/32</b>  | 0.7813 | 19.844 |
|               | 0.7874 | 20.000 |
| <b>51/64</b>  | 0.7969 | 20.241 |
|               | 0.7972 | 20.250 |
|               | 0.8071 | 20.500 |
| <b>13/16</b>  | 0.8125 | 20.638 |
|               | 0.8169 | 20.750 |
|               | 0.8268 | 21.000 |
| <b>53/64</b>  | 0.8281 | 21.034 |
|               | 0.8366 | 21.250 |
| <b>27/32</b>  | 0.8437 | 21.431 |
|               | 0.8465 | 21.500 |
|               | 0.8563 | 21.750 |
| <b>55/64</b>  | 0.8594 | 21.828 |
|               | 0.8661 | 22.000 |
| <b>7/8</b>    | 0.8750 | 22.225 |
|               | 0.8760 | 22.250 |
|               | 0.8858 | 22.500 |
| <b>57/64</b>  | 0.8906 | 22.622 |
|               | 0.8957 | 22.750 |
|               | 0.9055 | 23.000 |
| <b>29/32</b>  | 0.9063 | 23.019 |
|               | 0.9154 | 23.250 |
| <b>59/64</b>  | 0.9219 | 23.416 |
|               | 0.9252 | 23.500 |
|               | 0.9350 | 23.750 |
| <b>15/16</b>  | 0.9375 | 23.812 |
|               | 0.9449 | 24.000 |
| <b>61/64</b>  | 0.9531 | 24.209 |
|               | 0.9547 | 24.250 |
|               | 0.9646 | 24.500 |
| <b>31/32</b>  | 0.9687 | 24.606 |
|               | 0.9744 | 24.750 |
|               | 0.9843 | 25.000 |
| <b>63/64</b>  | 0.9844 | 25.003 |
|               | 0.9941 | 25.250 |
| <b>1</b>      | 1.0000 | 25.400 |
|               | 1.0039 | 25.500 |
|               | 1.0138 | 25.750 |
| <b>1.1/64</b> | 1.0156 | 25.797 |
|               | 1.0236 | 26.000 |
| <b>1.1/32</b> | 1.0313 | 26.194 |
|               | 1.0335 | 26.250 |
|               | 1.0433 | 26.500 |
| <b>1.3/64</b> | 1.0469 | 26.591 |
|               | 1.0531 | 26.750 |
| <b>1.1/16</b> | 1.0625 | 26.988 |
|               | 1.0630 | 27.000 |
|               | 1.0728 | 27.250 |
| <b>1.5/64</b> | 1.0781 | 27.384 |

| Imperial       | Inch   | Metric |
|----------------|--------|--------|
|                | 1.0827 | 27.500 |
|                | 1.0925 | 27.750 |
| <b>1.3/32</b>  | 1.0937 | 27.781 |
|                | 1.1024 | 28.000 |
| <b>1.7/64</b>  | 1.1094 | 28.178 |
|                | 1.1122 | 28.250 |
|                | 1.1220 | 28.500 |
| <b>1.1/8</b>   | 1.1250 | 28.575 |
|                | 1.1319 | 28.750 |
| <b>1.9/64</b>  | 1.1406 | 28.972 |
|                | 1.1417 | 29.000 |
|                | 1.1516 | 29.250 |
| <b>1.5/32</b>  | 1.1563 | 29.369 |
|                | 1.1614 | 29.500 |
|                | 1.1713 | 29.750 |
| <b>1.11/64</b> | 1.1719 | 29.766 |
|                | 1.1811 | 30.000 |
| <b>1.3/16</b>  | 1.1875 | 30.162 |
|                | 1.1909 | 30.250 |
|                | 1.2008 | 30.500 |
| <b>1.13/64</b> | 1.2031 | 30.559 |
|                | 1.2106 | 30.750 |
| <b>1.7/32</b>  | 1.2187 | 30.956 |
|                | 1.2205 | 31.000 |
|                | 1.2303 | 31.250 |
| <b>1.15/64</b> | 1.2344 | 31.353 |
|                | 1.2402 | 31.500 |
| <b>1.1/4</b>   | 1.2500 | 31.750 |
|                | 1.2598 | 32.000 |
| <b>1.17/64</b> | 1.2656 | 32.147 |
|                | 1.2795 | 32.500 |
| <b>1.9/32</b>  | 1.2813 | 32.544 |
| <b>1.19/64</b> | 1.2969 | 32.941 |
|                | 1.2992 | 33.000 |
| <b>1.5/16</b>  | 1.3125 | 33.338 |
|                | 1.3189 | 33.500 |
| <b>1.21/64</b> | 1.3281 | 33.734 |
|                | 1.3386 | 34.000 |
| <b>1.11/32</b> | 1.3437 | 34.131 |
|                | 1.3583 | 34.500 |
| <b>1.23/64</b> | 1.3594 | 34.528 |
| <b>1.3/8</b>   | 1.3750 | 34.925 |
|                | 1.3780 | 35.000 |
| <b>1.25/64</b> | 1.3906 | 35.322 |
|                | 1.3976 | 35.500 |
| <b>1.13/32</b> | 1.4063 | 35.719 |
|                | 1.4173 | 36.000 |
| <b>1.27/64</b> | 1.4219 | 36.116 |
|                | 1.4370 | 36.500 |
| <b>1.7/16</b>  | 1.4375 | 36.512 |
| <b>1.29/64</b> | 1.4531 | 36.909 |
|                | 1.4567 | 37.000 |
| <b>1.15/32</b> | 1.4687 | 37.306 |
|                | 1.4764 | 37.500 |
| <b>1.31/64</b> | 1.4844 | 37.703 |
|                | 1.4961 | 38.000 |
| <b>1.1/2</b>   | 1.5000 | 38.100 |
| <b>1.33/64</b> | 1.5156 | 38.497 |
|                | 1.5157 | 38.500 |
| <b>1.17/32</b> | 1.5313 | 38.894 |
|                | 1.5354 | 39.000 |
| <b>1.35/64</b> | 1.5469 | 39.291 |
|                | 1.5551 | 39.500 |
| <b>1.9/16</b>  | 1.5625 | 39.688 |
|                | 1.5748 | 40.000 |
| <b>1.37/64</b> | 1.5781 | 40.084 |
| <b>1.19/32</b> | 1.5937 | 40.481 |
|                | 1.5945 | 40.500 |
| <b>1.39/64</b> | 1.6094 | 40.878 |
|                | 1.6142 | 41.000 |
| <b>1.5/8</b>   | 1.6250 | 41.275 |
|                | 1.6339 | 41.500 |
| <b>1.41/64</b> | 1.6406 | 41.672 |
|                | 1.6535 | 42.000 |
| <b>1.21/32</b> | 1.6563 | 42.069 |
| <b>1.43/64</b> | 1.6719 | 42.466 |
|                | 1.6732 | 42.500 |

| Imperial       | Inch   | Metric |
|----------------|--------|--------|
| <b>1.11/16</b> | 1.6875 | 42.862 |
|                | 1.6929 | 43.000 |
| <b>1.45/64</b> | 1.7031 | 43.259 |
|                | 1.7126 | 43.500 |
| <b>1.23/32</b> | 1.7187 | 43.656 |
|                | 1.7323 | 44.000 |
| <b>1.47/64</b> | 1.7344 | 44.053 |
| <b>1.3/4</b>   | 1.7500 | 44.450 |
|                | 1.7520 | 44.500 |
| <b>1.49/64</b> | 1.7656 | 44.847 |
|                | 1.7717 | 45.000 |
| <b>1.25/32</b> | 1.7813 | 45.244 |
|                | 1.7913 | 45.500 |
| <b>1.51/64</b> | 1.7969 | 45.641 |
|                | 1.8110 | 46.000 |
| <b>1.13/16</b> | 1.8125 | 46.038 |
| <b>1.53/64</b> | 1.8281 | 46.434 |
|                | 1.8307 | 46.500 |
| <b>1.27/32</b> | 1.8437 | 46.831 |
|                | 1.8504 | 47.000 |
| <b>1.55/64</b> | 1.8594 | 47.228 |
|                | 1.8701 | 47.500 |
| <b>1.7/8</b>   | 1.8750 | 47.625 |
|                | 1.8898 | 48.000 |
| <b>1.57/64</b> | 1.8906 | 48.022 |
| <b>1.29/32</b> | 1.9063 | 48.419 |
|                | 1.9094 | 48.500 |
| <b>1.59/64</b> | 1.9219 | 48.816 |
|                | 1.9291 | 49.000 |
| <b>1.15/16</b> | 1.9375 | 49.212 |
|                | 1.9488 | 49.500 |
| <b>1.61/64</b> | 1.9531 | 49.609 |
|                | 1.9685 | 50.000 |
| <b>1.31/32</b> | 1.9687 | 50.006 |
| <b>1.63/64</b> | 1.9844 | 50.403 |
|                | 1.9882 | 50.500 |
| <b>2</b>       | 2.0000 | 50.800 |
|                | 2.0079 | 51.000 |
| <b>2.1/32</b>  | 2.0313 | 51.594 |
|                | 2.0472 | 52.000 |
| <b>2.1/16</b>  | 2.0625 | 52.388 |
|                | 2.0866 | 53.000 |
| <b>2.3/32</b>  | 2.0937 | 53.181 |
| <b>2.1/8</b>   | 2.1250 | 53.975 |
|                | 2.1260 | 54.000 |
| <b>2.5/32</b>  | 2.1563 | 54.769 |
|                | 2.1654 | 55.000 |
| <b>2.3/16</b>  | 2.1875 | 55.562 |
|                | 2.2047 | 56.000 |
| <b>2.7/32</b>  | 2.2187 | 56.356 |
|                | 2.2441 | 57.000 |
| <b>2.1/4</b>   | 2.2500 | 57.150 |
| <b>2.9/32</b>  | 2.2813 | 57.944 |
|                | 2.2835 | 58.000 |
| <b>2.5/16</b>  | 2.3125 | 58.738 |
|                | 2.3228 | 59.000 |
| <b>2.11/32</b> | 2.3437 | 59.531 |
|                | 2.3622 | 60.000 |
| <b>2.3/8</b>   | 2.3750 | 60.325 |
|                | 2.4016 | 61.000 |
| <b>2.13/32</b> | 2.4063 | 61.119 |
| <b>2.7/16</b>  | 2.4375 | 61.912 |
|                | 2.4409 | 62.000 |
| <b>2.15/32</b> | 2.4687 | 62.706 |
|                | 2.4803 | 63.000 |
| <b>2.1/2</b>   | 2.5000 | 63.500 |
|                | 2.5197 | 64.000 |
| <b>2.17/32</b> | 2.5313 | 64.294 |
|                | 2.5591 | 65.000 |
| <b>2.9/16</b>  | 2.5625 | 65.088 |
| <b>2.19/32</b> | 2.5937 | 65.881 |
|                | 2.5984 | 66.000 |
| <b>2.5/8</b>   | 2.6250 | 66.675 |
|                | 2.6378 | 67.000 |
| <b>2.21/32</b> | 2.6563 | 67.469 |
|                | 2.6772 | 68.000 |
| <b>2.11/16</b> | 2.6875 | 68.262 |

| Imperial       | Inch   | Metric |
|----------------|--------|--------|
|                | 2.7165 | 69.000 |
| <b>2.23/32</b> | 2.7187 | 69.056 |
| <b>2.3/4</b>   | 2.7500 | 69.850 |
|                | 2.7559 | 70.000 |
| <b>2.25/32</b> | 2.7813 | 70.644 |
|                | 2.7953 | 71.000 |
| <b>2.13/16</b> | 2.8125 | 71.438 |
|                | 2.8346 | 72.000 |
| <b>2.27/32</b> | 2.8437 | 72.231 |
|                | 2.8740 | 73.000 |
| <b>2.7/8</b>   | 2.8750 | 73.025 |
| <b>2.29/32</b> | 2.9063 | 73.819 |
|                | 2.9134 | 74.000 |
| <b>2.15/16</b> | 2.     |        |

$$RPM = \frac{\text{Surface Speed (Vc)} \times 1000}{\pi \times \text{Drill Diameter}}$$

$$\text{Surface Speed (Vc)} = \frac{RPM \times \pi \times \text{Drill Diameter}}{1000}$$

### OPTIMISING DRILLING PERFORMANCE

|                        |   |
|------------------------|---|
| <b>Drill Selection</b> | Select the shortest drill possible for the job to maximise rigidity and minimise vibration.   |
| <b>Tool Holders</b>    | Tool holders and collets should maintain accurate alignment between the drill and spindle. A positive stop should be used to prevent the tool from sliding into the holder. Avoid clamping over the flutes or overtightening. Tool runout must be carefully measured and kept within acceptable limits.   |
| <b>Workpiece</b>       | The workpiece must be firmly secured and adequately supported to prevent movement or deflection, especially when drilling through-holes.  |
| <b>Coolants</b>        | Using coolant is strongly advised when drilling mild steel and high-temperature alloys. Coolant helps remove chips from the cutting area and prevents them from interfering with the tool or workpiece. However, excessive pressure or volume can reduce drilling efficiency. For drills with internal coolant delivery, higher-than-normal pressure is required. A minimum pressure of 150 PSI is recommended. Smaller drill diameters require increased pressure to ensure effective chip removal from restricted spaces. |

### COMMON DRILLING PROBLEMS AND SOLUTIONS

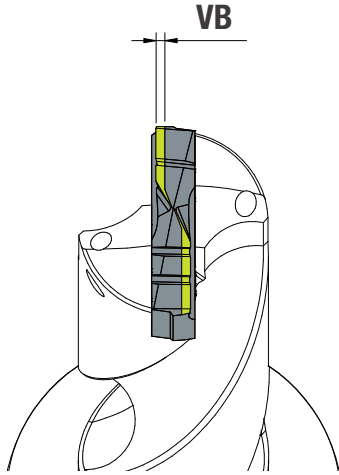
| PROBLEM                            | SOLUTION   |
|------------------------------------|--|
| <b>Wear on Outer Corners</b>       | <ul style="list-style-type: none"> <li>Lower the cutting speed</li> <li>Increase feed per revolution (IPR)</li> <li>Improve coolant flow direction</li> <li>Raise coolant pressure</li> <li>Add a corner break</li> </ul>  |
| <b>Chipping at the Chisel Edge</b> | <ul style="list-style-type: none"> <li>Verify drill runout accuracy</li> <li>Check workpiece stability and clamping</li> <li>Inspect point alignment and lip height</li> <li>Increase feed rate</li> </ul>   |
| <b>Chipping on Cutting Lips</b>    | <ul style="list-style-type: none"> <li>Check drill runout</li> <li>Ensure proper workpiece clamping</li> <li>Reduce cutting speed</li> <li>Reduce point clearance</li> <li>Increase edge honing</li> </ul>   |
| <b>Cracking of Lands</b>           | <ul style="list-style-type: none"> <li>Inspect for workpiece movement</li> <li>Increase back taper</li> <li>Confirm drill runout accuracy</li> <li>Prevent chip buildup by opening flute forms or using peck drilling (HSS/HSS-Co only)</li> <li>Reduce helix angle in horizontal drilling</li> <li>Increase feed rate</li> <li>Lower feed during spot drilling</li> <li>Improve coolant direction</li> <li>Increase coolant pressure</li> </ul> |
| <b>Oversized Holes</b>             | <ul style="list-style-type: none"> <li>Increase speed and reduce feed</li> <li>Check workpiece clamping</li> <li>Measure drill runout</li> <li>Reduce chip packing with improved flute design or peck drilling (HSS/HSS-Co only)</li> <li>Inspect point alignment and lip height</li> </ul>  |
| <b>Undersized Holes</b>            | <ul style="list-style-type: none"> <li>Improve coolant flow direction</li> <li>Reduce speed and increase feed</li> <li>Verify drill diameter</li> </ul>  |
| <b>Out-of-Round Holes</b>          | <ul style="list-style-type: none"> <li>Check drill runout</li> <li>Ensure secure workpiece clamping</li> <li>Inspect point alignment and lip height</li> <li>Prevent chip packing with better flute opening or peck drilling (HSS/HSS-Co only)</li> </ul>  |
| <b>Drill Breakage</b>              | <ul style="list-style-type: none"> <li>Reduce chip buildup through improved flute design or peck drilling (HSS/HSS-Co only)</li> <li>Check workpiece stability</li> <li>Measure drill runout</li> <li>Adjust feed rate as needed</li> <li>Improve coolant direction</li> <li>Increase coolant pressure</li> </ul>  |

## TAPPING TROUBLESHOOTING GUIDE

| Problem           | Cause   | Solution   |
|-------------------|---|--|
| Oversized Thread  | <ul style="list-style-type: none"> <li>• Wrong tolerance</li> <li>• Wrong tap for application</li> <li>• Incorrect axial feed</li> <li>• Tap speed too slow</li> <li>• Wrong tool holder “over feed thread”</li> </ul>  | <ul style="list-style-type: none"> <li>• Choose tap with lower tolerance</li> <li>• Refer to application charts</li> <li>• Ensure feed rate is controlled</li> </ul>   |
| Undersized Thread | <ul style="list-style-type: none"> <li>• Wrong tolerance</li> <li>• Tap worn out</li> <li>• Excessive pull off pressure</li> <li>• Tap drill hole too small</li> <li>• Material closing in after tapping</li> </ul>   | <ul style="list-style-type: none"> <li>• Choose tap with higher tolerance</li> <li>• Replace</li> <li>• Adjust tapping attachment</li> <li>• Increase drill diameter</li> </ul>  |
| Chipping          | <ul style="list-style-type: none"> <li>• Wrong tap for the material/application</li> <li>• Incorrect or lack of lubricant</li> <li>• Tap hitting bottom of hole</li> <li>• Trapped chip</li> <li>• Surface hardening in drilled hole</li> </ul>                                       | <ul style="list-style-type: none"> <li>• Check tool selection</li> <li>• Use appropriate emulsion or oil</li> <li>• Increase drill depth or reduce thread depth</li> <li>• Check tool selection</li> <li>• Check drilling recommendations</li> </ul>   |
| Breakage          | <ul style="list-style-type: none"> <li>• Too high torque</li> <li>• Tap worn out</li> <li>• Incorrect or lack of lubricant</li> <li>• Tap hitting bottom of hole</li> <li>• Tap speed too high</li> <li>• Trapped chip</li> <li>• Tap drill hole too small</li> </ul>                 | <ul style="list-style-type: none"> <li>• Use tap holder with torque settings</li> <li>• Replace</li> <li>• Use appropriate emulsion or oil</li> <li>• Increase drill depth or reduce thread depth</li> <li>• Lower cutting speed, see recommendations</li> <li>• Check tool selection</li> </ul> |
| Rapid Wear        | <ul style="list-style-type: none"> <li>• Wrong type of tap for the application</li> <li>• Wrong surface treatment</li> <li>• Incorrect or lack of lubricant</li> <li>• Tap speed too high</li> <li>• Surface hardening in drilled hole</li> <li>• Tap drill hole too small</li> </ul> | <ul style="list-style-type: none"> <li>• Use a more wear resistant surface treatment</li> <li>• Use appropriate emulsion or oil</li> <li>• Lower the cutting speed, see recommendations</li> <li>• Check drilling recommendations</li> </ul>   |
| Built-up Edge     | <ul style="list-style-type: none"> <li>• Wrong type of tap for the application</li> <li>• Tap worn out</li> <li>• Incorrect or lack of lubricant</li> </ul>   | <ul style="list-style-type: none"> <li>• Replace</li> <li>• Use appropriate emulsion or oil</li> </ul>   |

**WEAR LIMITS**

HSS-Co5 Insert VB=0.4mm  
 HSS-Co8 Insert VB=0.4mm  
 Tungsten Carbide Insert VB=0.3mm



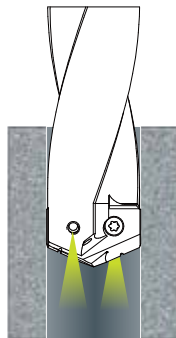
**INSERT INSTALLATION**



**COOLANT PRESSURE**

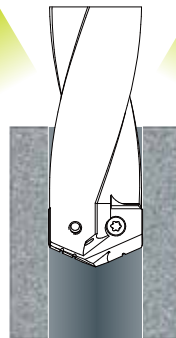
**INTERNAL COOLING**

**9.5–47.0MM**  
 5 Bar, 72 PSI, 500 kPa  
**48.0–65.0MM**  
 10 Bar, 145 PSI, 1000 kPa  
**66.0–89.0MM**  
 15 Bar, 217 PSI, 1500 kPa  
**90.0–114.0MM**  
 20 Bar, 290 PSI, 2000 kPa



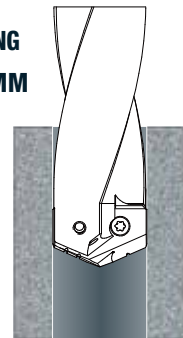
**EXTERNAL COOLING**

**9.5–35.0MM**  
 5 Bar, 72 PSI, 500 kPa  
**48.0–65.0MM**  
 NOT SUITABLE  
**66.0–89.0MM**  
 NOT SUITABLE  
**90.0–114.0MM**  
 NOT SUITABLE

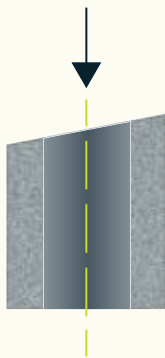


**QUASI DRY CUTTING**

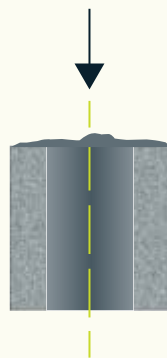
**9.5–35.0MM**  
 TUNGSTEN CARBIDE ONLY



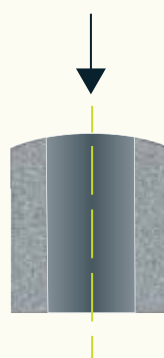
**APPLICATIONS**



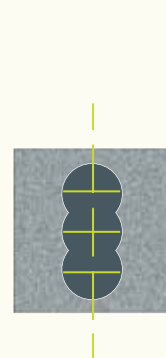
**ENTRY SURFACE IS SLANTED**  
 Slope <math>< 3^\circ</math>  
 Reduce Feed Rate to 50% of recommended.



**ENTRY SURFACE IS WELDED**  
 Level by spot facing prior to drilling.

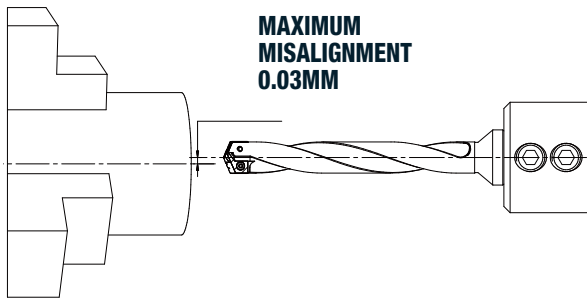
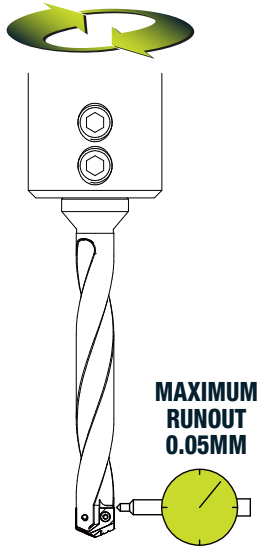


**ENTRY SURFACE IS ARC/CURVED**  
 Drilling at center of arc is permitted at reduced feed rate. Spot facing is required if the drilling entry point is not at the centre of the arc.

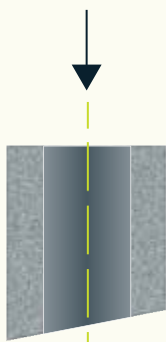
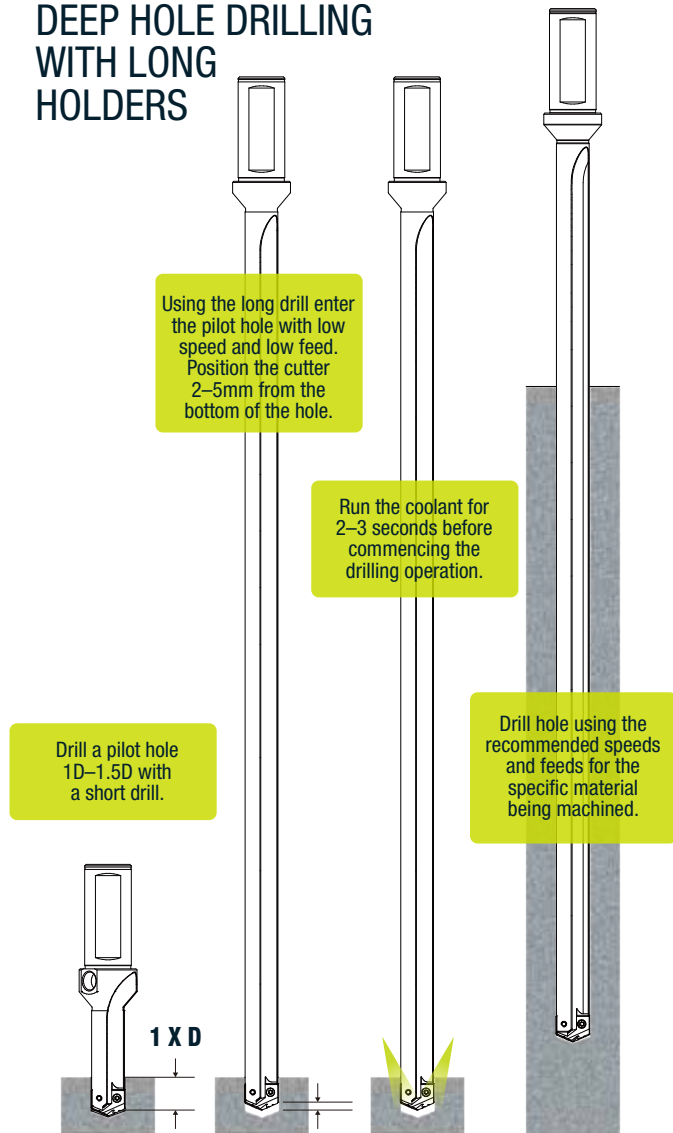


**DRILLING AN INCOMPLETE HOLE**  
**NOT PERMITTED**

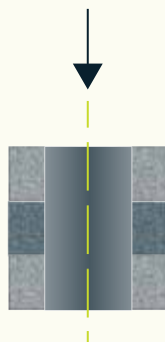
## MAXIMUM RUNOUT AND ALIGNMENT



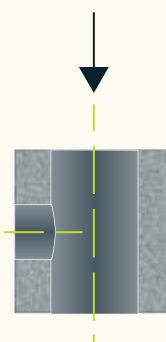
## DEEP HOLE DRILLING WITH LONG HOLDERS



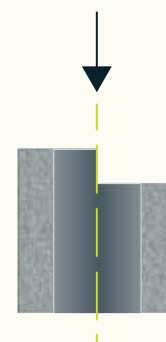
**EXIT SURFACE IS SLANTED**  
Slope <math>< 3^\circ</math>  
Reduce Feed Rate to 50% of recommended.



**STACKED PLATES**  
Ensure sufficient clamping.



**THROUGH HOLE**  
Drilling through a bisecting hole is **NOT PERMITTED**



**STEPPED ENTRY SURFACE**  
Entry point must be on a flat plane. **NOT PERMITTED**



SPADE DRILL FEEDS AND SPEEDS FOR PM HSS-Co5 AND PM HSS-Co8 INSERTS

| ISO   | WORKPIECE MATERIAL   |                             | HEAT TREATMENT        | BRINELL HARDNESS | TENSILE STRENGTH | CUTTING SPEED       |           |           |    |
|---|--|-----------------------------|-----------------------|------------------|------------------|---------------------|-----------|-----------|----|
|   |  |                             |                       |                  |                  | SURFACE SPEED M/MIN |           |           |    |
|   |  |                             |                       | HB               | N/MM2            | MIN                 | REC       | MAX       |    |
| P   | NON-ALLOY STEEL<br>Y13, 1215, 1.0736<br>Y15, 1213, 1.0715<br>LOW CARBON STEEL<br>45, 1045, 1.0503<br>Q345B, 1140, 1.7026 | <0.25% C                    | ANNEALED              | 100-150          | 370-500          | 38                  | <b>54</b> | 70        |    |
|   |  | ≥0.25% C                    | ANNEALED              | 175-225          | 600-775          | 35                  | <b>50</b> | 64        |    |
|   |  | <0.55% C                    | QUENCHED AND TEMPERED | 225-275          | 775-940          | 32                  | <b>45</b> | 59        |    |
|   |  | ≥0.55% C                    | ANNEALED              | 275-325          | 940-1090         | 25                  | <b>36</b> | 47        |    |
|   | LOW ALLOY STEEL<br>40CR, 5140, 1.7035<br>42CRMO, 4140, 1.7225  |                             | ANNEALED              | 175-225          | 600-775          | 33                  | <b>47</b> | 62        |    |
|   |  |                             | ANNEALED              | 225-275          | 775-940          | 32                  | <b>45</b> | 59        |    |
|   |  |                             | ANNEALED              | 275-325          | 940-1090         | 28                  | <b>41</b> | 53        |    |
|   |  |                             | TEMPERED              | 325-375          | 1090-1265        | 24                  | <b>34</b> | 44        |    |
|   |  |                             | ANNEALED              | 225-300          | 600-1020         | 22                  | <b>32</b> | 41        |    |
|   |  |                             | TEMPERED              | 300-350          | 1020-1180        | 19                  | <b>27</b> | 35        |    |
| HIGH ALLOY STEEL, TOOL STEEL, CAST STEEL<br>CR12, D3, 1.2080, 4CR5MOV5, H13, 1.2344 |  | FERRITIC                    | 185-275               | 640-940          | 16               | <b>23</b>           | 29        |           |    |
|   |  | MARTENSITIC                 | 275-350               | 940-1180         | 19               | <b>27</b>           | 35        |           |    |
| M   | STAINLESS STEEL AUSTENITIC<br>0CR18NI9, 304, 1.4301<br>0CR17NI11MO2, 316, 1.4401   |                             | ANNEALED              | 135-185          | 480-640          | 18                  | <b>25</b> | 32        |    |
|   |  |                             | CAST                  | 185-275          | 640-940          | 18                  | <b>25</b> | 32        |    |
|   | SUPER DUPLEX<br>STAINLESS STEEL  | N <0.1%                     | 60% FERRITIC          | 135-185          | 480-640          | —                   | —         | —         |    |
| N ≥0.1%   |  | 60% FERRITIC                | 185-275               | 640-940          | —                | —                   | —         |           |    |
| K   | GREY CAST IRON<br>HT200, NO.30, GG20<br>HT250, NO.35, GG25   |                             | FERRITIC              | 120-150          | 430-500          | 38                  | <b>54</b> | 70        |    |
|   |  |                             | PEARLITIC             | 150-200          | 500-700          | 35                  | <b>50</b> | 64        |    |
|   | CAST IRON NODULAR<br>QT400-18, 60-40-18, GGG40<br>QT600-3, 80-60-03, GGG60   |                             | FERRITIC              | 200-220          | 700-755          | 32                  | <b>45</b> | 59        |    |
|   |  |                             | PEARLITIC             | 220-260          | 755-890          | 32                  | <b>45</b> | 59        |    |
| MALLEABLE CAST IRON   |  | FERRITIC                    | 120-150               | 430-500          | 32               | <b>45</b>           | 59        |           |    |
|   |  | PEARLITIC                   | 260-320               | 890-1020         | 32               | <b>45</b>           | 59        |           |    |
| N   | WROUGHT ALUMINIUM  |                             | NOT CUREABIE          | 30               | 100              | 47                  | <b>68</b> | 88        |    |
|   |  |                             | CURED                 | 180              | 600              | 41                  | <b>59</b> | 76        |    |
|   | CAST ALUMINIUM   | ≤12% Si                     | CURED                 | 30               | 100              | 47                  | <b>68</b> | 88        |    |
|   |  | >12% Si                     | HIGH TEMPERATURE      | —                | —                | 41                  | <b>59</b> | 76        |    |
|   | ALUMINIUM BRONZE   | >1% Pb                      |                       | FREE CUTTING     | 100-200          | 370-670             | 47        | <b>68</b> | 88 |
|   |  |                             |                       | BRASS            | 200-250          | 670-855             | 47        | <b>68</b> | 88 |
|   |  |                             | ELECTROLYTIC COPPER   | 100              | 370              | 47                  | <b>68</b> | 88        |    |
| NON METALLIC  |  | DUROPLASTICS FIBER PLASTICS | —                     | —                | 47               | <b>68</b>           | 88        |           |    |
|   |  | HARD RUBBER                 | 60                    | 200              | 47               | <b>68</b>           | 88        |           |    |
| S   | HIGH TEMP. ALLOY<br>HASTELLOY B, INCONEL 600   | Fe BASE                     | ANNEALED              | 140-220          | 480-755          | 14                  | <b>20</b> | 27        |    |
|   |  |                             | CURED                 | 223-310          | 755-990          | 11                  | <b>16</b> | 21        |    |
|   |  | Ni OR<br>Co BASE            | ANNEALED              | 250              | —                | 11                  | <b>16</b> | 21        |    |
|   |  |                             | CURED                 | 350              | —                | 11                  | <b>16</b> | 21        |    |
|   | TITANIUM ALLOY   |                             | —                     | 320              | RM400            | 11                  | <b>16</b> | 21        |    |
|   |  |                             | α+β ALLOYS CURED      | —                | RM 1050          | 11                  | <b>16</b> | 21        |    |
| H   | WEAR PLATE<br>HARDOX, AR400, T-1   |                             | HARDENED              | 400              | 1365             | 7                   | <b>10</b> | 13        |    |
|   |  |                             | HARDENED              | 500              | 1600             | —                   | —         | —         |    |
|   | HARDENED STEEL   |                             | HARDENED              | 300-400          | 1020-1365        | 9                   | <b>13</b> | 16        |    |
|   |  |                             | HARDENED              | 400-500          | 1365+            | —                   | —         | —         |    |



WHEN USING INTERMITTENT MACHINING THE FEED RATE SHOULD BE REDUCED BY 30 TO 50%.

THESE RECOMMENDED CUTTING PARAMETERS ARE BASED ON UP TO F40 HOLDERS. WHEN USING LONGER HOLDERS THE SPEEDS SHOULD BE APPROPRIATELY REDUCED ACCORDING TO THE WORKING CONDITIONS. THE FOLLOWING REDUCTIONS SHOULD BE A STARTING GUIDE.

**F40 HOLDERS = 100% OF THE TABULATED DATA**  
**F50 HOLDERS = 90% OF THE TABULATED DATA**  
**F70 HOLDERS = 80% OF THE TABULATED DATA**  
**F90 HOLDERS = 70% OF THE TABULATED DATA**

**HOLDER DESIGNATIONS ARE INCLUDED IN THE PART NUMBER I.E. 6515-55SF70**

| FEED RATE MM/REV |             |      |               |             |      |               |             |      |               |             |      |               |             |      |               |             |      |                |             |      |
|------------------|-------------|------|---------------|-------------|------|---------------|-------------|------|---------------|-------------|------|---------------|-------------|------|---------------|-------------|------|----------------|-------------|------|
| Ø 9.5-12.5MM     |             |      | Ø 13.0-17.5MM |             |      | Ø 18.0-24.0MM |             |      | Ø 25.0-35.0MM |             |      | Ø 36.0-47.0MM |             |      | Ø 48.0-65.0MM |             |      | Ø 66.0-114.0MM |             |      |
| MIN              | REC         | MAX  | MIN           | REC         | MAX  | MIN           | REC         | MAX  | MIN           | REC         | MAX  | MIN           | REC         | MAX  | MIN           | REC         | MAX  | MIN            | REC         | MAX  |
| 0.09             | <b>0.12</b> | 0.17 | 0.13          | <b>0.17</b> | 0.23 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.26          | <b>0.34</b> | 0.47 | 0.29          | <b>0.39</b> | 0.54 | 0.36           | <b>0.48</b> | 0.66 |
| 0.07             | <b>0.09</b> | 0.12 | 0.1           | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 | 0.19          | <b>0.25</b> | 0.34 | 0.23          | <b>0.31</b> | 0.43 | 0.27          | <b>0.36</b> | 0.5  | 0.31           | <b>0.42</b> | 0.57 |
| 0.07             | <b>0.09</b> | 0.12 | 0.1           | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 | 0.19          | <b>0.25</b> | 0.34 | 0.23          | <b>0.31</b> | 0.43 | 0.27          | <b>0.36</b> | 0.5  | 0.31           | <b>0.42</b> | 0.57 |
| 0.05             | <b>0.07</b> | 0.1  | 0.09          | <b>0.12</b> | 0.17 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 | 0.21          | <b>0.28</b> | 0.39 | 0.25          | <b>0.33</b> | 0.45 | 0.29           | <b>0.38</b> | 0.53 |
| 0.04             | <b>0.06</b> | 0.08 | 0.08          | <b>0.1</b>  | 0.14 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 | 0.19          | <b>0.26</b> | 0.35 | 0.22          | <b>0.3</b>  | 0.41 | 0.26           | <b>0.34</b> | 0.47 |
| 0.07             | <b>0.09</b> | 0.12 | 0.1           | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 | 0.19          | <b>0.25</b> | 0.34 | 0.22          | <b>0.3</b>  | 0.41 | 0.25          | <b>0.33</b> | 0.45 | 0.29           | <b>0.38</b> | 0.53 |
| 0.07             | <b>0.09</b> | 0.12 | 0.09          | <b>0.12</b> | 0.17 | 0.13          | <b>0.17</b> | 0.23 | 0.19          | <b>0.25</b> | 0.34 | 0.22          | <b>0.3</b>  | 0.41 | 0.25          | <b>0.33</b> | 0.45 | 0.29           | <b>0.38</b> | 0.53 |
| 0.05             | <b>0.07</b> | 0.1  | 0.08          | <b>0.1</b>  | 0.14 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 | 0.19          | <b>0.26</b> | 0.35 | 0.22          | <b>0.3</b>  | 0.41 | 0.26           | <b>0.34</b> | 0.47 |
| 0.04             | <b>0.06</b> | 0.08 | 0.08          | <b>0.1</b>  | 0.14 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 | 0.19          | <b>0.26</b> | 0.35 | 0.22          | <b>0.3</b>  | 0.41 | 0.26           | <b>0.34</b> | 0.47 |
| 0.07             | <b>0.09</b> | 0.12 | 0.09          | <b>0.12</b> | 0.17 | 0.12          | <b>0.16</b> | 0.22 | 0.13          | <b>0.17</b> | 0.23 | 0.19          | <b>0.25</b> | 0.34 | 0.22          | <b>0.3</b>  | 0.41 | 0.26           | <b>0.34</b> | 0.47 |
| 0.05             | <b>0.07</b> | 0.1  | 0.09          | <b>0.12</b> | 0.17 | 0.12          | <b>0.16</b> | 0.22 | 0.13          | <b>0.17</b> | 0.23 | 0.19          | <b>0.25</b> | 0.34 | 0.22          | <b>0.3</b>  | 0.41 | 0.26           | <b>0.34</b> | 0.47 |
| 0.08             | <b>0.1</b>  | 0.14 | 0.1           | <b>0.14</b> | 0.19 | 0.12          | <b>0.16</b> | 0.22 | 0.13          | <b>0.17</b> | 0.23 | 0.19          | <b>0.25</b> | 0.34 | 0.21          | <b>0.28</b> | 0.39 | 0.26           | <b>0.34</b> | 0.47 |
| 0.07             | <b>0.09</b> | 0.12 | 0.09          | <b>0.12</b> | 0.17 | 0.1           | <b>0.14</b> | 0.19 | 0.1           | <b>0.14</b> | 0.19 | 0.16          | <b>0.21</b> | 0.29 | 0.19          | <b>0.25</b> | 0.34 | 0.23           | <b>0.31</b> | 0.43 |
| 0.04             | <b>0.06</b> | 0.08 | 0.09          | <b>0.12</b> | 0.17 | 0.1           | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 | 0.19          | <b>0.25</b> | 0.34 | 0.21          | <b>0.28</b> | 0.39 | 0.26           | <b>0.34</b> | 0.47 |
| 0.04             | <b>0.06</b> | 0.08 | 0.08          | <b>0.1</b>  | 0.14 | 0.09          | <b>0.12</b> | 0.17 | 0.1           | <b>0.14</b> | 0.19 | 0.16          | <b>0.21</b> | 0.29 | 0.19          | <b>0.25</b> | 0.34 | 0.23           | <b>0.31</b> | 0.43 |
| —                | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    | —              | —           | —    |
| —                | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    | —              | —           | —    |
| 0.09             | <b>0.12</b> | 0.17 | 0.16          | <b>0.21</b> | 0.29 | 0.21          | <b>0.28</b> | 0.39 | 0.26          | <b>0.34</b> | 0.47 | 0.31          | <b>0.42</b> | 0.57 | 0.35          | <b>0.47</b> | 0.65 | 0.39           | <b>0.52</b> | 0.72 |
| 0.08             | <b>0.1</b>  | 0.14 | 0.14          | <b>0.19</b> | 0.26 | 0.19          | <b>0.25</b> | 0.34 | 0.23          | <b>0.31</b> | 0.43 | 0.29          | <b>0.38</b> | 0.53 | 0.32          | <b>0.43</b> | 0.59 | 0.36           | <b>0.48</b> | 0.66 |
| 0.08             | <b>0.1</b>  | 0.14 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 | 0.21          | <b>0.28</b> | 0.39 | 0.23          | <b>0.31</b> | 0.43 | 0.27          | <b>0.36</b> | 0.5  | 0.31           | <b>0.42</b> | 0.57 |
| 0.07             | <b>0.09</b> | 0.12 | 0.09          | <b>0.12</b> | 0.17 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 | 0.19          | <b>0.25</b> | 0.34 | 0.22          | <b>0.3</b>  | 0.41 | 0.26           | <b>0.34</b> | 0.47 |
| 0.09             | <b>0.12</b> | 0.17 | 0.16          | <b>0.21</b> | 0.29 | 0.21          | <b>0.28</b> | 0.39 | 0.26          | <b>0.34</b> | 0.47 | 0.31          | <b>0.42</b> | 0.57 | 0.35          | <b>0.47</b> | 0.65 | 0.39           | <b>0.52</b> | 0.72 |
| 0.05             | <b>0.07</b> | 0.1  | 0.08          | <b>0.1</b>  | 0.14 | 0.09          | <b>0.12</b> | 0.17 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 | 0.19          | <b>0.25</b> | 0.34 | 0.21           | <b>0.28</b> | 0.39 |
| 0.05             | <b>0.07</b> | 0.10 | 0.08          | <b>0.10</b> | 0.14 | 0.13          | <b>0.17</b> | 0.23 | 0.16          | <b>0.21</b> | 0.29 | 0.29          | <b>0.38</b> | 0.53 | 0.32          | <b>0.43</b> | 0.59 | 0.32           | <b>0.43</b> | 0.59 |
| 0.10             | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.23          | <b>0.31</b> | 0.43 | 0.29          | <b>0.38</b> | 0.53 | 0.32          | <b>0.43</b> | 0.59 | 0.32           | <b>0.43</b> | 0.59 |
| 0.10             | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.26          | <b>0.34</b> | 0.47 | 0.29          | <b>0.38</b> | 0.53 | 0.32          | <b>0.43</b> | 0.59 | 0.32           | <b>0.43</b> | 0.59 |
| 0.10             | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.23          | <b>0.31</b> | 0.43 | 0.29          | <b>0.38</b> | 0.53 | 0.32          | <b>0.43</b> | 0.59 | 0.32           | <b>0.43</b> | 0.59 |
| 0.10             | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.23          | <b>0.31</b> | 0.43 | 0.29          | <b>0.38</b> | 0.53 | 0.32          | <b>0.43</b> | 0.59 | 0.32           | <b>0.43</b> | 0.59 |
| 0.08             | <b>0.10</b> | 0.14 | 0.14          | <b>0.19</b> | 0.26 | 0.19          | <b>0.25</b> | 0.34 | 0.23          | <b>0.31</b> | 0.43 | 0.29          | <b>0.38</b> | 0.53 | 0.34          | <b>0.45</b> | 0.62 | 0.36           | <b>0.48</b> | 0.66 |
| 0.07             | <b>0.09</b> | 0.12 | 0.09          | <b>0.12</b> | 0.17 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 | 0.19          | <b>0.25</b> | 0.34 | 0.22          | <b>0.30</b> | 0.41 | 0.26           | <b>0.34</b> | 0.47 |
| 0.09             | <b>0.12</b> | 0.17 | 0.16          | <b>0.21</b> | 0.29 | 0.21          | <b>0.28</b> | 0.39 | 0.26          | <b>0.34</b> | 0.47 | 0.31          | <b>0.42</b> | 0.57 | 0.36          | <b>0.48</b> | 0.66 | 0.39           | <b>0.52</b> | 0.72 |
| 0.10             | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.23          | <b>0.31</b> | 0.43 | 0.29          | <b>0.38</b> | 0.53 | 0.32          | <b>0.43</b> | 0.59 | 0.32           | <b>0.43</b> | 0.59 |
| 0.10             | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.23          | <b>0.31</b> | 0.43 | 0.29          | <b>0.38</b> | 0.53 | 0.32          | <b>0.43</b> | 0.59 | 0.32           | <b>0.43</b> | 0.59 |
| 0.04             | <b>0.06</b> | 0.08 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 | 0.16          | <b>0.21</b> | 0.29 | 0.19          | <b>0.26</b> | 0.35 | —              | —           | —    |
| 0.04             | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 | 0.16          | <b>0.21</b> | 0.29 | —              | —           | —    |
| 0.04             | <b>0.06</b> | 0.08 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 | 0.16          | <b>0.21</b> | 0.29 | 0.19          | <b>0.26</b> | 0.35 | —              | —           | —    |
| 0.04             | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 | 0.16          | <b>0.21</b> | 0.29 | —              | —           | —    |
| 0.04             | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 | 0.16          | <b>0.21</b> | 0.29 | —              | —           | —    |
| 0.04             | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.10          | <b>0.14</b> | 0.19 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 | 0.21          | <b>0.28</b> | 0.39 | 0.23           | <b>0.31</b> | 0.43 |
| —                | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    | —              | —           | —    |
| 0.04             | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.10          | <b>0.14</b> | 0.19 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 | 0.21          | <b>0.28</b> | 0.39 | 0.23           | <b>0.31</b> | 0.43 |
| —                | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    | —              | —           | —    |



SPADE DRILL FEEDS AND SPEEDS FOR TUNGSTEN CARBIDE INSERTS

| ISO   | WORKPIECE MATERIAL   |                             | HEAT TREATMENT        | BRINELL HARDNESS    | TENSILE STRENGTH | CUTTING SPEED       |            |            |     |
|---|--|-----------------------------|-----------------------|---------------------|------------------|---------------------|------------|------------|-----|
|   |  |                             |                       |                     |                  | SURFACE SPEED M/MIN |            |            |     |
|   |  |                             |                       | HB                  | N/MM2            | MIN                 | REC        | MAX        |     |
| P   | NON-ALLOY STEEL<br>Y13, 1215, 1.0736<br>Y15, 1213, 1.0715<br>LOW CARBON STEEL<br>45, 1045, 1.0503<br>Q345B, 1140, 1.7026 | <0.25% C                    | ANNEALED              | 100-150             | 370-500          | 75                  | <b>94</b>  | 117        |     |
|   |  | ≥0.25% C                    | ANNEALED              | 175-225             | 600-775          | 55                  | <b>69</b>  | 86         |     |
|   |  | <0.55% C                    | QUENCHED AND TEMPERED | 225-275             | 775-940          | 49                  | <b>61</b>  | 76         |     |
|   |  | ≥0.55% C                    | ANNEALED              | 275-325             | 940-1090         | 41                  | <b>51</b>  | 64         |     |
|   | LOW ALLOY STEEL<br>40CR, 5140, 1.7035<br>42CRMO, 4140, 1.7225  |                             | ANNEALED              | 175-225             | 600-775          | 54                  | <b>67</b>  | 84         |     |
|   |  |                             | ANNEALED              | 225-275             | 775-940          | 49                  | <b>61</b>  | 76         |     |
|   |  |                             | ANNEALED              | 275-325             | 940-1090         | 45                  | <b>56</b>  | 70         |     |
|   |  |                             | TEMPERED              | 325-375             | 1090-1265        | 40                  | <b>50</b>  | 62         |     |
|   | HIGH ALLOY STEEL, TOOL STEEL, CAST STEEL<br>CR12, D3, 1.2080, 4CR5MOV5, H13, 1.2344                                      |                             | ANNEALED              | 225-300             | 600-1020         | 40                  | <b>50</b>  | 62         |     |
|   |  |                             | TEMPERED              | 300-350             | 1020-1180        | 30                  | <b>38</b>  | 47         |     |
| STAINLESS STEEL FERRITIC/MARTENSITIC<br>OCR13, 403, 1.400, 2CR13, 410, 1.4021 |  | FERRITIC                    | 185-275               | 640-940             | 37               | <b>46</b>           | 58         |            |     |
|   |  | MARTENSITIC                 | 275-350               | 940-1180            | 29               | <b>36</b>           | 45         |            |     |
| M   | STAINLESS STEEL AUSTENITIC<br>OCR18NI9, 304, 1.4301<br>OCR17NI11MO2, 316, 1.4401   |                             | ANNEALED              | 135-185             | 480-640          | 37                  | <b>46</b>  | 58         |     |
|   |  |                             | CAST                  | 185-275             | 640-940          | 29                  | <b>36</b>  | 45         |     |
|   | SUPER DUPLEX<br>STAINLESS STEEL  | N <0.1%                     | 60% FERRITIC          | 135-185             | 480-640          | —                   | —          | —          |     |
|   | N ≥0.1%  | 60% FERRITIC                | 185-275               | 640-940             | —                | —                   | —          |            |     |
| K   | GREY CAST IRON<br>HT200, NO.30, GG20<br>HT250, NO.35, GG25   |                             | FERRITIC              | 120-150             | 430-500          | 78                  | <b>98</b>  | 122        |     |
|   |  |                             | PEARLITIC             | 150-200             | 500-700          | 75                  | <b>94</b>  | 117        |     |
|   | CAST IRON NODULAR<br>QT400-18, 60-40-18, GGG40<br>QT600-3, 80-60-03, GGG60   |                             | FERRITIC              | 200-220             | 700-755          | 67                  | <b>84</b>  | 105        |     |
|   |  |                             | PEARLITIC             | 220-260             | 755-890          | 58                  | <b>72</b>  | 90         |     |
| MALLEABLE CAST IRON   |  | FERRITIC                    | 120-150               | 430-500             | 75               | <b>94</b>           | 117        |            |     |
|   |  | PEARLITIC                   | 260-320               | 890-1020            | 52               | <b>66</b>           | 82         |            |     |
| N   | WROUGHT ALUMINIUM  |                             | NOT CUREABLE          | 30                  | 100              | 105                 | <b>150</b> | 195        |     |
|   |  |                             | CURED                 | 180                 | 600              | 91                  | <b>130</b> | 169        |     |
|   | CAST ALUMINIUM   | ≤12% Si                     | CURED                 | 30                  | 100              | 105                 | <b>150</b> | 195        |     |
|   |  | >12% Si                     | HIGH TEMPERATURE      | —                   | —                | 91                  | <b>130</b> | 169        |     |
|   | ALUMINIUM BRONZE   | >1% Pb                      |                       | FREE CUTTING        | 100-200          | 370-670             | 105        | <b>150</b> | 195 |
|   |  |                             |                       | BRASS               | 200-250          | 670-855             | 105        | <b>150</b> | 195 |
|   |  |                             |                       | ELECTROLYTIC COPPER | 100              | 370                 | 105        | <b>150</b> | 195 |
| NON METALLIC  |  | DUROPLASTICS FIBER PLASTICS | —                     | —                   | 105              | <b>150</b>          | 195        |            |     |
|   |  | HARD RUBBER                 | 60                    | 200                 | 105              | <b>150</b>          | 195        |            |     |
| S   | HIGH TEMP. ALLOY<br>HASTELLOY B, INCONEL 600   | Fe BASE                     | ANNEALED              | 140-220             | 480-755          | 19                  | <b>24</b>  | 30         |     |
|   |  |                             | CURED                 | 223-310             | 755-990          | 15                  | <b>18</b>  | 23         |     |
|   |  | Ni OR<br>Co BASE            | ANNEALED              | 250                 | —                | 19                  | <b>24</b>  | 30         |     |
|   |  |                             | CURED                 | 350                 | —                | 15                  | <b>18</b>  | 23         |     |
|   | TITANIUM ALLOY   |                             | —                     | 320                 | RM400            | 22                  | <b>27</b>  | 34         |     |
|   |  |                             | α+β ALLOYS CURED      | —                   | RM 1050          | 17                  | <b>21</b>  | 26         |     |
| H   | WEAR PLATE<br>HARDOX, AR400, T-1   |                             | HARDENED              | 400                 | 1365             | 23                  | <b>29</b>  | 36         |     |
|   |  |                             | HARDENED              | 500                 | 1600             | 19                  | 24         | 30         |     |
|   | HARDENED STEEL   |                             | HARDENED              | 300-400             | 1020-1365        | 24                  | <b>30</b>  | 38         |     |
|   |  |                             | HARDENED              | 400-500             | 1365+            | 19                  | 24         | 30         |     |



WHEN USING INTERMITTENT MACHINING THE FEED RATE SHOULD BE REDUCED BY 30 TO 50%.

THESE RECOMMENDED CUTTING PARAMETERS ARE BASED ON UP TO F40 HOLDERS. WHEN USING LONGER HOLDERS THE SPEEDS SHOULD BE APPROPRIATELY REDUCED ACCORDING TO THE WORKING CONDITIONS. THE FOLLOWING REDUCTIONS SHOULD BE A STARTING GUIDE.

**F40 HOLDERS = 100% OF THE TABULATED DATA**  
**F50 HOLDERS = 90% OF THE TABULATED DATA**  
**F70 HOLDERS = 80% OF THE TABULATED DATA**  
**F90 HOLDERS = 70% OF THE TABULATED DATA**

**HOLDER DESIGNATIONS ARE INCLUDED IN THE PART NUMBER I.E. 6515-55SF70**

**FEED RATE MM/REV**

|  | Ø 9.5-12.5MM |             |      | Ø 13.0-17.5MM |             |      | Ø 18.0-24.0MM |             |      | Ø 25.0-35.0MM |             |      |
|--|--------------|-------------|------|---------------|-------------|------|---------------|-------------|------|---------------|-------------|------|
|  | MIN          | REC         | MAX  | MIN           | REC         | MAX  | MIN           | REC         | MAX  | MIN           | REC         | MAX  |
|  | 0.09         | <b>0.12</b> | 0.17 | 0.13          | <b>0.17</b> | 0.23 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 |
|  | 0.07         | <b>0.09</b> | 0.12 | 0.10          | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 | 0.19          | <b>0.25</b> | 0.34 |
|  | 0.07         | <b>0.09</b> | 0.12 | 0.10          | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 | 0.19          | <b>0.25</b> | 0.34 |
|  | 0.05         | <b>0.07</b> | 0.10 | 0.09          | <b>0.12</b> | 0.17 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 |
|  | 0.04         | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 |
|  | 0.07         | <b>0.09</b> | 0.12 | 0.10          | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 | 0.19          | <b>0.25</b> | 0.34 |
|  | 0.07         | <b>0.09</b> | 0.12 | 0.09          | <b>0.12</b> | 0.17 | 0.13          | <b>0.17</b> | 0.23 | 0.19          | <b>0.25</b> | 0.34 |
|  | 0.05         | <b>0.07</b> | 0.10 | 0.08          | <b>0.10</b> | 0.14 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 |
|  | 0.04         | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 |
|  | 0.07         | <b>0.09</b> | 0.12 | 0.09          | <b>0.12</b> | 0.17 | 0.12          | <b>0.16</b> | 0.22 | 0.13          | <b>0.17</b> | 0.23 |
|  | 0.05         | <b>0.07</b> | 0.10 | 0.09          | <b>0.12</b> | 0.17 | 0.12          | <b>0.16</b> | 0.22 | 0.13          | <b>0.17</b> | 0.23 |
|  | 0.08         | <b>0.10</b> | 0.14 | 0.10          | <b>0.14</b> | 0.19 | 0.12          | <b>0.16</b> | 0.22 | 0.13          | <b>0.17</b> | 0.23 |
|  | 0.07         | <b>0.09</b> | 0.12 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 | 0.10          | <b>0.14</b> | 0.19 |
|  | 0.04         | <b>0.06</b> | 0.08 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 |
|  | 0.04         | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 |
|  | —            | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    |
|  | —            | —           | —    | —             | —           | —    | —             | —           | —    | —             | —           | —    |
|  | 0.09         | <b>0.12</b> | 0.17 | 0.16          | <b>0.21</b> | 0.29 | 0.21          | <b>0.28</b> | 0.39 | 0.26          | <b>0.34</b> | 0.47 |
|  | 0.08         | <b>0.10</b> | 0.14 | 0.14          | <b>0.19</b> | 0.26 | 0.19          | <b>0.25</b> | 0.34 | 0.23          | <b>0.31</b> | 0.43 |
|  | 0.08         | <b>0.10</b> | 0.14 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 | 0.21          | <b>0.28</b> | 0.39 |
|  | 0.07         | <b>0.09</b> | 0.12 | 0.09          | <b>0.12</b> | 0.17 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 |
|  | 0.09         | <b>0.12</b> | 0.17 | 0.16          | <b>0.21</b> | 0.29 | 0.21          | <b>0.28</b> | 0.39 | 0.26          | <b>0.34</b> | 0.47 |
|  | 0.05         | <b>0.07</b> | 0.10 | 0.08          | <b>0.10</b> | 0.14 | 0.09          | <b>0.12</b> | 0.17 | 0.12          | <b>0.16</b> | 0.22 |
|  | 0.05         | <b>0.07</b> | 0.10 | 0.08          | <b>0.10</b> | 0.14 | 0.13          | <b>0.17</b> | 0.23 | 0.16          | <b>0.21</b> | 0.29 |
|  | 0.10         | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.23          | <b>0.31</b> | 0.43 |
|  | 0.10         | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.26          | <b>0.34</b> | 0.47 |
|  | 0.10         | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.23          | <b>0.31</b> | 0.43 |
|  | 0.10         | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.23          | <b>0.31</b> | 0.43 |
|  | 0.08         | <b>0.10</b> | 0.14 | 0.14          | <b>0.19</b> | 0.26 | 0.19          | <b>0.25</b> | 0.34 | 0.23          | <b>0.31</b> | 0.43 |
|  | 0.07         | <b>0.09</b> | 0.12 | 0.09          | <b>0.12</b> | 0.17 | 0.12          | <b>0.16</b> | 0.22 | 0.16          | <b>0.21</b> | 0.29 |
|  | 0.09         | <b>0.12</b> | 0.17 | 0.16          | <b>0.21</b> | 0.29 | 0.21          | <b>0.28</b> | 0.39 | 0.26          | <b>0.34</b> | 0.47 |
|  | 0.10         | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.23          | <b>0.31</b> | 0.43 |
|  | 0.10         | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.23          | <b>0.31</b> | 0.43 |
|  | 0.10         | <b>0.14</b> | 0.19 | 0.17          | <b>0.22</b> | 0.31 | 0.21          | <b>0.28</b> | 0.39 | 0.23          | <b>0.31</b> | 0.43 |
|  | 0.04         | <b>0.06</b> | 0.08 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 |
|  | 0.04         | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 |
|  | 0.04         | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 |
|  | 0.04         | <b>0.06</b> | 0.08 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 | 0.13          | <b>0.17</b> | 0.23 |
|  | 0.04         | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 |
|  | 0.04         | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 |
|  | 0.04         | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.10          | <b>0.14</b> | 0.19 | 0.12          | <b>0.16</b> | 0.22 |
|  | 0.02         | <b>0.03</b> | 0.04 | 0.07          | <b>0.09</b> | 0.12 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 |
|  | 0.04         | <b>0.06</b> | 0.08 | 0.08          | <b>0.10</b> | 0.14 | 0.10          | <b>0.14</b> | 0.19 | 0.12          | <b>0.16</b> | 0.22 |
|  | 0.02         | <b>0.03</b> | 0.04 | 0.07          | <b>0.09</b> | 0.12 | 0.09          | <b>0.12</b> | 0.17 | 0.10          | <b>0.14</b> | 0.19 |

FORMULAE FOR METRIC ENDMILLS

- $\varnothing$  Nominal tool diameter (mm)
- $n$  Spindle speed (RPM)
- $v_c$  Cutting speed (m/min)
- $f_z$  Feed rate per tooth (mm/tooth)
- $v_f$  Feed rate (mm/min)
- $z$  Number of cutting edges
- $Q$  Metal removal rate (cm<sup>3</sup>/min)
- $a_p$  Cutting depth (mm)
- $a_e$  Cutting width (mm)

$$n = \frac{v_c \times 1000}{\varnothing \times \pi} \approx \frac{v_c}{\varnothing} \times 318$$

$$v_c = \frac{n \times \varnothing \times \pi}{1000} \approx \frac{n \times \varnothing}{318}$$

$$f_z = \frac{v_f}{z \times n} \quad v_f = f_z \times z \times n$$

$$Q = \frac{a_p \times a_e \times v_f}{1000}$$

TROUBLESHOOTING GUIDE

| Problem             | Cause   | Solution  |
|---------------------|---|---|
| Chip Packing        | <ul style="list-style-type: none"> <li>• Feed per tooth too high</li> <li>• Not enough chip room</li> <li>• Not enough coolant</li> </ul>   | <ul style="list-style-type: none"> <li>• Lower feed rate</li> <li>• Use endmill with fewer flutes</li> <li>• Use more coolant to flush chips</li> </ul>   |
| Rough Finish        | <ul style="list-style-type: none"> <li>• Feed too fast</li> <li>• Slow speed</li> <li>• Too much cutter wear</li> <li>• Feed per tooth too high</li> </ul>  | <ul style="list-style-type: none"> <li>• Reduce to correct feed</li> <li>• Use higher speed</li> <li>• Resharpen or replace tool</li> <li>• Lower feed rate</li> </ul>  |
| Burrs               | <ul style="list-style-type: none"> <li>• Dull cutting edge</li> <li>• Improper cutting angle</li> </ul>   | <ul style="list-style-type: none"> <li>• Resharpen or replace tool</li> <li>• Change to correct cutting angle</li> </ul>  |
| Wandering           | <ul style="list-style-type: none"> <li>• Machine or holder runout</li> <li>• Insufficient rigidity in machine or holder</li> <li>• Not enough flutes</li> <li>• Tool deflection</li> </ul>  | <ul style="list-style-type: none"> <li>• Repair machine or holder</li> <li>• Change machine or holder</li> <li>• Use endmill with more flutes</li> <li>• Choke up on shank or reduce feed</li> </ul>  |
| Chipping            | <ul style="list-style-type: none"> <li>• Feed too fast</li> <li>• Feed too fast on the first cut</li> <li>• Lack of machine / tool holder rigidity</li> <li>• Loose holder</li> <li>• Loose vice</li> <li>• Lack of cutting tool rigidity</li> <li>• Teeth too sharp</li> </ul>                   | <ul style="list-style-type: none"> <li>• Lower feed rate</li> <li>• Lower feed on initial contact</li> <li>• Change to a more rigid machine / holder</li> <li>• Tighten tool holder</li> <li>• Tighten workpiece fixture</li> <li>• Choke up on shank or use shorter tool</li> <li>• Choose a tool with correct primary relief angle</li> </ul> |
| Excessive Tool Wear | <ul style="list-style-type: none"> <li>• Speed too fast</li> <li>• Hard material</li> <li>• Feed too slow</li> <li>• Improper cutting angle</li> <li>• Primary relief angle too small</li> </ul>  | <ul style="list-style-type: none"> <li>• Reduce speed and use more coolant</li> <li>• Use a cutter of better grade material</li> <li>• Use a cutter with a suitable coating</li> <li>• Increase feed speed</li> <li>• Change to correct cutting angle</li> <li>• Increase primary relief angle</li> </ul>                                       |
| Tool Breakage       | <ul style="list-style-type: none"> <li>• Feed too fast</li> <li>• Chip load per tooth too great</li> <li>• Flute length too long</li> <li>• Overall length too long</li> <li>• Too much cutter wear</li> </ul>  | <ul style="list-style-type: none"> <li>• Reduce feed speed</li> <li>• Adjust to smaller chip load per tooth</li> <li>• Choke up on the shank</li> <li>• Use a shorter tool</li> <li>• Resharpen or replace tool</li> </ul>  |
| Tool Chatter        | <ul style="list-style-type: none"> <li>• Feed and speed too fast</li> <li>• Poor rigidity of machine / holder</li> <li>• Relief angle too large</li> <li>• Loose workpiece holder</li> <li>• Cutting too deep</li> <li>• Flute length too long</li> <li>• Overall tool length too long</li> </ul> | <ul style="list-style-type: none"> <li>• Adjust feed and speed</li> <li>• Change to a more rigid machine / holder</li> <li>• Change to a smaller relief angle</li> <li>• Tighten tool holder</li> <li>• Change to a smaller depth of cut</li> <li>• Choke up on the shank</li> <li>• Use a shorter tool</li> </ul>                              |



HIGH  
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# TURNING INSERTS AND HOLDERS BUYER'S GUIDE

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### COMMITMENT TO EXCELLENCE

At Bordo International Pty Ltd, we believe that excellence is not just a goal; it is our guiding principle. Since our establishment in 1987, we have dedicated ourselves to providing the highest quality industrial cutting tools and accessories to our customers across Australia. As a proud 100% family-owned Australian company, we are committed to serving our customers and supporting our local community.

### COMPREHENSIVE PRODUCT RANGE

Our extensive product range is designed to meet the diverse needs of our customers in various industries. We take pride in offering one of the most comprehensive selections of industrial tools available, ensuring that you can find everything you need in one convenient location. Our unwavering commitment to "quality without compromise" drives us to source our products from the world's leading manufacturers, ensuring reliability and performance in every tool we offer.

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**INDUSTRIAL TOOLS**

**Bordo International Pty Ltd** ABN 96 005 125 833  
3 Kingston Park Court Knoxfield Victoria 3180 Australia  
**Telephone** +61 3 9212 7000 **Email** info@bordo.com.au  
**Web** www.bordo.com.au



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