

Drilling Solutions

High Performance

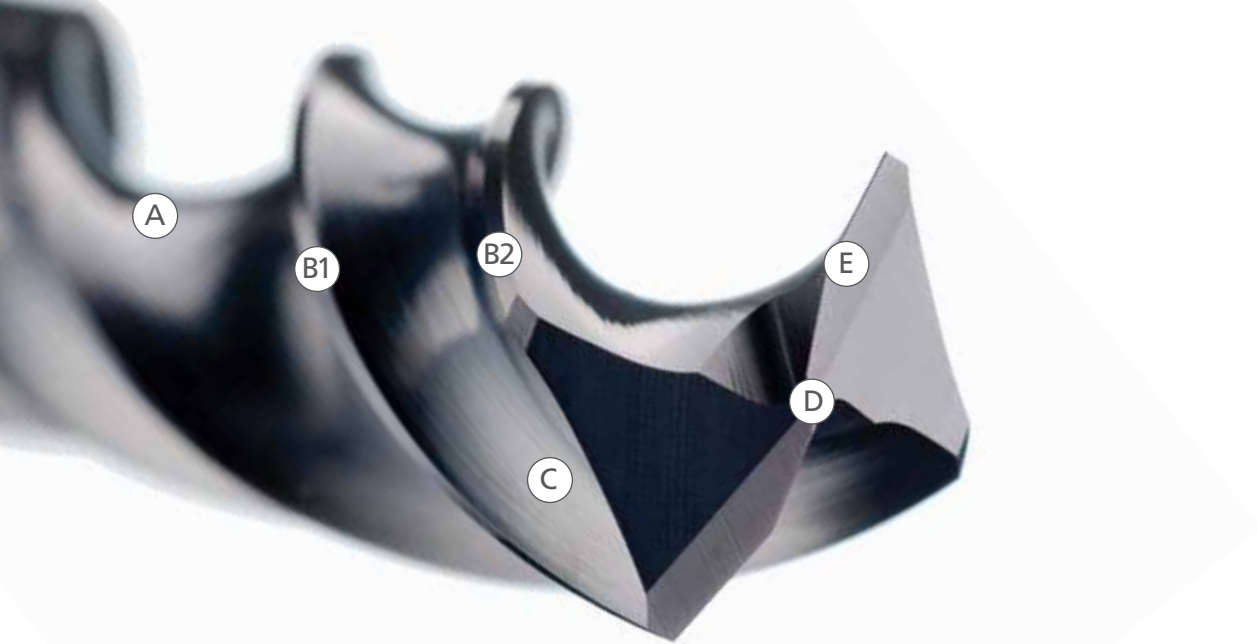
VALUE AT THE SPINDLE



ISO 9001 Certified Company

New Expanded Offering

www.sgstool.com



HIGH PERFORMANCE CARBIDE DRILLS

The key features designed into the SGS Hi-PerCarb drill allow the product to offer application benefits not only beyond that of standard carbide drills, but also other High Performance drills. Each feature of the SGS Hi-PerCarb drill was uniquely engineered as a solution towards addressing the issues commonly encountered during high production drilling.

- A** HIGH PERFORMANCE FLUTE DESIGN
- efficiently transports chips
 - increases strength for aggressive drilling

Ti-NAMITE A COATING

- improves resistance to heat and wear
- enhances tool life

- B1** DOUBLE MARGIN DESIGN
- improves accuracy and surface finish
- B2** increases stability and rigidity

- C** SECONDARY FLUTE
- improves coolant flow to point
 - reduces friction along drill body
 - assists in fine swarf evacuation

- D** SPECIALIZED 145° NOTCHED POINT
- self centering eliminates need for spot drill
 - improves chip control
 - decreases drill thrust and deflection

- E** ENGINEERED EDGE PROTECTION
- improves edge strength
 - reduces edge fatigue
 - allows increased feed rates

PERFORMANCE. PRECISION. PASSION.
WITH HI-PERCARB EXTERNAL COOLANT DRILLS

PERFORMANCE.

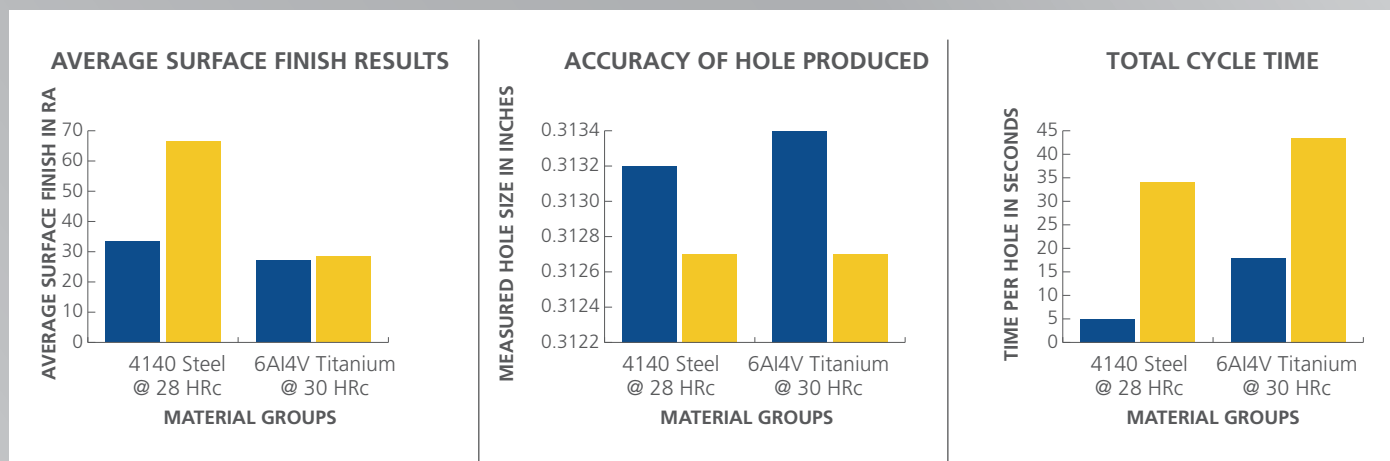
MACHINING ENVIRONMENT:

Haas VM-3 with 9% Water Soluble Oil Flood Coolant

5/16" (.3125) diameter hole:

4140 application – .650" deep

6Al-4V application – 1.125" deep



■ SGS HI-PERCARB ■ SOLID CARBIDE DRILL AND REAMER

The second margin gives the Hi-PerCarb drill a burnishing effect and the flute form effectively controls and transports chips allowing the drill to offer superior surface finishes and hole size in high production environments saving cycle time by often avoiding the need for reaming in many applications.

PRECISION.

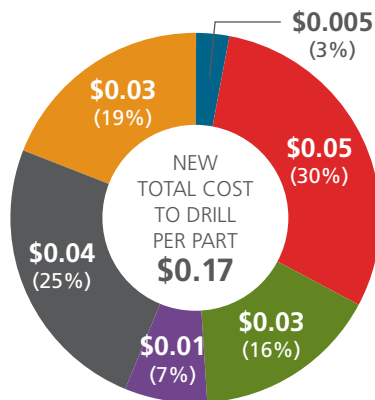
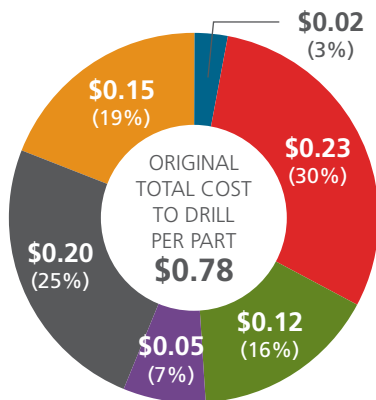
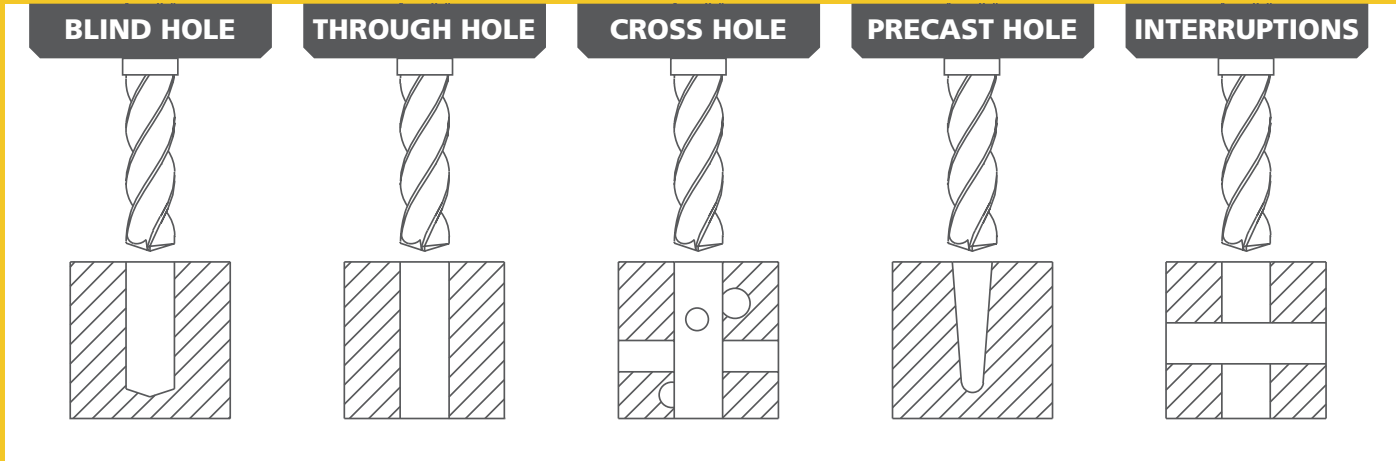
The stability of the double margin design and penetration capability of the point geometry allow the Hi-PerCarb drill to address demanding applications that would normally require reduced operating parameters or a two step process.

PASSION.

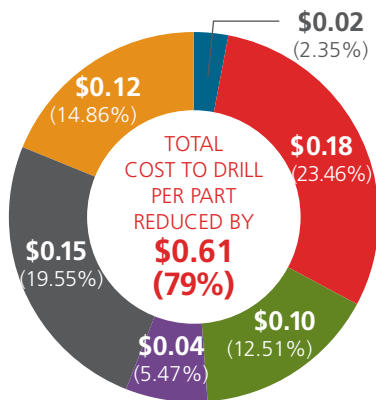
The secondary flute provides a channel for cooling capabilities normally not found in external coolant drills, this combined with the Ti-NAMITE A tool coating and the high strength edge design results in increased operating parameters with additional tool life.

ACTUAL CUSTOMER APPLICATION USING A 6MM DRILL IN 17-4 PH STAINLESS STEEL

| | COMPETITOR | SGS HI-PERCARB |
|--|-------------|----------------|
| NUMBER OF PARTS TO PRODUCE | 50000 | 50000 |
| SURFACE FEET PER MINUTE (SFM) | 74 | 124 |
| SPEED IN REVOLUTIONS PER MINUTE (RPM) | 1200 | 2000 |
| FEED IN INCHES PER MINUTE (IPM) | 3.6 | 10 |
| NUMBER OF PARTS PRODUCED PER TOOL | 140 | 500 |
| DEPTH OF HOLE | 0.6800 | 0.6800 |
| NUMBER OF NEW TOOLS REQUIRED TO COMPLETE JOB | 358 | 100 |
| TOTAL HOURS OF MACHINING TIME | 157 | 57 |
| TOTAL MACHINING COST | \$10,231.48 | \$3,683.33 |
| TOOL CHANGE COST | \$1,939.17 | \$541.67 |
| TOTAL COST | \$39,017.07 | \$8,460.00 |
| COST PER PART | \$0.78 | \$0.17 |
| MATERIAL REMOVAL RATE (IN ³ / MIN) – DRILLING | 0.16 | 0.44 |
| CUTTING TIME PER PART – MINUTES | 0.19 | 0.07 |
| SAVINGS PER PART – DOLLARS | 0 | \$0.61 |
| TOTAL COST SAVINGS / JOB – PERCENTAGE | 0 | 78.32% |
| TOTAL COST SAVINGS / JOB – DOLLARS | 0 | \$30,557.07 |

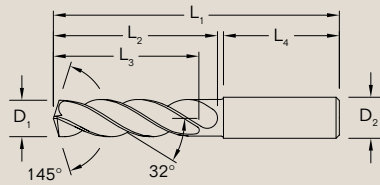


- TOOL COST
- MACHINING COST
- COOLANT COST
- MACHINE DOWNTIME COST
- TOOL CHANGE COST
- ADMINISTRATIVE COST



- TOOL COST REDUCED BY
- MACHINING COST REDUCED BY
- COOLANT COST REDUCED BY
- MACHINE DOWNTIME COST REDUCED BY
- TOOL CHANGE COST REDUCED BY
- ADMINISTRATIVE COST REDUCED BY

- Using 100 tools per job compared to 358 means less inventory and fewer purchase orders to issue resulting in improved administrative cost and reduced tooling cost per job.
- Increasing the feed by 278% has decreased the total hours of machine time by 100 hours gaining manufacturing capacity; this factored with the hourly shop rate has resulted in the largest portion of the savings.
- With a tool life of 500 parts compared to 140 parts or a 357% improvement in tool life equates to less time dedicated to changing tools to keep the job running.
- Increasing the material removal rate by .28 cubic inches or 275% requires less time in the cut and a reduced use of coolant.



TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≤ 3/4 | +0.0001 / -0.0005 | h6 |
| > 3/4 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

New Expanded Tools

SERIES 135
3xD

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AITiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 1/64 | 0.0156 | | 1/8 | 1-1/2 | 1/8 | 5/64 | 1 | 51752 |
| 1/32 | 0.0312 | | 1/8 | 1-1/2 | 1/4 | 3/16 | 1 | 51269 |
| 3/64 | 0.0469 | 1/16-64 | 1/8 | 1-1/2 | 3/8 | 5/16 | 1 | 51270 |
| 1,25 mm | 0.0492 | | 3,0 | 38,0 | 10,0 | 8,0 | 25,0 | 64500 |
| 1,45 mm | 0.0571 | | 3,0 | 38,0 | 10,0 | 8,0 | 25,0 | 64501 |
| #53 | 0.0595 | | 1/8 | 1-1/2 | 3/8 | 5/16 | 1 | 64502 |
| 1/16 | 0.0625 | 5/64-60 | 1/8 | 2 | 7/16 | 3/8 | 1-1/4 | 51271 |
| 1,6 mm | 0.0630 | | 3,0 | 50,0 | 12,0 | 9,0 | 32,0 | 64503 |
| 1,75 mm | 0.0689 | | 3,0 | 50,0 | 12,0 | 9,0 | 32,0 | 64504 |
| #50 | 0.0700 | | 1/8 | 2 | 7/16 | 3/8 | 1-1/4 | 64505 |
| 5/64 | 0.0781 | | 1/8 | 2 | 1/2 | 7/16 | 1-1/4 | 51272 |
| #47 | 0.0785 | | 1/8 | 2 | 1/2 | 7/16 | 1-1/4 | 64506 |
| 2,05 mm | 0.0807 | | 3,0 | 50,0 | 14,0 | 11,0 | 32,0 | 64507 |
| #46 | 0.0810 | | 1/8 | 2 | 1/2 | 7/16 | 1-1/4 | 64508 |
| #43 | 0.0890 | | 1/8 | 2 | 1/2 | 7/16 | 1-1/4 | 64509 |
| #42 | 0.0935 | | 1/8 | 2 | 1/2 | 7/16 | 1-1/4 | 64510 |
| 3/32 | 0.0938 | 1/8-32 | 1/8 | 2 | 1/2 | 7/16 | 1-1/4 | 51273 |
| 40 | 0.0980 | | 1/8 | 2 | 9/16 | 1/2 | 1-1/4 | 51274 |
| 2,5 mm | 0.0984 | | 3,0 | 50,0 | 17,0 | 12,0 | 32,0 | 64511 |
| 39 | 0.0995 | | 1/8 | 2 | 9/16 | 1/2 | 1-1/4 | 51753 |
| 38 | 0.1015 | 5-40 | 1/8 | 2 | 9/16 | 1/2 | 1-1/4 | 51754 |
| 37 | 0.1040 | 5-44 | 1/8 | 2 | 9/16 | 1/2 | 1-1/4 | 51755 |
| 36 | 0.1065 | 6-32 | 1/8 | 2 | 9/16 | 1/2 | 1-1/4 | 51756 |
| 7/64 | 0.1094 | | 1/8 | 2 | 5/8 | 9/16 | 1-1/4 | 51275 |
| 35 | 0.1100 | | 1/8 | 2 | 5/8 | 9/16 | 1-1/4 | 51276 |
| 34 | 0.1110 | | 1/8 | 2 | 5/8 | 9/16 | 1-1/4 | 51277 |
| 33 | 0.1130 | 6-40 | 1/8 | 2 | 5/8 | 9/16 | 1-1/4 | 51757 |
| 2,9 mm | 0.1142 | | 3,0 | 50,0 | 19,0 | 14,0 | 32,0 | 64512 |
| 32 | 0.1160 | | 1/8 | 2 | 5/8 | 9/16 | 1-1/4 | 51758 |
| 3,0 mm | 0.1181 | | 6,0 | 62,0 | 20,0 | 17,0 | 36,0 | 63155 |
| 31 | 0.1200 | | 1/8 | 2 | 5/8 | 9/16 | 1-1/4 | 51759 |
| 3,1 mm | 0.1220 | | 6,0 | 62,0 | 20,0 | 17,0 | 36,0 | 63741 |
| 1/8 | 0.1250 | | 1/4 | 2-1/2 | 3/4 | 21/32 | 1-7/16 | 51330 |
| 3,2 mm | 0.1260 | M3,5 X 0,35 | 6,0 | 62,0 | 20,0 | 17,0 | 36,0 | 63156 |
| 30 | 0.1285 | | 1/4 | 2-1/2 | 3/4 | 21/32 | 1-7/16 | 51278 |
| 3,3 mm | 0.1299 | M4 X 0,7 | 6,0 | 62,0 | 20,0 | 17,0 | 36,0 | 63157 |
| 3,4 mm | 0.1339 | | 6,0 | 62,0 | 20,0 | 17,0 | 36,0 | 63158 |
| 29 | 0.1360 | 8-32,8-36 | 1/4 | 2-1/2 | 3/4 | 21/32 | 1-7/16 | 51331 |
| 3,5 mm | 0.1378 | M4 X 0,5 | 6,0 | 62,0 | 20,0 | 17,0 | 36,0 | 63159 |
| 28 | 0.1405 | 8-40 | 1/4 | 2-1/2 | 3/4 | 2w | 1-7/16 | 51760 |
| 9/64 | 0.1406 | | 1/4 | 2-1/2 | 3/4 | 21/32 | 1-7/16 | 51332 |
| 3,6 mm | 0.1417 | M4 X 0,35 | 6,0 | 62,0 | 20,0 | 17,0 | 36,0 | 63160 |

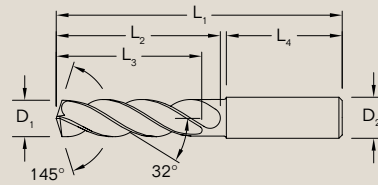
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TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≤ 34 | +0.0001 / -0.0005 | h6 |
| > 34 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

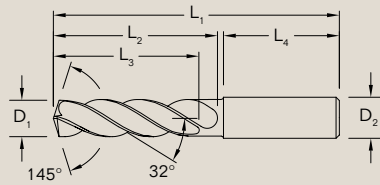


New Expanded Tools

SERIES 135
3xD
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | TI-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 27 | 0.1440 | | 1/4 | 2-1/2 | 3/4 | 21/32 | 1-7/16 | 51761 |
| 3,7 mm | 0.1457 | M4.5 X 0,75 | 6,0 | 62,0 | 20,0 | 17,0 | 36,0 | 63161 |
| 26 | 0.1470 | 3/16-24 | 1/4 | 2-1/2 | 3/4 | 21/32 | 1-7/16 | 51762 |
| 25 | 0.1495 | 10-24 | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51333 |
| 3,8 mm | 0.1496 | | 6,0 | 66,0 | 24,0 | 21,0 | 36,0 | 63472 |
| 24 | 0.1520 | 10-28 | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51763 |
| 3,9 mm | 0.1535 | | 6,0 | 66,0 | 24,0 | 21,0 | 36,0 | 63743 |
| 23 | 0.1540 | | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51764 |
| 5/32 | 0.1562 | | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51334 |
| 22 | 0.1570 | 10-30 | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51765 |
| 4,0 mm | 0.1575 | M4,5 X 0,5 | 6,0 | 66,0 | 24,0 | 21,0 | 36,0 | 63162 |
| 21 | 0.1590 | 10-32 | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51335 |
| 20 | 0.1610 | 13/64-24 | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51279 |
| 4,1 mm | 0.1614 | | 6,0 | 66,0 | 24,0 | 21,0 | 36,0 | 63744 |
| 4,2 mm | 0.1654 | M5 / M5 X 0,75 | 6,0 | 66,0 | 24,0 | 21,0 | 36,0 | 63163 |
| 19 | 0.1660 | | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51766 |
| 4,3 mm | 0.1693 | | 6,0 | 66,0 | 24,0 | 21,0 | 36,0 | 63164 |
| 18 | 0.1695 | | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51767 |
| 11/64 | 0.1719 | | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51336 |
| 17 | 0.1730 | | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51768 |
| 4,4 mm | 0.1732 | | 6,0 | 66,0 | 24,0 | 21,0 | 36,0 | 63745 |
| 16 | 0.1770 | 12-24 | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51769 |
| 4,5 mm | 0.1772 | M5 X 0,5 | 6,0 | 66,0 | 24,0 | 21,0 | 36,0 | 63165 |
| 15 | 0.1800 | | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51770 |
| 4,6 mm | 0.1811 | 12-28 | 6,0 | 66,0 | 24,0 | 21,0 | 36,0 | 63166 |
| 14 | 0.1820 | | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51771 |
| 13 | 0.1850 | 12-32 | 1/4 | 2-5/8 | 7/8 | 23/32 | 1-7/16 | 51772 |
| 4,7 mm | 0.1850 | | 6,0 | 66,0 | 24,0 | 21,0 | 36,0 | 63746 |
| 3/16 | 0.1875 | | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51337 |
| 12 | 0.1890 | 7/32-32 | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51773 |
| 4,8 mm | 0.1890 | | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63167 |
| 11 | 0.1910 | | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51774 |
| 4,9 mm | 0.1929 | | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63747 |
| 10 | 0.1935 | 14-20 | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51775 |
| 9 | 0.1960 | | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51776 |
| 5,0 mm | 0.1969 | M6 X 1 | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63168 |
| 8 | 0.1990 | | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51777 |
| 5,1 mm | 0.2008 | | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63748 |
| 7 | 0.2010 | 1/4-20 | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51338 |
| 13/64 | 0.2031 | | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51339 |
| 6 | 0.2040 | | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51778 |
| 5,2 mm | 0.2047 | M6 X 0,75 | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63749 |

(continued on next page)



TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≤ 3/4 | +0.0001 / -0.0005 | h6 |
| > 3/4 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

New Expanded Tools

**SERIES 135
3xD
(CONTINUED)**

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AITiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 5 | 0.2055 | | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51779 |
| 5,25 mm | 0.2067 | | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63169 |
| 5,3 mm | 0.2087 | | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63170 |
| 4 | 0.2090 | 1/4-24 | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51780 |
| 5,4 mm | 0.2126 | | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63750 |
| 3 | 0.2130 | 1/4-28 | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51340 |
| 5,5 mm | 0.2165 | M6 X 0,5 | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63171 |
| 7/32 | 0.2188 | 1/4-32 | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51341 |
| 5,6 mm | 0.2205 | | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63751 |
| 2 | 0.2210 | | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51781 |
| 5,7 mm | 0.2244 | | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63752 |
| 1 | 0.2280 | | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51782 |
| 5,8 mm | 0.2283 | | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63172 |
| 5,9 mm | 0.2323 | | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63753 |
| A | 0.2340 | | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51601 |
| 15/64 | 0.2344 | | 1/4 | 2-5/8 | 1 | 53/64 | 1-7/16 | 51342 |
| 6,0 | 0.2362 | M7 X 1 | 6,0 | 66,0 | 28,0 | 24,0 | 36,0 | 63173 |
| B | 0.2380 | | 1/4 | 3-1/8 | 1-5/16 | 1-3/64 | 1-7/16 | 51602 |
| 6,1 mm | 0.2402 | | 8,0 | 79,0 | 34,0 | 28,0 | 36,0 | 63754 |
| C | 0.2420 | | 1/4 | 3-1/8 | 1-5/16 | 1-3/64 | 1-7/16 | 51603 |
| 6,2 mm | 0.2441 | | 8,0 | 79,0 | 34,0 | 28,0 | 36,0 | 63755 |
| D | 0.2460 | | 1/4 | 3-1/8 | 1-5/16 | 1-3/64 | 1-7/16 | 51604 |
| 6,25 mm | 0.2461 | M7 X 0,75 | 8,0 | 79,0 | 34,0 | 28,0 | 36,0 | 63174 |
| 6,3 mm | 0.2480 | | 8,0 | 79,0 | 34,0 | 28,0 | 36,0 | 63756 |
| 1/4 | 0.2500 | | 1/4 | 3-1/8 | 1-5/16 | 1-3/64 | 1-7/16 | 51343 |
| E | 0.2500 | | 1/4 | 3-1/8 | 1-5/16 | 1-3/64 | 1-7/16 | 51605 |
| 6,4 mm | 0.2520 | | 8,0 | 79,0 | 34,0 | 28,0 | 36,0 | 63175 |
| 6,5 mm | 0.2559 | | 8,0 | 79,0 | 34,0 | 28,0 | 36,0 | 63213 |
| F | 0.2570 | 5/16-18 | 5/16 | 3-1/8 | 1-5/16 | 1-3/64 | 1-7/16 | 51344 |
| 6,6 mm | 0.2598 | | 8,0 | 79,0 | 34,0 | 28,0 | 36,0 | 63757 |
| G | 0.2610 | | 5/16 | 3-1/8 | 1-5/16 | 1-3/64 | 1-7/16 | 51606 |
| 6,7 mm | 0.2638 | | 8,0 | 79,0 | 34,0 | 28,0 | 36,0 | 63758 |
| 17/64 | 0.2656 | 5/16-20 | 5/16 | 3-1/8 | 1-5/16 | 1-3/64 | 1-7/16 | 51345 |
| H | 0.2660 | | 5/16 | 3-1/8 | 1-5/16 | 1-3/64 | 1-7/16 | 51607 |
| 6,8 mm | 0.2677 | M8 X 1,25 | 8,0 | 79,0 | 34,0 | 28,0 | 36,0 | 63176 |
| 6,9 mm | 0.2717 | | 8,0 | 79,0 | 34,0 | 28,0 | 36,0 | 63759 |
| I | 0.2720 | 5/16-24 | 5/16 | 3-1/8 | 1-5/16 | 1-3/64 | 1-7/16 | 51346 |
| 7,0 mm | 0.2756 | M8 X 1 | 8,0 | 79,0 | 34,0 | 28,0 | 36,0 | 63177 |
| J | 0.2770 | | 5/16 | 3-1/8 | 1-5/16 | 1-3/64 | 1-7/16 | 51608 |
| 7,1 mm | 0.2795 | | 8,0 | 79,0 | 41,0 | 34,0 | 36,0 | 63760 |
| K | 0.2810 | | 5/16 | 3-1/8 | 1-9/16 | 1-3/16 | 1-7/16 | 51609 |
| 9/32 | 0.2812 | 5/16-32 | 5/16 | 3-1/8 | 1-9/16 | 1-3/16 | 1-7/16 | 51347 |

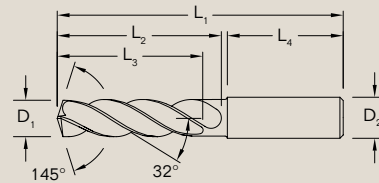
(continued on next page)

TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≤ 34 | +0.0001 / -0.0005 | h6 |
| > 34 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

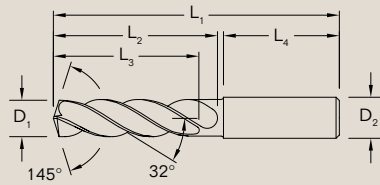


New Expanded Tools

SERIES 135
3xD
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | TI-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 7,2 mm | 0.2835 | | 8,0 | 79,0 | 41,0 | 34,0 | 36,0 | 63761 |
| 7,25 mm | 0.2854 | M8 X 0,75 | 8,0 | 79,0 | 41,0 | 34,0 | 36,0 | 63178 |
| 7,3 mm | 0.2874 | | 8,0 | 79,0 | 41,0 | 34,0 | 36,0 | 63762 |
| L | 0.2900 | | 5/16 | 3-1/8 | 1-9/16 | 1-3/16 | 1-7/16 | 51610 |
| 7,4 mm | 0.2913 | | 8,0 | 79,0 | 41,0 | 34,0 | 36,0 | 63763 |
| M | 0.2950 | | 5/16 | 3-1/8 | 1-9/16 | 1-3/16 | 1-7/16 | 51611 |
| 7,5 mm | 0.2953 | M8 X 0,5 | 8,0 | 79,0 | 41,0 | 34,0 | 36,0 | 63179 |
| 19/64 | 0.2969 | | 5/16 | 3-1/8 | 1-9/16 | 1-3/16 | 1-7/16 | 51348 |
| 7,6 mm | 0.2992 | | 8,0 | 79,0 | 41,0 | 34,0 | 36,0 | 63764 |
| N | 0.3020 | | 5/16 | 3-1/8 | 1-9/16 | 1-3/16 | 1-7/16 | 51612 |
| 7,7 mm | 0.3031 | | 8,0 | 79,0 | 41,0 | 34,0 | 36,0 | 63765 |
| 7,8 mm | 0.3071 | M9 X 1,25 | 8,0 | 79,0 | 41,0 | 34,0 | 36,0 | 63180 |
| 7,9 mm | 0.3110 | | 8,0 | 79,0 | 41,0 | 34,0 | 36,0 | 63766 |
| 5/16 | 0.3125 | 3/8-16 | 5/16 | 3-1/8 | 1-9/16 | 1-3/16 | 1-7/16 | 51349 |
| 8,0 mm | 0.3150 | M9 x 1 | 8,0 | 79,0 | 41,0 | 34,0 | 36,0 | 63181 |
| O | 0.3160 | | 3/8 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51613 |
| 8,1 mm | 0.3189 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63767 |
| 8,2 mm | 0.3228 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63768 |
| P | 0.3230 | | 3/8 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51614 |
| 8,3 mm | 0.3268 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63769 |
| 21/64 | 0.3281 | 3/8-20 | 3/8 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51350 |
| 8,4 mm | 0.3307 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63182 |
| Q | 0.3320 | 3/8-24 | 3/8 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51351 |
| 8,5 mm | 0.3346 | M10 X 1,5 | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63183 |
| 8,6 mm | 0.3386 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63770 |
| R | 0.3390 | | 3/8 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51615 |
| 8,7 mm | 0.3425 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63771 |
| 11/32 | 0.3438 | 3/8-32 | 3/8 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51352 |
| 8,8 mm | 0.3465 | M10 X 1,25 | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63184 |
| S | 0.3480 | | 3/8 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51616 |
| 8,9 mm | 0.3504 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63772 |
| 9,0 mm | 0.3543 | M10 X 1 | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63185 |
| T | 0.3580 | | 3/8 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51617 |
| 9,1 mm | 0.3583 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63773 |
| 23/64 | 0.3594 | | 3/8 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51353 |
| 9,2 mm | 0.3622 | M10 X 0,75 | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63774 |
| 9,25 mm | 0.3642 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63186 |
| 9,3 mm | 0.3661 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63775 |
| U | 0.3680 | 7/16-14 | 3/8 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51354 |
| 9,4 mm | 0.3701 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63776 |
| 9,5 mm | 0.3740 | M10 X 0,5 | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63187 |
| 3/8 | 0.3750 | | 3/8 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51355 |

(continued on next page)



TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≤ 3/4 | +0.0001 / -0.0005 | h6 |
| > 3/4 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

New Expanded Tools

SERIES 135
3xD
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AITiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| V | 0.3770 | | 1/2 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51618 |
| 9,6 mm | 0.3780 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63777 |
| 9,7 mm | 0.3819 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63778 |
| 9,8 mm | 0.3858 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63779 |
| W | 0.3860 | | 1/2 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51619 |
| 9,9 mm | 0.3898 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63780 |
| 25/64 | 0.3906 | 7/16-20 | 1/2 | 3-1/2 | 1-27/32 | 1-37/64 | 1-9/16 | 51356 |
| 10,0 mm | 0.3937 | | 10,0 | 89,0 | 47,0 | 40,0 | 40,0 | 63188 |
| X | 0.3970 | 7/16-24 | 1/2 | 4-1/16 | 2-3/16 | 1-51/64 | 1-49/64 | 51620 |
| 10,1 mm | 0.3976 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63781 |
| 10,2 mm | 0.4016 | M12 X 1,75 | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63189 |
| Y | 0.4040 | 7/16-28 | 1/2 | 4-1/16 | 2-3/16 | 1-51/64 | 1-49/64 | 51621 |
| 10,3 mm | 0.4055 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63782 |
| 13/32 | 0.4062 | | 1/2 | 4-1/16 | 2-3/16 | 1-51/64 | 1-49/64 | 51357 |
| 10,4 mm | 0.4094 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63783 |
| Z | 0.4130 | | 1/2 | 4-1/16 | 2-3/16 | 1-51/64 | 1-49/64 | 51622 |
| 10,5 mm | 0.4134 | M12 X 1,5 | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63190 |
| 10,6 mm | 0.4173 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63784 |
| 10,7 mm | 0.4213 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63785 |
| 27/64 | 0.4219 | 1/2-13 | 1/2 | 4-1/16 | 2-3/16 | 1-51/64 | 1-49/64 | 51358 |
| 10,8 mm | 0.4252 | M12 X 1,25 | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63191 |
| 10,9 mm | 0.4291 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63786 |
| 11,0 mm | 0.4331 | M12 X 1 | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63192 |
| 11,1 mm | 0.4370 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63787 |
| 7/16 | 0.4375 | 1/4-18 NPT | 1/2 | 4-1/16 | 2-3/16 | 1-51/64 | 1-49/64 | 51359 |
| 11,2 mm | 0.4409 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63788 |
| 11,25 mm | 0.4429 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63193 |
| 11,3 mm | 0.4449 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63789 |
| 11,4 mm | 0.4488 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63790 |
| 11,5 mm | 0.4528 | M12 X 0,5 | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63194 |
| 29/64 | 0.4531 | 1/2-20 | 1/2 | 4-1/16 | 2-3/16 | 1-51/64 | 1-49/64 | 51360 |
| 11,6 mm | 0.4567 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63791 |
| 11,7 mm | 0.4606 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63792 |
| 11,8 mm | 0.4646 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63793 |
| 11,9 mm | 0.4685 | | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63794 |
| 15/32 | 0.4688 | 1/2-28 | 1/2 | 4-1/16 | 2-3/16 | 1-51/64 | 1-49/64 | 51361 |
| 12,0 mm | 0.4724 | M14 X 2 | 12,0 | 102,0 | 55,0 | 45,0 | 45,0 | 63195 |
| 31/64 | 0.4844 | 9/16-12 | 1/2 | 4-1/4 | 2-5/16 | 1-7/8 | 1-49/64 | 51362 |
| 12,5 mm | 0.4921 | M14 X 1,5 | 14,0 | 107,0 | 60,0 | 49,0 | 45,0 | 63196 |
| 1/2 | 0.5000 | | 1/2 | 4-1/4 | 2-5/16 | 1-7/8 | 1-49/64 | 51363 |
| 12,8 mm | 0.5039 | M14 X 1,25 | 14,0 | 107,0 | 60,0 | 49,0 | 45,0 | 63197 |
| 13,0 mm | 0.5118 | M14 X 1 | 14,0 | 107,0 | 60,0 | 49,0 | 45,0 | 63198 |

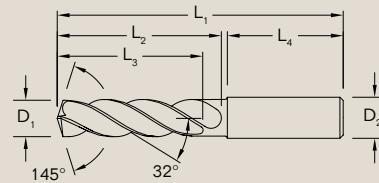
(continued on next page)

TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≤ 34 | +0.0001 / -0.0005 | h6 |
| > 34 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

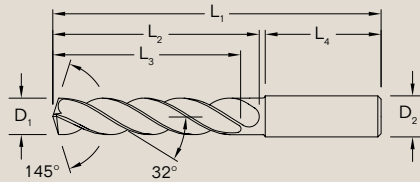
| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |



New Expanded Tools

SERIES 135
3xD
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 33/64 | 0.5156 | 9/16-18 | 5/8 | 4-1/4 | 2-5/16 | 1-7/8 | 1-49/64 | 51364 |
| 17/32 | 0.5312 | 5/8-11 | 5/8 | 4-1/4 | 2-5/16 | 1-7/8 | 1-49/64 | 51365 |
| 13,5 mm | 0.5315 | | 14,0 | 107,0 | 60,0 | 49,0 | 45,0 | 63199 |
| 35/64 | 0.5469 | 5/8-12 | 5/8 | 4-1/4 | 2-5/16 | 1-7/8 | 1-49/64 | 51783 |
| 14,0 mm | 0.5512 | M16 X 2 | 14,0 | 107,0 | 60,0 | 49,0 | 45,0 | 63200 |
| 9/16 | 0.5625 | | 5/8 | 4-9/16 | 2-1/2 | 2 | 1-57/64 | 51366 |
| 14,5 mm | 0.5709 | M16 X 1,5 | 16,0 | 115,0 | 65,0 | 51,0 | 48,0 | 63201 |
| 37/64 | 0.5781 | 5/8-18 | 5/8 | 4-9/16 | 2-1/2 | 2 | 1-57/64 | 51367 |
| 15,0 mm | 0.5906 | M16 X 1 | 16,0 | 115,0 | 65,0 | 51,0 | 48,0 | 63202 |
| 19/32 | 0.5938 | 11/16-11 | 5/8 | 4-9/16 | 2-1/2 | 2 | 1-57/64 | 51784 |
| 39/64 | 0.6094 | 11/16-12 | 5/8 | 4-9/16 | 2-1/2 | 2 | 1-57/64 | 51785 |
| 15,5 mm | 0.6102 | M18 X 2,5 | 16,0 | 115,0 | 65,0 | 51,0 | 48,0 | 63203 |
| 5/8 | 0.6250 | 11/16-16 | 5/8 | 4-9/16 | 2-1/2 | 2 | 1-57/64 | 51368 |
| 16,0 mm | 0.6299 | | 16,0 | 115,0 | 65,0 | 51,0 | 48,0 | 63204 |
| 41/64 | 0.6406 | 11/16-24 | 3/4 | 4-7/8 | 2-3/4 | 2-5/16 | 1-57/64 | 51786 |
| 16,5 mm | 0.6496 | M18 X 1,5 | 18,0 | 123,0 | 73,0 | 58,0 | 48,0 | 63205 |
| 21/32 | 0.6562 | 3/4-10 | 3/4 | 4-7/8 | 2-3/4 | 2-5/16 | 1-57/64 | 51369 |
| 17,0 mm | 0.6693 | | 18,0 | 123,0 | 73,0 | 58,0 | 48,0 | 63206 |
| 43/64 | 0.6719 | 3/4-12 | 3/4 | 4-7/8 | 2-3/4 | 2-5/16 | 1-57/64 | 51787 |
| 11/16 | 0.6875 | 3/4-16 | 3/4 | 4-7/8 | 2-3/4 | 2-5/16 | 1-57/64 | 51370 |
| 17,5 mm | 0.6890 | M20 X 2,5 | 18,0 | 123,0 | 73,0 | 58,0 | 48,0 | 63207 |
| 45/64 | 0.7031 | 3/4-20, 1/2-14 NPT | 3/4 | 4-7/8 | 2-3/4 | 2-5/16 | 1-57/64 | 51788 |
| 18,0 mm | 0.7087 | | 18,0 | 123,0 | 73,0 | 58,0 | 48,0 | 63208 |
| 23/32 | 0.7188 | | 3/4 | 4-7/8 | 2-3/4 | 2-5/16 | 1-57/64 | 51789 |
| 18,5 mm | 0.7283 | M20 X 1,5 | 20,0 | 131,0 | 79,0 | 63,0 | 50,0 | 63209 |
| 47/64 | 0.7344 | 13/16-12 | 3/4 | 4-7/8 | 2-3/4 | 2-5/16 | 1-57/64 | 51790 |
| 19,0 mm | 0.7480 | | 20,0 | 131,0 | 79,0 | 63,0 | 50,0 | 63210 |
| 3/4 | 0.7500 | 13/16-16 | 3/4 | 5-1/4 | 3-1/16 | 2-7/16 | 1-31/32 | 51371 |
| 49/64 | 0.7656 | 7/8-9 | 7/8 | 5-1/4 | 3-1/16 | 2-7/16 | 1-31/32 | 51372 |
| 19,5 mm | 0.7677 | M22 X 2,5 | 20,0 | 131,0 | 79,0 | 63,0 | 50,0 | 63211 |
| 25/32 | 0.7812 | | 7/8 | 6 | 3-11/16 | 2-11/16 | 2-1/8 | 51791 |
| 20,0 mm | 0.7874 | | 20,0 | 131,0 | 79,0 | 63,0 | 50,0 | 63212 |
| 51/64 | 0.7969 | 7/8-12 | 7/8 | 6 | 3-11/16 | 2-11/16 | 2-1/8 | 51792 |
| 20,5 mm | 0.8071 | | 22 | 150 | 93 | 73 | 53 | 64513 |
| 13/16 | 0.8125 | 7/8-14 | 7/8 | 6 | 3-11/16 | 2-11/16 | 2-1/8 | 51373 |
| 21,0 mm | 0.8268 | | 22 | 150 | 93 | 73 | 53 | 64514 |
| 22,0 mm | 0.8661 | | 22 | 150 | 93 | 73 | 53 | 64515 |
| 7/8 | 0.8750 | 15/16-16, 1-8 | 7/8 | 6 | 3-11/16 | 2-11/16 | 2-1/8 | 51374 |
| 59/64 | 0.9219 | 1-12 | 1 | 6 | 3-11/16 | 2-11/16 | 2-1/8 | 51375 |



TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≤ 3/4 | +0.0001 / -0.0005 | h6 |
| > 3/4 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

New Expanded Tools

SERIES 135
5xD

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 1/64 | 0.0156 | | 1/8 | 1 1/2 | 5/32 | 1/8 | 1 | 52300 |
| 1/32 | 0.0312 | | 1/8 | 1 1/2 | 5/16 | 15/64 | 1 | 52301 |
| 3/64 | 0.0469 | 1/16-64 | 1/8 | 1 1/2 | 25/64 | 19/64 | 1 | 52302 |
| 1,25 mm | 0.0492 | | 3,0 | 38,0 | 10,0 | 9,0 | 25,0 | 64520 |
| 1,45 mm | 0.0571 | | 3,0 | 38,0 | 10,0 | 9,0 | 25,0 | 64521 |
| #53 | 0.0595 | | 1/8 | 1-1/2 | 25/64 | 19/64 | 1 | 64522 |
| 1/16 | 0.0625 | 5/64-60 | 1/8 | 2 | 15/32 | 23/64 | 1-1/4 | 52303 |
| 1,6 mm | 0.0630 | | 3,0 | 50,0 | 12,0 | 11,0 | 32,0 | 64523 |
| 1,75 mm | 0.0689 | | 3,0 | 50,0 | 12,0 | 11,0 | 32,0 | 64524 |
| #50 | 0.0700 | | 1/8 | 2 | 15/32 | 23/64 | 1-1/4 | 64525 |
| 5/64 | 0.0781 | | 1/8 | 2 | 35/64 | 27/64 | 1-1/4 | 52304 |
| #47 | 0.0785 | | 1/8 | 2 | 35/64 | 27/64 | 1-1/4 | 64526 |
| 2,05 mm | 0.0807 | | 3,0 | 50,0 | 14,0 | 12,0 | 32,0 | 64527 |
| #46 | 0.0810 | | 1/8 | 2 | 35/64 | 27/64 | 1-1/4 | 64528 |
| #43 | 0.0890 | | 1/8 | 2 | 19/32 | 15/32 | 1-1/4 | 64529 |
| #42 | 0.0935 | | 1/8 | 2 | 5/8 | 9/16 | 1-1/4 | 64530 |
| 3/32 | 0.0938 | 1/8-32 | 1/8 | 2 | 5/8 | 9/16 | 1-1/4 | 52305 |
| #40 | 0.0980 | | 1/8 | 2 | 43/64 | 9/16 | 1-1/4 | 52306 |
| 2,5 mm | 0.0984 | | 3,0 | 50,0 | 17,0 | 15,0 | 32,0 | 64531 |
| #39 | 0.0995 | | 1/8 | 2 | 43/64 | 9/16 | 1-1/4 | 52307 |
| #38 | 0.1015 | 5-40 | 1/8 | 2 | 43/64 | 9/16 | 1-1/4 | 52308 |
| #37 | 0.1040 | 5-44 | 1/8 | 2 | 45/64 | 9/16 | 1-1/4 | 52309 |
| #36 | 0.1065 | 6-32 | 1/8 | 2 | 45/64 | 9/16 | 1-1/4 | 52310 |
| 7/64 | 0.1094 | | 1/8 | 2 | 3/4 | 39/64 | 1-1/4 | 52311 |
| #35 | 0.1100 | | 1/8 | 2 | 3/4 | 39/64 | 1-1/4 | 52312 |
| #34 | 0.1110 | | 1/8 | 2 | 3/4 | 39/64 | 1-1/4 | 52313 |
| #33 | 0.1130 | 6-40 | 1/8 | 2 | 3/4 | 39/64 | 1-1/4 | 52314 |
| 2,9 mm | 0.1142 | | 3,0 | 50,0 | 19,0 | 17,0 | 32,0 | 64532 |
| #32 | 0.1160 | | 1/8 | 2 | 3/4 | 39/64 | 1-1/4 | 52315 |
| 3,0 mm | 0.1181 | | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 64100 |
| #31 | 0.1200 | | 1/8 | 2 | 3/4 | 39/64 | 1-1/4 | 52316 |
| 3,1 mm | 0.1220 | | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 64101 |
| 1/8 | 0.1250 | | 1/4 | 3 | 1 | 53/64 | 1-15/16 | 51580 |
| 3,2 mm | 0.1260 | M3,5 X 0,35 | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 64102 |
| 30 | 0.1285 | | 1/4 | 3 | 1 | 53/64 | 1-15/16 | 51581 |
| 3,3 mm | 0.1299 | M4 X 0,7 | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 64103 |
| 3,4 mm | 0.1339 | 8-32,8-36 | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 64104 |
| 29 | 0.1360 | | 1/4 | 3 | 1 | 53/64 | 1-15/16 | 51582 |
| 3,5 mm | 0.1378 | | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 64105 |
| #28 | 0.1405 | 8-40 | 1/4 | 3 | 1 | 53/64 | 1- 7/16 | 52317 |
| 9/64 | 0.1406 | | 1/4 | 3 | 1 | 53/64 | 1-15/16 | 51583 |
| 3,6 mm | 0.1417 | M4 X 0,35 | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 64106 |

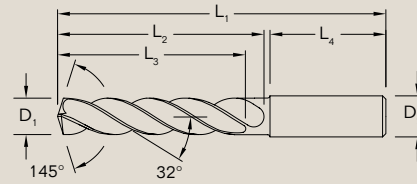
(continued on next page)

TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≤ 34 | +0.0001 / -0.0005 | h6 |
| > 34 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

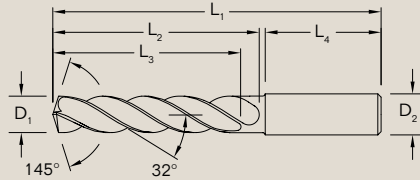


New Expanded Tools

SERIES 135
5xD
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| #27 | 0.1440 | | 1/4 | 3 | 1 | 53/64 | 1-7/16 | 52318 |
| 3,7 mm | 0.1457 | M4.5 X 0,75 | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 64107 |
| #26 | 0.1470 | 3/16-24 | 1/4 | 3 | 1 | 53/64 | 1-7/16 | 52319 |
| 25 | 0.1495 | 10-24 | 1/4 | 3-1/4 | 1-1/4 | 1-5/64 | 1-15/16 | 51584 |
| 3,8 mm | 0.1496 | | 6,0 | 75,0 | 36,0 | 29,0 | 36,0 | 64108 |
| #24 | 0.1520 | 10-28 | 1/4 | 3 1/4 | 1 1/4 | 1 5/64 | 1 7/16 | 52321 |
| 3,9 mm | 0.1535 | | 6,0 | 75,0 | 36,0 | 29,0 | 36,0 | 64109 |
| #23 | 0.1540 | | 1/4 | 3 1/4 | 1 1/4 | 1 5/64 | 1 7/16 | 52322 |
| 5/32 | 0.1562 | | 1/4 | 3-1/4 | 1-1/4 | 1-5/64 | 1-15/16 | 51585 |
| #22 | 0.1570 | 10-30 | 1/4 | 3 1/4 | 1 1/4 | 1 5/64 | 1 7/16 | 52323 |
| 4,0 mm | 0.1575 | M4,5 X 0,5 | 6,0 | 75,0 | 36,0 | 29,0 | 36,0 | 64110 |
| 21 | 0.1590 | 10-32 | 1/4 | 3-1/4 | 1-1/4 | 1-5/64 | 1-15/16 | 51586 |
| 20 | 0.1610 | 13/64-24 | 1/4 | 3-1/4 | 1-1/4 | 1-5/64 | 1-15/16 | 51587 |
| 4,1 mm | 0.1614 | | 6,0 | 75,0 | 36,0 | 29,0 | 36,0 | 64111 |
| 4,2 mm | 0.1654 | M5 / M5 X 0,75 | 6,0 | 75,0 | 36,0 | 29,0 | 36,0 | 64112 |
| #19 | 0.1660 | | 1/4 | 3 1/4 | 1 1/4 | 1 5/64 | 1- 7/16 | 52324 |
| 4,3 mm | 0.1693 | | 6,0 | 75,0 | 36,0 | 29,0 | 36,0 | 64113 |
| #18 | 0.1695 | | 1/4 | 3 1/4 | 1 1/4 | 1 5/64 | 1- 7/16 | 52325 |
| 11/64 | 0.1719 | | 1/4 | 3-1/4 | 1-1/4 | 1-5/64 | 1-15/16 | 51588 |
| #17 | 0.1730 | | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 52326 |
| 4,4 mm | 0.1732 | | 6,0 | 75,0 | 36,0 | 29,0 | 36,0 | 64114 |
| 4,5 mm | 0.1772 | M5 X 0,5 | 6,0 | 75,0 | 36,0 | 29,0 | 36,0 | 64115 |
| #15 | 0.1800 | | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 52327 |
| 4,6 mm | 0.1811 | 12-28 | 6,0 | 75,0 | 36,0 | 29,0 | 36,0 | 64116 |
| #14 | 0.1820 | | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 52328 |
| #13 | 0.1850 | 12-32 | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 52329 |
| 4,7 mm | 0.1850 | | 6,0 | 75,0 | 36,0 | 29,0 | 36,0 | 64117 |
| 3/16 | 0.1875 | | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 51589 |
| #12 | 0.1890 | 7/32-32 | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 52330 |
| 4,8 mm | 0.1890 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64118 |
| 4,9 mm | 0.1929 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64119 |
| #10 | 0.1935 | 14-20 | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 52331 |
| #9 | 0.1960 | | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 52332 |
| 5,0 mm | 0.1969 | M6 X 1 | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64120 |
| #8 | 0.1990 | | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 52333 |
| 5,1 mm | 0.2008 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64121 |
| 7 | 0.2010 | 1/4-20 | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 51506 |
| 13/64 | 0.2031 | | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 51507 |
| #6 | 0.2040 | | 1/4 | 3 1/4 | 1 3/4 | 1 37/64 | 1 7/16 | 52334 |
| 5,2 mm | 0.2047 | M6 X 0,75 | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64122 |
| 5 | 0.2055 | | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 51590 |
| 5,25 mm | 0.2067 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64123 |

(continued on next page)



TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≤ 3/4 | +0.0001 / -0.0005 | h6 |
| > 3/4 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

New Expanded Tools

SERIES 135
5xD
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 5,3 mm | 0.2087 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64124 |
| 4 | 0.2090 | 1/4-24 | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 51508 |
| 5,4 mm | 0.2126 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64125 |
| 3 | 0.2130 | 1/4-28 | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 51509 |
| 5,5 mm | 0.2165 | M6 X 0,5 | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64126 |
| 7/32 | 0.2188 | 1/4-32 | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 51510 |
| 5,6 mm | 0.2205 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64127 |
| #2 | 0.2210 | | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 52335 |
| 5,7 mm | 0.2244 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64128 |
| #1 | 0.2280 | | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 52336 |
| 5,8 mm | 0.2283 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64129 |
| 5,9 mm | 0.2323 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64130 |
| A | 0.2340 | | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 52337 |
| 15/64 | 0.2344 | | 1/4 | 3-1/4 | 1-3/4 | 1-37/64 | 1-7/16 | 51591 |
| 6,0 mm | 0.2362 | M7 X 1 | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 64131 |
| B | 0.2380 | | 1/4 | 3 5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 52338 |
| 6,1 mm | 0.2402 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64132 |
| C | 0.2420 | | 1/4 | 3 5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 52339 |
| 6,2 mm | 0.2441 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64133 |
| D | 0.2460 | | 1/4 | 3 5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 52340 |
| 6,25 mm | 0.2461 | M7 X 0,75 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64134 |
| 6,3 mm | 0.2480 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64135 |
| 1/4 | 0.2500 | | 1/4 | 3-5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 51511 |
| 6,4 mm | 0.2520 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64136 |
| 6,5 mm | 0.2559 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64137 |
| F | 0.2570 | 5/16-18 | 5/16 | 3-5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 51512 |
| 6,6 mm | 0.2598 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64138 |
| G | 0.2610 | | 5/16 | 3 5/8 | 2 5/64 | 1 51/64 | 1 7/16 | 52341 |
| 6,7 mm | 0.2638 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64139 |
| 17/64 | 0.2656 | 5/16-20 | 5/16 | 3-5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 51513 |
| H | 0.2660 | | 5/16 | 3-5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 52342 |
| 6,8 mm | 0.2677 | M8 X 1,25 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64140 |
| 6,9 mm | 0.2717 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64141 |
| I | 0.2720 | 5/16-24 | 5/16 | 3-5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 51514 |
| 7,0 mm | 0.2756 | M8 X 1 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64142 |
| J | 0.2770 | | 5/16 | 3 5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 52343 |
| 7,1 mm | 0.2795 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64143 |
| K | 0.2810 | | 5/16 | 3 5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 52344 |
| 9/32 | 0.2812 | 5/16-32 | 5/16 | 3-5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 51515 |
| 7,2 mm | 0.2835 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64144 |
| 7,25 mm | 0.2854 | M8 X 0,75 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64145 |
| 7,3 mm | 0.2874 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64146 |

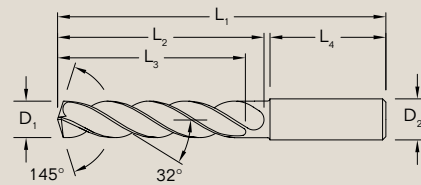
(continued on next page)

TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≤ 34 | +0.0001 / -0.0005 | h6 |
| > 34 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

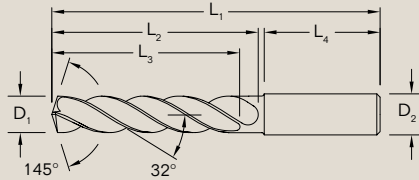


New Expanded Tools

SERIES 135
5xD
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| L | 0.2900 | | 5/16 | 3-5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 52345 |
| 7,4 mm | 0.2913 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64147 |
| M | 0.2950 | | 5/16 | 3-5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 52346 |
| 7,5 mm | 0.2953 | M8 X 0,5 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64148 |
| 19/64 | 0.2969 | | 5/16 | 3-5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 51516 |
| 7,6 mm | 0.2992 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64149 |
| N | 0.3020 | | 5/16 | 3-5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 52347 |
| 7,7 mm | 0.3031 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64150 |
| 7,8 mm | 0.3071 | M9 X 1,25 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64151 |
| 7,9 mm | 0.3110 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64152 |
| 5/16 | 0.3125 | 3/8-16 | 5/16 | 3-5/8 | 2-5/64 | 1-51/64 | 1-7/16 | 51517 |
| 8,0 mm | 0.3150 | M9 X 1 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 64153 |
| O | 0.3160 | | 3/8 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 52348 |
| 8,1 mm | 0.3189 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64154 |
| 8,2 mm | 0.3228 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64155 |
| P | 0.3230 | | 3/8 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 51518 |
| 8,3 mm | 0.3268 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64156 |
| 21/64 | 0.3281 | 3/8-20 | 3/8 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 51519 |
| 8,4 mm | 0.3307 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64157 |
| Q | 0.3320 | 3/8-24 | 3/8 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 51520 |
| 8,5 mm | 0.3346 | M10 X 1,5 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64158 |
| 8,6 mm | 0.3386 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64159 |
| R | 0.3390 | 3/8-32 | 3/8 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 52349 |
| 8,7 mm | 0.3425 | M10 X 1,25 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64160 |
| 11/32 | 0.3438 | | 3/8 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 51521 |
| 8,8 mm | 0.3465 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64161 |
| S | 0.3480 | | 3/8 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 51522 |
| 8,9 mm | 0.3504 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64162 |
| 9,0 mm | 0.3543 | M10 X 1 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64163 |
| T | 0.3580 | | 3/8 | 4 | 2 13/32 | 2 1/8 | 1 9/16 | 52350 |
| 9,1 mm | 0.3583 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64164 |
| 23/64 | 0.3594 | | 3/8 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 51523 |
| 9,2 mm | 0.3622 | M10 X 0,75 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64165 |
| 9,25 mm | 0.3642 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64166 |
| 9,3 mm | 0.3661 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64167 |
| U | 0.3680 | 7/16-14 | 3/8 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 51524 |
| 9,4 mm | 0.3701 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64168 |
| 9,5 mm | 0.3740 | M10 X 0,5 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64169 |
| 3/8 | 0.3750 | | 3/8 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 51525 |
| V | 0.3770 | | 1/2 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 52351 |
| 9,6 mm | 0.3780 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64170 |
| 9,7 mm | 0.3819 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64171 |

(continued on next page)



TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≤ 3/4 | +0.0001 / -0.0005 | h6 |
| > 3/4 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

New Expanded Tools

SERIES 135
5xD
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 9,8 mm | 0.3858 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64172 |
| W | 0.3860 | | 1/2 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 51526 |
| 9,9 mm | 0.3898 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64173 |
| 25/64 | 0.3906 | 7/16-20 | 1/2 | 4 | 2-13/32 | 2-1/8 | 1-9/16 | 51527 |
| 10,0 mm | 0.3937 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 64174 |
| X | 0.3970 | 7/16-24 | 1/2 | 4-11/16 | 2-3/4 | 2-23/64 | 1-49/64 | 52352 |
| 10,1 mm | 0.3976 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64175 |
| 10,2 mm | 0.4016 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64176 |
| Y | 0.4040 | 7/16-28 | 1/2 | 4-11/16 | 2-3/4 | 2-23/64 | 1-49/64 | 52353 |
| 10,3 mm | 0.4055 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64177 |
| 13/32 | 0.4062 | | 1/2 | 4-11/16 | 2-3/4 | 2-23/64 | 1-49/64 | 51528 |
| 10,4 mm | 0.4095 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64178 |
| Z | 0.4130 | | 1/2 | 4-11/16 | 2-3/4 | 2-23/64 | 1-49/64 | 52354 |
| 10,5 mm | 0.4134 | M12 X 1,5 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64179 |
| 10,6 mm | 0.4173 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64180 |
| 10,7 mm | 0.4213 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64181 |
| 27/64 | 0.4219 | 1/2-13 | 1/2 | 4-11/16 | 2-3/4 | 2-23/64 | 1-49/64 | 51529 |
| 10,8 mm | 0.4252 | M12 X 1,25 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64182 |
| 10,9 mm | 0.4291 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64183 |
| 11,0 mm | 0.4331 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64184 |
| 11,1 mm | 0.4370 | M12 X 1 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64185 |
| 7/16 | 0.4375 | 1/4-18 NPT | 1/2 | 4-11/16 | 2-3/4 | 2-23/64 | 1-49/64 | 51530 |
| 11,2 mm | 0.4409 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64186 |
| 11,25 mm | 0.4429 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64187 |
| 11,3 mm | 0.4449 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64188 |
| 11,4 mm | 0.4488 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64189 |
| 11,5 mm | 0.4528 | M12 X 0,5 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64190 |
| 29/64 | 0.4531 | 1/2-20 | 1/2 | 4-11/16 | 2-3/4 | 2-23/64 | 1-49/64 | 51531 |
| 11,6 mm | 0.4567 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64191 |
| 11,7 mm | 0.4606 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64192 |
| 11,8 mm | 0.4646 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64193 |
| 11,9 mm | 0.4685 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64194 |
| 15/32 | 0.4688 | 1/2-28 | 1/2 | 4-11/16 | 2-3/4 | 2-23/64 | 1-49/64 | 51532 |
| 12,0 mm | 0.4724 | M14 X 2 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64195 |
| 31/64 | 0.4844 | 9/16-12 | 1/2 | 4-7/8 | 3-1/32 | 2-19/32 | 1-49/64 | 51533 |
| 12,5 mm | 0.4921 | M14 X 1,5 | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 64196 |
| 1/2 | 0.5000 | | 1/2 | 4-7/8 | 3-1/32 | 2-19/32 | 1-49/64 | 51534 |
| 12,8 mm | 0.5039 | M14 X 1,25 | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 64197 |
| 13,0 mm | 0.5118 | M14 X 1 | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 64198 |
| 33/64 | 0.5156 | 9/16-18 | 5/8 | 4-7/8 | 3-1/32 | 2-19/32 | 1-49/64 | 51535 |
| 17/32 | 0.5312 | 5/8-11 | 5/8 | 4-7/8 | 3-1/32 | 2-19/32 | 1-49/64 | 51536 |
| 13,5 mm | 0.5315 | | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 64199 |

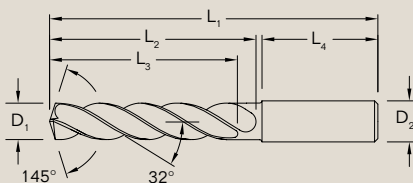
(continued on next page)

TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≤ 34 | +0.0001 / -0.0005 | h6 |
| > 34 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |



New Expanded Tools

SERIES 135
5xD
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 35/64 | 0.5469 | 5/8-12 | 5/8 | 4-7/8 | 3-1/32 | 2-19/32 | 1-49/64 | 51537 |
| 14,0 mm | 0.5512 | M16 X 2 | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 64200 |
| 9/16 | 0.5625 | | 5/8 | 5-1/4 | 3-1/4 | 2-3/4 | 1-57/64 | 51538 |
| 14,5 mm | 0.5709 | M16 X 1,5 | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 64201 |
| 37/64 | 0.5781 | 5/8-18 | 5/8 | 5-1/4 | 3-1/4 | 2-3/4 | 1-57/64 | 51539 |
| 15,0 mm | 0.5906 | M16 X 1 | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 64202 |
| 19/32 | 0.5938 | 11/16-11 | 5/8 | 5-1/4 | 3-1/4 | 2-3/4 | 1-57/64 | 51592 |
| 39/64 | 0.6094 | 11/16-12 | 5/8 | 5-1/4 | 3-1/4 | 2-3/4 | 1-57/64 | 51593 |
| 15,5 mm | 0.6102 | M18 X 2,5 | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 64203 |
| 5/8 | 0.6250 | 11/16-16 | 5/8 | 5-1/4 | 3-1/4 | 2-3/4 | 1-57/64 | 51540 |
| 16,0 mm | 0.6299 | | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 64204 |
| 41/64 | 0.6406 | 11/16-24 | 3/4 | 5-5/8 | 3-5/8 | 3-3/16 | 1-57/64 | 51594 |
| 16,5 mm | 0.6496 | M18 X 1,5 | 20,0 | 143,0 | 93,0 | 71,0 | 48,0 | 64205 |
| 21/32 | 0.6562 | 3/4-10 | 3/4 | 5-5/8 | 3-5/8 | 3-3/16 | 1-57/64 | 51541 |
| 17,0 mm | 0.6693 | | 18,0 | 143,0 | 93,0 | 71,0 | 48,0 | 64206 |
| 43/64 | 0.6719 | 3/4-12 | 3/4 | 5-5/8 | 3-5/8 | 3-3/16 | 1-57/64 | 51595 |
| 11/16 | 0.6875 | 3/4-16 | 3/4 | 5-5/8 | 3-5/8 | 3-3/16 | 1-57/64 | 51542 |
| 17,5 mm | 0.6890 | M20 X 2,5 | 18,0 | 143,0 | 93,0 | 71,0 | 48,0 | 64207 |
| 45/64 | 0.7031 | 3/4-20, 1/2-14 NPT | 3/4 | 5-5/8 | 3-5/8 | 3-3/16 | 1-57/64 | 51543 |
| 18,0 mm | 0.7087 | | 18,0 | 143,0 | 93,0 | 71,0 | 48,0 | 64208 |
| 23/32 | 0.7188 | | 3/4 | 6 | 4 | 3-3/8 | 1-31/32 | 51596 |
| 18,5 mm | 0.7283 | M20 X 1,5 | 20,0 | 153,0 | 101,0 | 77,0 | 50,0 | 64209 |
| 47/64 | 0.7344 | 13/16-12 | 3/4 | 6 | 4 | 3-3/8 | 1-31/32 | 51544 |
| 19,0 mm | 0.7480 | | 20,0 | 153,0 | 101,0 | 77,0 | 50,0 | 64210 |
| 3/4 | 0.7500 | 13/16-16 | 3/4 | 6 | 4 | 3-3/8 | 1-31/32 | 51545 |
| 49/64 | 0.7656 | 7/8-9 | 7/8 | 6 | 4 | 3-3/8 | 1-31/32 | 52355 |
| 19,5 mm | 0.7677 | M22 X 2,5 | 20,0 | 153,0 | 101,0 | 77,0 | 50,0 | 64211 |
| 25/32 | 0.7812 | | 7/8 | 6 | 4 | 3-7/8 | 1-31/32 | 52356 |
| 20,0 mm | 0.7874 | | 20,0 | 153,0 | 101,0 | 77,0 | 50,0 | 64212 |
| 51/64 | 0.7969 | 7/8-12 | 7/8 | 6 | 4 | 3-7/8 | 1-31/32 | 52357 |
| 20,5 mm | 0.8071 | | 22,0 | 153,0 | 101,0 | 77,0 | 50,0 | 64533 |
| 13/16 | 0.8125 | 7/8-14 | 7/8 | 6-1/2 | 4-1/2 | 3-7/8 | 2-1/8 | 52358 |
| 21,0 mm | 0.8268 | | 22,0 | 153,0 | 101,0 | 77,0 | 50,0 | 64534 |
| 22,0 mm | 0.8661 | | 22,0 | 178,0 | 127,0 | 108,0 | 54,0 | 64535 |
| 7/8 | 0.8750 | 15/16-16, 1-8 | 7/8 | 6-1/2 | 4-1/2 | 3-7/8 | 2-1/8 | 52359 |
| 59/64 | 0.9219 | 1-12 | 1 | 7 | 5 | 4-7/32 | 2-1/8 | 52360 |

| Series 135 3D Fractional | Hardness (Brinell) | Vc (SFM) | Diameter (D ₁) (inch) | | | | | | | | |
|---|--|----------------|--------------------------------------|------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/32 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 7/8 | | |
| P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536 | ≤ 175 | 385 | RPM | 47062 | 11766 | 5883 | 3922 | 2941 | 2353 | 1681 | |
| | | (308-462) | Fr | 0.0010 | 0.0038 | 0.0076 | 0.0115 | 0.0153 | 0.0191 | 0.0268 | |
| | | | Feed (IPM) | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | |
| | > 175 ≤ 275 | 350 | RPM | 42784 | 10696 | 5348 | 3565 | 2674 | 2139 | 1528 | |
| | | (280-420) | Fr | 0.0009 | 0.0036 | 0.0071 | 0.0107 | 0.0142 | 0.0178 | 0.0249 | |
| | | | Feed (IPM) | 38.0 | 38.0 | 38.0 | 38.0 | 38.0 | 38.0 | 38.0 | |
| | > 275 ≤ 425 | 200 | RPM | 24448 | 6112 | 3056 | 2037 | 1528 | 1222 | 873 | |
| | | (160-240) | Fr | 0.0007 | 0.0029 | 0.0059 | 0.0088 | 0.0118 | 0.0147 | 0.0206 | |
| | | | Feed (IPM) | 18.0 | 18.0 | 18.0 | 18.0 | 18.0 | 18.0 | 18.0 | |
| | P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100 | ≤ 275 | 300 | RPM | 36672 | 9168 | 4584 | 3056 | 2292 | 1834 | 1310 |
| | | | (240-360) | Fr | 0.0007 | 0.0029 | 0.0059 | 0.0088 | 0.0118 | 0.0147 | 0.0206 |
| | | | | Feed (IPM) | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 |
| > 275 ≤ 375 | | 185 | RPM | 22614 | 5654 | 2827 | 1885 | 1413 | 1131 | 808 | |
| | | (148-222) | Fr | 0.0006 | 0.0026 | 0.0051 | 0.0077 | 0.0103 | 0.0128 | 0.0180 | |
| | | | Feed (IPM) | 14.5 | 14.5 | 14.5 | 14.5 | 14.5 | 14.5 | 14.5 | |
| > 375 ≤ 450 | | 130 | RPM | 15891 | 3973 | 1986 | 1324 | 993 | 795 | 568 | |
| | | (104-156) | Fr | 0.0004 | 0.0018 | 0.0035 | 0.0053 | 0.0070 | 0.0088 | 0.0123 | |
| | | | Feed (IPM) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | |
| P TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2 | | ≤ 200 | 130 | RPM | 15891 | 3973 | 1986 | 1324 | 993 | 795 | 568 |
| | | | (104-156) | Fr | 0.0007 | 0.0026 | 0.0053 | 0.0079 | 0.0106 | 0.0132 | 0.0185 |
| | | | | Feed (IPM) | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 |
| | > 200 ≤ 375 | 90 | RPM | 11002 | 2750 | 1375 | 917 | 688 | 550 | 393 | |
| | | (72-108) | Fr | 0.0003 | 0.0012 | 0.0023 | 0.0035 | 0.0047 | 0.0058 | 0.0081 | |
| | | | Feed (IPM) | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 | |
| | > 375 ≤ 475 | 75 | RPM | 9168 | 2292 | 1146 | 764 | 573 | 458 | 327 | |
| | | (60-90) | Fr | 0.0002 | 0.0008 | 0.0016 | 0.0024 | 0.0031 | 0.0039 | 0.0055 | |
| | | | Feed (IPM) | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | |
| | K CAST IRONS Gray, Malleable, Ductile | ≤ 220 | 320 | RPM | 39117 | 9779 | 4890 | 3260 | 2445 | 1956 | 1397 |
| | | | (256-384) | Fr | 0.0012 | 0.0046 | 0.0092 | 0.0138 | 0.0184 | 0.0230 | 0.0322 |
| | | | | Feed (IPM) | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 |
| > 220 ≤ 260 | | 285 | RPM | 34838 | 8710 | 4355 | 2903 | 2177 | 1742 | 1244 | |
| | | (228-342) | Fr | 0.0011 | 0.0046 | 0.0092 | 0.0138 | 0.0184 | 0.0230 | 0.0321 | |
| | | | Feed (IPM) | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | |
| M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F | | ≤ 185 | 275 | RPM | 33616 | 8404 | 4202 | 2801 | 2101 | 1681 | 1201 |
| | | | (220-330) | Fr | 0.0006 | 0.0026 | 0.0051 | 0.0077 | 0.0102 | 0.0128 | 0.0179 |
| | | | | Feed (IPM) | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 | 21.5 |
| | | > 185 ≤ 275 | 170 | RPM | 20781 | 5195 | 2598 | 1732 | 1299 | 1039 | 742 |
| | | | (136-204) | Fr | 0.0005 | 0.0020 | 0.0040 | 0.0061 | 0.0081 | 0.0101 | 0.0141 |
| | | | | Feed (IPM) | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 | 10.5 |
| | M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450 | ≤ 275 | 90 | RPM | 11002 | 2750 | 1375 | 917 | 688 | 550 | 393 |
| | | | (72-108) | Fr | 0.0005 | 0.0020 | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0140 |
| | | | | Feed (IPM) | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 |
| | | > 275 ≤ 375 | 65 | RPM | 7946 | 1986 | 993 | 662 | 497 | 397 | 284 |
| | | | (52-78) | Fr | 0.0004 | 0.0018 | 0.0035 | 0.0053 | 0.0070 | 0.0088 | 0.0123 |
| | | | | Feed (IPM) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |

continued on next page

| Series 135 3D Fractional | Hardness (Brinell) | Vc (SFM) | Diameter (D ₁) (inch) | | | | | | | |
|---|-----------------------|-------------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/32 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 7/8 | |
| S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy | ≤ 300 | 55 | RPM | 6723 | 1681 | 840 | 560 | 420 | 336 | 240 |
| | | (44-66) | Fr | 0.0002 | 0.0008 | 0.0015 | 0.0023 | 0.0031 | 0.0039 | 0.0054 |
| | | | Feed (IPM) | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| | > 300 ≤ 400 | 30 | RPM | 3667 | 917 | 458 | 306 | 229 | 183 | 131 |
| | | (24-36) | Fr | 0.0002 | 0.0007 | 0.0013 | 0.0020 | 0.0026 | 0.0033 | 0.0046 |
| | | | Feed (IPM) | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| S TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V | ≤ 275 | 135 | RPM | 16502 | 4126 | 2063 | 1375 | 1031 | 825 | 589 |
| | | (108-162) | Fr | 0.0004 | 0.0018 | 0.0035 | 0.0053 | 0.0071 | 0.0088 | 0.0124 |
| | | | Feed (IPM) | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 | 7.3 |
| | > 275 ≤ 350 | 100 | RPM | 12224 | 3056 | 1528 | 1019 | 764 | 611 | 437 |
| | | (80-120) | Fr | 0.0004 | 0.0016 | 0.0033 | 0.0049 | 0.0065 | 0.0082 | 0.0115 |
| | | | Feed (IPM) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| > 350 ≤ 440 | 55 | RPM | 6723 | 1681 | 840 | 560 | 420 | 336 | 240 | |
| | (44-66) | Fr | 0.0003 | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0059 | 0.0083 | |
| | | Feed (IPM) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | |
| N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075 | ≤ 80 | 700 | RPM | 85568 | 21392 | 10696 | 7131 | 5348 | 4278 | 3056 |
| | | (560-840) | Fr | 0.0012 | 0.0049 | 0.0098 | 0.0147 | 0.0196 | 0.0245 | 0.0344 |
| | | | Feed (IPM) | 105.0 | 105.0 | 105.0 | 105.0 | 105.0 | 105.0 | 105.0 |
| | > 80 | 600 | RPM | 73344 | 18336 | 9168 | 6112 | 4584 | 3667 | 2619 |
| | | (480-720) | Fr | 0.0012 | 0.0050 | 0.0099 | 0.0149 | 0.0199 | 0.0248 | 0.0347 |
| | | | Feed (IPM) | 91.0 | 91.0 | 91.0 | 91.0 | 91.0 | 91.0 | 91.0 |
| N COPPER ALLOYS Alum Bronze, C110, Muntz Brass | ≤ 140 | 500 | RPM | 61120 | 15280 | 7640 | 5093 | 3820 | 3056 | 2183 |
| | | (400-600) | Fr | 0.0005 | 0.0020 | 0.0039 | 0.0059 | 0.0079 | 0.0098 | 0.0137 |
| | | | Feed (IPM) | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| | > 140 | 400 | RPM | 48896 | 12224 | 6112 | 4075 | 3056 | 2445 | 1746 |
| | | (320-480) | Fr | 0.0005 | 0.0020 | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0140 |
| | | | Feed (IPM) | 24.5 | 24.5 | 24.5 | 24.5 | 24.5 | 24.5 | 24.5 |

Note:

- rpm = sfm x 3.82 / D₁
- ipm = (inch / revolution) x rpm
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



www.sgstool.com

| Series 135M 3D Metric | Hardness (Brinell) | Vc (m/min) | Diameter (D ₁) (mm) | | | | | | | | | |
|--|--|---------------|------------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | 1.5 | 3 | 6 | 8 | 10 | 12 | 16 | 20 | | |
| P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536 | ≤ 175 | 117 | RPM | 24882 | 12441 | 6220 | 4665 | 3732 | 3110 | 2333 | 1866 | |
| | | (94-141) | Fr | 0.047 | 0.094 | 0.189 | 0.252 | 0.315 | 0.378 | 0.504 | 0.630 | |
| | | | Feed (mm/min) | 1175 | 1175 | 1175 | 1175 | 1175 | 1175 | 1175 | 1175 | |
| | > 175 ≤ 275 | 107 | RPM | 22620 | 11310 | 5655 | 4241 | 3393 | 2827 | 2121 | 1696 | |
| | | (85-128) | Fr | 0.043 | 0.086 | 0.172 | 0.229 | 0.286 | 0.343 | 0.457 | 0.572 | |
| | | | Feed (mm/min) | 970 | 970 | 970 | 970 | 970 | 970 | 970 | 970 | |
| | > 275 ≤ 425 | 61 | RPM | 12926 | 6463 | 3231 | 2424 | 1939 | 1616 | 1212 | 969 | |
| | | (49-73) | Fr | 0.036 | 0.071 | 0.142 | 0.190 | 0.237 | 0.285 | 0.380 | 0.475 | |
| | | | Feed (mm/min) | 460 | 460 | 460 | 460 | 460 | 460 | 460 | 460 | |
| | P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100 | ≤ 275 | 91 | RPM | 19388 | 9694 | 4847 | 3635 | 2908 | 2424 | 1818 | 1454 |
| | | | (73-110) | Fr | 0.036 | 0.071 | 0.142 | 0.190 | 0.237 | 0.285 | 0.380 | 0.475 |
| | | | | Feed (mm/min) | 690 | 690 | 690 | 690 | 690 | 690 | 690 | 690 |
| > 275 ≤ 375 | | 56 | RPM | 11956 | 5978 | 2989 | 2242 | 1793 | 1495 | 1121 | 897 | |
| | | (45-68) | Fr | 0.031 | 0.061 | 0.122 | 0.163 | 0.204 | 0.244 | 0.326 | 0.407 | |
| | | | Feed (mm/min) | 365 | 365 | 365 | 365 | 365 | 365 | 365 | 365 | |
| > 375 ≤ 450 | | 40 | RPM | 8402 | 4201 | 2100 | 1575 | 1260 | 1050 | 788 | 630 | |
| | | (32-48) | Fr | 0.021 | 0.042 | 0.083 | 0.111 | 0.139 | 0.167 | 0.222 | 0.278 | |
| | | | Feed (mm/min) | 175 | 175 | 175 | 175 | 175 | 175 | 175 | 175 | |
| P TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2 | | ≤ 200 | 40 | RPM | 8402 | 4201 | 2100 | 1575 | 1260 | 1050 | 788 | 630 |
| | | | (32-48) | Fr | 0.032 | 0.063 | 0.126 | 0.168 | 0.210 | 0.252 | 0.336 | 0.421 |
| | | | | Feed (mm/min) | 265 | 265 | 265 | 265 | 265 | 265 | 265 | 265 |
| | > 200 ≤ 375 | 27 | RPM | 5816 | 2908 | 1454 | 1091 | 872 | 727 | 545 | 436 | |
| | | (22-33) | Fr | 0.014 | 0.028 | 0.055 | 0.073 | 0.092 | 0.110 | 0.147 | 0.183 | |
| | | | Feed (mm/min) | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | |
| | > 375 ≤ 475 | 23 | RPM | 4847 | 2424 | 1212 | 909 | 727 | 606 | 454 | 364 | |
| | | (18-27) | Fr | 0.009 | 0.019 | 0.037 | 0.050 | 0.062 | 0.074 | 0.099 | 0.124 | |
| | | | Feed (mm/min) | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | |
| | K CAST IRONS Gray, Malleable, Ductile | ≤ 220 | 98 | RPM | 20681 | 10340 | 5170 | 3878 | 3102 | 2585 | 1939 | 1551 |
| | | | (78-117) | Fr | 0.055 | 0.110 | 0.220 | 0.293 | 0.366 | 0.439 | 0.585 | 0.732 |
| | | | | Feed (mm/min) | 1135 | 1135 | 1135 | 1135 | 1135 | 1135 | 1135 | 1135 |
| > 220 ≤ 260 | | 87 | RPM | 18419 | 9209 | 4605 | 3454 | 2763 | 2302 | 1727 | 1381 | |
| | | (69-104) | Fr | 0.055 | 0.110 | 0.219 | 0.292 | 0.366 | 0.439 | 0.585 | 0.731 | |
| | | | Feed (mm/min) | 1010 | 1010 | 1010 | 1010 | 1010 | 1010 | 1010 | 1010 | |
| M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F | ≤ 185 | 84 | RPM | 17773 | 8886 | 4443 | 3332 | 2666 | 2222 | 1666 | 1333 | |
| | | (67-101) | Fr | 0.031 | 0.061 | 0.123 | 0.164 | 0.204 | 0.245 | 0.327 | 0.409 | |
| | | | Feed (mm/min) | 545 | 545 | 545 | 545 | 545 | 545 | 545 | 545 | |
| | > 185 ≤ 275 | 52 | RPM | 10987 | 5493 | 2747 | 2060 | 1648 | 1373 | 1030 | 824 | |
| | | (41-62) | Fr | 0.024 | 0.047 | 0.095 | 0.126 | 0.158 | 0.189 | 0.252 | 0.316 | |
| | | | Feed (mm/min) | 260 | 260 | 260 | 260 | 260 | 260 | 260 | 260 | |
| M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450 | ≤ 275 | 27 | RPM | 5816 | 2908 | 1454 | 1091 | 872 | 727 | 545 | 436 | |
| | | (22-33) | Fr | 0.023 | 0.046 | 0.093 | 0.124 | 0.155 | 0.186 | 0.248 | 0.309 | |
| | | | Feed (mm/min) | 135 | 135 | 135 | 135 | 135 | 135 | 135 | 135 | |
| | > 275 ≤ 375 | 20 | RPM | 4201 | 2100 | 1050 | 788 | 630 | 525 | 394 | 315 | |
| | | (16-24) | Fr | 0.020 | 0.040 | 0.081 | 0.108 | 0.135 | 0.162 | 0.216 | 0.270 | |
| | | | Feed (mm/min) | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | |

continued on next page

| Series 135M 3D Metric | Hardness (Brinell) | Vc (m/min) | Diameter (D ₁) (mm) | | | | | | | | |
|---|-----------------------|---------------|------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | 1.5 | 3 | 6 | 8 | 10 | 12 | 16 | 20 | |
| S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy | ≤ 300 | 17 | RPM | 3555 | 1777 | 889 | 666 | 533 | 444 | 333 | 267 |
| | | (13-20) | Fr | 0.010 | 0.020 | 0.039 | 0.053 | 0.066 | 0.079 | 0.105 | 0.131 |
| | | | Feed (mm/min) | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| | > 300 ≤ 400 | 9 | RPM | 1939 | 969 | 485 | 364 | 291 | 242 | 182 | 145 |
| | | (7-11) | Fr | 0.008 | 0.015 | 0.031 | 0.041 | 0.052 | 0.062 | 0.083 | 0.103 |
| | | | Feed (mm/min) | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| S TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V | ≤ 275 | 41 | RPM | 8725 | 4362 | 2181 | 1636 | 1309 | 1091 | 818 | 654 |
| | | (33-49) | Fr | 0.021 | 0.042 | 0.085 | 0.113 | 0.141 | 0.170 | 0.226 | 0.283 |
| | | | Feed (mm/min) | 185 | 185 | 185 | 185 | 185 | 185 | 185 | 185 |
| | > 275 ≤ 350 | 30 | RPM | 6463 | 3231 | 1616 | 1212 | 969 | 808 | 606 | 485 |
| | | (24-37) | Fr | 0.019 | 0.039 | 0.077 | 0.103 | 0.129 | 0.155 | 0.206 | 0.258 |
| | | | Feed (mm/min) | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 |
| > 350 ≤ 440 | 17 | RPM | 3555 | 1777 | 889 | 666 | 533 | 444 | 333 | 267 | |
| | (13-20) | Fr | 0.014 | 0.028 | 0.056 | 0.075 | 0.094 | 0.113 | 0.150 | 0.188 | |
| | | Feed (mm/min) | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | |
| N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075 | ≤ 80 | 213 | RPM | 45239 | 22620 | 11310 | 8482 | 6786 | 5655 | 4241 | 3393 |
| | | (171-256) | Fr | 0.059 | 0.119 | 0.238 | 0.317 | 0.396 | 0.476 | 0.634 | 0.793 |
| | | | Feed (mm/min) | 2690 | 2690 | 2690 | 2690 | 2690 | 2690 | 2690 | 2690 |
| | > 80 | 183 | RPM | 38777 | 19388 | 9694 | 7271 | 5816 | 4847 | 3635 | 2908 |
| | | (146-219) | Fr | 0.060 | 0.120 | 0.240 | 0.320 | 0.400 | 0.480 | 0.640 | 0.799 |
| | | | Feed (mm/min) | 2325 | 2325 | 2325 | 2325 | 2325 | 2325 | 2325 | 2325 |
| N COPPER ALLOYS Alum Bronze, C110, Muntz Brass | ≤ 140 | 152 | RPM | 32314 | 16157 | 8078 | 6059 | 4847 | 4039 | 3029 | 2424 |
| | | (122-183) | Fr | 0.024 | 0.048 | 0.096 | 0.128 | 0.160 | 0.192 | 0.256 | 0.320 |
| | | | Feed (mm/min) | 776 | 776 | 776 | 776 | 776 | 776 | 776 | 776 |
| | > 140 | 122 | RPM | 25851 | 12926 | 6463 | 4847 | 3878 | 3231 | 2424 | 1939 |
| | | (98-146) | Fr | 0.024 | 0.049 | 0.097 | 0.130 | 0.162 | 0.195 | 0.260 | 0.325 |
| | | | Feed (mm/min) | 630 | 630 | 630 | 630 | 630 | 630 | 630 | 630 |

Note:

- rpm = (1000 x m / min) / (3.14 x D₁)
- mm / min = (mm / revolution) x rpm
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



www.sgstool.com

| Series 135 5D Fractional | Hardness (Brinell) | Vc (SFM) | Diameter (D ₁) (inch) | | | | | | | | |
|--|--|-------------|--------------------------------------|------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/32 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 7/8 | | |
| P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536 | ≤ 175 | 345 | RPM | 42173 | 10543 | 5272 | 3514 | 2636 | 2109 | 1506 | |
| | | (276-414) | Fr | 0.0010 | 0.0040 | 0.0080 | 0.0120 | 0.0159 | 0.0199 | 0.0279 | |
| | | | Feed (IPM) | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | 42.0 | |
| | > 175 ≤ 275 | 310 | RPM | 37894 | 9474 | 4737 | 3158 | 2368 | 1895 | 1353 | |
| | | (248-372) | Fr | 0.0009 | 0.0036 | 0.0072 | 0.0108 | 0.0144 | 0.0179 | 0.0251 | |
| | | | Feed (IPM) | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | |
| | > 275 ≤ 425 | 180 | RPM | 22003 | 5501 | 2750 | 1834 | 1375 | 1100 | 786 | |
| | | (144-216) | Fr | 0.0007 | 0.0030 | 0.0060 | 0.0090 | 0.0120 | 0.0150 | 0.0210 | |
| | | | Feed (IPM) | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | |
| | P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100 | ≤ 275 | 270 | RPM | 33005 | 8251 | 4126 | 2750 | 2063 | 1650 | 1179 |
| | | | (216-324) | Fr | 0.0008 | 0.0030 | 0.0061 | 0.0091 | 0.0121 | 0.0151 | 0.0212 |
| | | | | Feed (IPM) | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 |
| > 275 ≤ 375 | | 165 | RPM | 20170 | 5042 | 2521 | 1681 | 1261 | 1008 | 720 | |
| | | (132-198) | Fr | 0.0006 | 0.0026 | 0.0052 | 0.0077 | 0.0103 | 0.0129 | 0.0180 | |
| | | | Feed (IPM) | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 | |
| > 375 ≤ 450 | | 115 | RPM | 14058 | 3514 | 1757 | 1171 | 879 | 703 | 502 | |
| | | (92-138) | Fr | 0.0004 | 0.0018 | 0.0035 | 0.0053 | 0.0071 | 0.0088 | 0.0123 | |
| | | | Feed (IPM) | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | 6.2 | |
| P TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2 | | ≤ 200 | 120 | RPM | 14669 | 3667 | 1834 | 1222 | 917 | 733 | 524 |
| | | | (96-144) | Fr | 0.0006 | 0.0026 | 0.0051 | 0.0077 | 0.0103 | 0.0128 | 0.0179 |
| | | | | Feed (IPM) | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 | 9.4 |
| | > 200 ≤ 375 | 80 | RPM | 9779 | 2445 | 1222 | 815 | 611 | 489 | 349 | |
| | | (64-96) | Fr | 0.0003 | 0.0012 | 0.0024 | 0.0036 | 0.0047 | 0.0059 | 0.0083 | |
| | | | Feed (IPM) | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | 2.9 | |
| | > 375 ≤ 475 | 70 | RPM | 8557 | 2139 | 1070 | 713 | 535 | 428 | 306 | |
| | | (56-84) | Fr | 0.0002 | 0.0008 | 0.0016 | 0.0024 | 0.0032 | 0.0040 | 0.0056 | |
| | | | Feed (IPM) | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | |
| | K CAST IRONS Gray, Malleable, Ductile | ≤ 220 | 300 | RPM | 36672 | 9168 | 4584 | 3056 | 2292 | 1834 | 1310 |
| | | | (240-360) | Fr | 0.0011 | 0.0045 | 0.0089 | 0.0134 | 0.0179 | 0.0224 | 0.0313 |
| | | | | Feed (IPM) | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 |
| > 220 ≤ 260 | | 265 | RPM | 32394 | 8098 | 4049 | 2699 | 2025 | 1620 | 1157 | |
| | | (212-318) | Fr | 0.0011 | 0.0046 | 0.0091 | 0.0137 | 0.0183 | 0.0228 | 0.0320 | |
| | | | Feed (IPM) | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | |
| M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F | ≤ 185 | 250 | RPM | 30560 | 7640 | 3820 | 2547 | 1910 | 1528 | 1091 | |
| | | (200-300) | Fr | 0.0006 | 0.0026 | 0.0051 | 0.0077 | 0.0102 | 0.0128 | 0.0179 | |
| | | | Feed (IPM) | 19.5 | 19.5 | 19.5 | 19.5 | 19.5 | 19.5 | 19.5 | |
| | > 185 ≤ 275 | 150 | RPM | 18336 | 4584 | 2292 | 1528 | 1146 | 917 | 655 | |
| | | (120-180) | Fr | 0.0005 | 0.0020 | 0.0039 | 0.0059 | 0.0079 | 0.0098 | 0.0137 | |
| | | | Feed (IPM) | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | |
| M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450 | ≤ 275 | 80 | RPM | 9779 | 2445 | 1222 | 815 | 611 | 489 | 349 | |
| | | (64-96) | Fr | 0.0005 | 0.0020 | 0.0039 | 0.0059 | 0.0079 | 0.0098 | 0.0137 | |
| | | | Feed (IPM) | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | |
| | > 275 ≤ 375 | 55 | RPM | 6723 | 1681 | 840 | 560 | 420 | 336 | 240 | |
| | | (44-66) | Fr | 0.0004 | 0.0018 | 0.0036 | 0.0054 | 0.0071 | 0.0089 | 0.0125 | |
| | | | Feed (IPM) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |

continued on next page

| Series 135 5D Fractional | Hardness (Brinell) | Vc (SFM) | Diameter (D ₁) (inch) | | | | | | | |
|---|-----------------------|-------------|--------------------------------------|---------|--------|--------|--------|--------|--------|--------|
| | | | 1/32 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 7/8 | |
| | | | | | | | | | | |
| S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy | ≤ 300 | 40 | RPM | 4890 | 1222 | 611 | 407 | 306 | 244 | 175 |
| | | (32-48) | Fr | 0.0002 | 0.0008 | 0.0016 | 0.0025 | 0.0033 | 0.0041 | 0.0057 |
| | | | Feed (IPM) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| | > 300 ≤ 400 | 20 | RPM | 2445 | 611 | 306 | 204 | 153 | 122 | 87 |
| | | (16-24) | Fr | 0.0002 | 0.0007 | 0.0013 | 0.0020 | 0.0026 | 0.0033 | 0.0046 |
| | | | Feed (IPM) | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| S TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V | ≤ 275 | 105 | RPM | 12835 | 3209 | 1604 | 1070 | 802 | 642 | 458 |
| | | (84-126) | Fr | 0.0005 | 0.0018 | 0.0036 | 0.0054 | 0.0072 | 0.0090 | 0.0127 |
| | | | Feed (IPM) | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 | 5.8 |
| | > 275 ≤ 350 | 80 | RPM | 9779 | 2445 | 1222 | 815 | 611 | 489 | 349 |
| | | (64-96) | Fr | #VALUE! | 0.0016 | 0.0032 | 0.0048 | 0.0064 | 0.0080 | 0.0112 |
| | | | Feed (IPM) | | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 |
| > 350 ≤ 440 | 42 | RPM | 5134 | 1284 | 642 | 428 | 321 | 257 | 183 | |
| | (34-50) | Fr | 0.0003 | 0.0012 | 0.0025 | 0.0037 | 0.0050 | 0.0062 | 0.0087 | |
| | | Feed (IPM) | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | |
| N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075 | ≤ 80 | 635 | RPM | 77622 | 19406 | 9703 | 6469 | 4851 | 3881 | 2772 |
| | | (508-762) | Fr | 0.0012 | 0.0049 | 0.0099 | 0.0148 | 0.0198 | 0.0247 | 0.0346 |
| | | | Feed (IPM) | 96.0 | 96.0 | 96.0 | 96.0 | 96.0 | 96.0 | 96.0 |
| | > 80 | 540 | RPM | 66010 | 16502 | 8251 | 5501 | 4126 | 3300 | 2357 |
| | | (432-648) | Fr | 0.0012 | 0.0050 | 0.0099 | 0.0149 | 0.0199 | 0.0248 | 0.0348 |
| | | | Feed (IPM) | 82.0 | 82.0 | 82.0 | 82.0 | 82.0 | 82.0 | 82.0 |
| N COPPER ALLOYS Alum Bronze, C110, Muntz Brass | ≤ 140 | 450 | RPM | 55008 | 13752 | 6876 | 4584 | 3438 | 2750 | 1965 |
| | | (360-540) | Fr | 0.0005 | 0.0020 | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0140 |
| | | | Feed (IPM) | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 | 27.5 |
| | > 140 | 360 | RPM | 44006 | 11002 | 5501 | 3667 | 2750 | 2200 | 1572 |
| | | (288-432) | Fr | 0.0005 | 0.0020 | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0140 |
| | | | Feed (IPM) | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 | 22.0 |

Note:

- rpm = sfm x 3.82 / D₁
- ipm = (inch / revolution) x rpm
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



Tool Wizard
CALCULATE APPLICATION PARAMETERS

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| Series 135M 5D Metric | Hardness (Brinell) | Vc (m/min) | Diameter (D ₁) (mm) | | | | | | | | | |
|--|--|---------------|------------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | 1.5 | 3 | 6 | 8 | 10 | 12 | 16 | 20 | | |
| P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536 | ≤ 175 | 105 | RPM | 22297 | 11148 | 5574 | 4181 | 3344 | 2787 | 2090 | 1672 | |
| | | (84-126) | Fr | 0.048 | 0.095 | 0.190 | 0.254 | 0.317 | 0.380 | 0.507 | 0.634 | |
| | | | Feed (mm/min) | 1060 | 1060 | 1060 | 1060 | 1060 | 1060 | 1060 | 1060 | |
| | > 175 ≤ 275 | 94 | RPM | 20035 | 10017 | 5009 | 3756 | 3005 | 2504 | 1878 | 1503 | |
| | | (76-113) | Fr | 0.043 | 0.085 | 0.171 | 0.228 | 0.285 | 0.341 | 0.455 | 0.569 | |
| | | | Feed (mm/min) | 855 | 855 | 855 | 855 | 855 | 855 | 855 | 855 | |
| | > 275 ≤ 425 | 55 | RPM | 11633 | 5816 | 2908 | 2181 | 1745 | 1454 | 1091 | 872 | |
| | | (44-66) | Fr | 0.036 | 0.071 | 0.143 | 0.190 | 0.238 | 0.285 | 0.381 | 0.476 | |
| | | | Feed (mm/min) | 415 | 415 | 415 | 415 | 415 | 415 | 415 | 415 | |
| | P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100 | ≤ 275 | 82 | RPM | 17449 | 8725 | 4362 | 3272 | 2617 | 2181 | 1636 | 1309 |
| | | | (66-99) | Fr | 0.036 | 0.072 | 0.143 | 0.191 | 0.239 | 0.287 | 0.382 | 0.478 |
| | | | | Feed (mm/min) | 625 | 625 | 625 | 625 | 625 | 625 | 625 | 625 |
| > 275 ≤ 375 | | 50 | RPM | 10664 | 5332 | 2666 | 1999 | 1600 | 1333 | 1000 | 800 | |
| | | (40-60) | Fr | 0.031 | 0.062 | 0.124 | 0.165 | 0.206 | 0.248 | 0.330 | 0.413 | |
| | | | Feed (mm/min) | 330 | 330 | 330 | 330 | 330 | 330 | 330 | 330 | |
| > 375 ≤ 450 | | 35 | RPM | 7432 | 3716 | 1858 | 1394 | 1115 | 929 | 697 | 557 | |
| | | (28-42) | Fr | 0.022 | 0.043 | 0.086 | 0.115 | 0.144 | 0.172 | 0.230 | 0.287 | |
| | | | Feed (mm/min) | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 | |
| P TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2 | | ≤ 200 | 37 | RPM | 7755 | 3878 | 1939 | 1454 | 1163 | 969 | 727 | 582 |
| | | | (29-44) | Fr | 0.031 | 0.062 | 0.124 | 0.165 | 0.206 | 0.248 | 0.330 | 0.413 |
| | | | | Feed (mm/min) | 240 | 240 | 240 | 240 | 240 | 240 | 240 | 240 |
| | > 200 ≤ 375 | 24 | RPM | 5170 | 2585 | 1293 | 969 | 776 | 646 | 485 | 388 | |
| | | (20-29) | Fr | 0.015 | 0.029 | 0.058 | 0.077 | 0.097 | 0.116 | 0.155 | 0.193 | |
| | | | Feed (mm/min) | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | |
| | > 375 ≤ 475 | 21 | RPM | 4524 | 2262 | 1131 | 848 | 679 | 565 | 424 | 339 | |
| | | (17-26) | Fr | 0.010 | 0.020 | 0.040 | 0.053 | 0.066 | 0.080 | 0.106 | 0.133 | |
| | | | Feed (mm/min) | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 45 | |
| | K CAST IRONS Gray, Malleable, Ductile | ≤ 220 | 91 | RPM | 19388 | 9694 | 4847 | 3635 | 2908 | 2424 | 1818 | 1454 |
| | | | (73-110) | Fr | 0.054 | 0.108 | 0.217 | 0.289 | 0.361 | 0.433 | 0.578 | 0.722 |
| | | | | Feed (mm/min) | 1050 | 1050 | 1050 | 1050 | 1050 | 1050 | 1050 | 1050 |
| > 220 ≤ 260 | | 81 | RPM | 17126 | 8563 | 4282 | 3211 | 2569 | 2141 | 1606 | 1284 | |
| | | (65-97) | Fr | 0.055 | 0.109 | 0.218 | 0.291 | 0.364 | 0.437 | 0.582 | 0.728 | |
| | | | Feed (mm/min) | 935 | 935 | 935 | 935 | 935 | 935 | 935 | 935 | |
| M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F | ≤ 185 | 76 | RPM | 16157 | 8078 | 4039 | 3029 | 2424 | 2020 | 1515 | 1212 | |
| | | (61-91) | Fr | 0.031 | 0.061 | 0.123 | 0.163 | 0.204 | 0.245 | 0.327 | 0.408 | |
| | | | Feed (mm/min) | 495 | 495 | 495 | 495 | 495 | 495 | 495 | 495 | |
| | > 185 ≤ 275 | 46 | RPM | 9694 | 4847 | 2424 | 1818 | 1454 | 1212 | 909 | 727 | |
| | | (37-55) | Fr | 0.024 | 0.047 | 0.095 | 0.127 | 0.158 | 0.190 | 0.253 | 0.316 | |
| | | | Feed (mm/min) | 230 | 230 | 230 | 230 | 230 | 230 | 230 | 230 | |
| M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450 | ≤ 275 | 24 | RPM | 5170 | 2585 | 1293 | 969 | 776 | 646 | 485 | 388 | |
| | | (20-29) | Fr | 0.023 | 0.046 | 0.093 | 0.124 | 0.155 | 0.186 | 0.248 | 0.309 | |
| | | | Feed (mm/min) | 120 | 120 | 120 | 120 | 120 | 120 | 120 | 120 | |
| | > 275 ≤ 375 | 17 | RPM | 3555 | 1777 | 889 | 666 | 533 | 444 | 333 | 267 | |
| | | (13-20) | Fr | 0.021 | 0.042 | 0.084 | 0.113 | 0.141 | 0.169 | 0.225 | 0.281 | |
| | | | Feed (mm/min) | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | |

continued on next page

| Series 135M 5D Metric | Hardness (Brinell) | Vc (m/min) | Diameter (D ₁) (mm) | | | | | | | | |
|---|-----------------------|---------------|------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | 1.5 | 3 | 6 | 8 | 10 | 12 | 16 | 20 | |
| S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy | ≤ 300 | 12 | RPM | 2585 | 1293 | 646 | 485 | 388 | 323 | 242 | 194 |
| | | (10-15) | Fr | 0.010 | 0.019 | 0.039 | 0.052 | 0.064 | 0.077 | 0.103 | 0.129 |
| | | | Feed (mm/min) | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| | > 300 ≤ 400 | 6 | RPM | 1293 | 646 | 323 | 242 | 194 | 162 | 121 | 97 |
| | | (5-7) | Fr | 0.007 | 0.014 | 0.028 | 0.037 | 0.046 | 0.056 | 0.074 | 0.093 |
| | | | Feed (mm/min) | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| S TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V | ≤ 275 | 32 | RPM | 6786 | 3393 | 1696 | 1272 | 1018 | 848 | 636 | 509 |
| | | (26-38) | Fr | 0.021 | 0.043 | 0.085 | 0.114 | 0.142 | 0.171 | 0.228 | 0.285 |
| | | | Feed (mm/min) | 145 | 145 | 145 | 145 | 145 | 145 | 145 | 145 |
| | > 275 ≤ 350 | 24 | RPM | 5170 | 2585 | 1293 | 969 | 776 | 646 | 485 | 388 |
| | | (20-29) | Fr | 0.019 | 0.039 | 0.077 | 0.103 | 0.129 | 0.155 | 0.206 | 0.258 |
| | | | Feed (mm/min) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| > 350 ≤ 440 | 13 | RPM | 2714 | 1357 | 679 | 509 | 407 | 339 | 254 | 204 | |
| | (10-15) | Fr | 0.015 | 0.029 | 0.059 | 0.079 | 0.098 | 0.118 | 0.157 | 0.196 | |
| | | Feed (mm/min) | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | |
| N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075 | ≤ 80 | 194 | RPM | 41039 | 20519 | 10260 | 7695 | 6156 | 5130 | 3847 | 3078 |
| | | (155-232) | Fr | 0.059 | 0.118 | 0.237 | 0.316 | 0.395 | 0.474 | 0.632 | 0.790 |
| | | | Feed (mm/min) | 2430 | 2430 | 2430 | 2430 | 2430 | 2430 | 2430 | 2430 |
| | > 80 | 165 | RPM | 34899 | 17449 | 8725 | 6544 | 5235 | 4362 | 3272 | 2617 |
| | | (132-198) | Fr | 0.059 | 0.118 | 0.237 | 0.316 | 0.394 | 0.473 | 0.631 | 0.789 |
| | | | Feed (mm/min) | 2065 | 2065 | 2065 | 2065 | 2065 | 2065 | 2065 | 2065 |
| N COPPER ALLOYS Alum Bronze, C110, Muntz Brass | ≤ 140 | 137 | RPM | 29082 | 14541 | 7271 | 5453 | 4362 | 3635 | 2726 | 2181 |
| | | (110-165) | Fr | 0.027 | 0.053 | 0.107 | 0.142 | 0.178 | 0.213 | 0.284 | 0.355 |
| | | | Feed (mm/min) | 775 | 775 | 775 | 775 | 775 | 775 | 775 | 775 |
| | > 140 | 110 | RPM | 23266 | 11633 | 5816 | 4362 | 3490 | 2908 | 2181 | 1745 |
| | | (88-132) | Fr | 0.027 | 0.054 | 0.108 | 0.144 | 0.181 | 0.217 | 0.289 | 0.361 |
| | | | Feed (mm/min) | 630 | 630 | 630 | 630 | 630 | 630 | 630 | 630 |

Note:

- rpm = (1000 x m / min) / (3.14 x D₁)
- mm / min = (mm / revolution) x rpm
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



www.sgstool.com



High Performance Internal Coolant Drills

The design of the SGS ICE-CARB was created to bring to the end user the ability to achieve high performance results with high production demands. The internal coolant design allows for better control of machining temperatures during these types of applications, while the geometry features provide effective and efficient chip creation and removal. The results of the ICE-CARB design are reduced cutting loads, increased operating parameters and enhanced tool life.

A COOLANT THROUGH DESIGN

- promotes controlled and consistent operating temperatures
- improves coolant flow to the cut while maintaining strength
- increases tool life at increased operating parameters

B HIGH PERFORMANCE FLUTE DESIGN

- optimized open fluting
- improved surface finish through effective chip evacuation

C POLISHED TI-NAMITE A COATING

- reduces friction between the chip and tool preventing the impediment of chip flow
- decreased machine loads associated with chip clogging
- reduced friction reduces heat and abrasion wear

D HIGH PENETRATION 140° POINT GEOMETRY

- split point geometry for improved drill penetration and accuracy
- cam relief drill point
- self centering design with high penetration capabilities

E ENGINEERED CUTTING EDGES

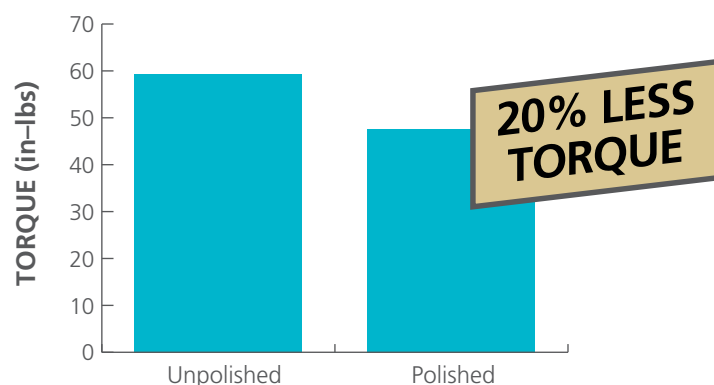
- precisely ground with a curvature that allows efficient chip creation and control
- controlled edge honing for longevity
- negative corner position strengthens and protects

PERFORMANCE. PRECISION. PASSION.
WITH ICE-CARB INTERNAL COOLANT DRILLS

PERFORMANCE.

The cutting edges of the SGS ICe-Carb are designed to allow the tool to achieve high penetration rates, while the highly polished Ti-NAMITE A tool coating allows the chips to move smoothly along the flute and out of the cut. This helps to avoid chip clogging often associated with elevated penetration rates. Through efficient chip creation and movement, the drill operates at lower loads under identical conditions.

TORQUE COMPARISON
8620 Carbon Steel @ 175 BHN
3/8" Diameter 1.125" Deep
350 sfm / 29 ipm



PRECISION.

The more efficient a drill can function, the more precise the results it can produce. The symmetrical grind of the cam relieved point ensures balanced pressure during cutting, while the split point design ensures fast and accurate engagement into the material. Precision must be maintained throughout the life of the drill, so the SGS ICe-Carb's specialized hone, strong margin design and negative corner position help to delay the wear that often causes a drill to lose precision in the cut and prematurely end tool life.

SGS ICE-CARB VS. 2 COMPETITORS

| | |
|---------------|-------------------------------|
| DRILL SIZE | 3/8" (.3750) |
| DEPTH OF HOLE | 1.875" |
| MATERIAL | 316 STAINLESS STEEL @ 140 BHN |
| SPEED | 1430 RPM (140 sfm) |
| FEED | 8.5 IPM (.0059 ipr) |
| COOLANT | 8% WATER SOLUBLE @ 700 psi |
| MACHINE | HAAS VF-3 VMC |
| TYPE OF HOLE | BLIND |

PASSION.

Controlling temperatures during the cutting process certainly helps to improve the operating parameters and tool life a tool is capable of achieving. All of the high performance features of the ICe-Carb are engineered to work together to create the most efficient total cutting performance beyond what simply having coolant through the tool can offer. The flute profile compliments the coolant through design of the ICe-Carb to create a strong cutting tool that effectively transports the chips being created, while the cutting edges offer a balance of strength and shear.

ACTUAL CUSTOMER TEST IN 17-4 PH STAINLESS STEEL @ 36 HRC SGS ICE-CARB 8xD VS. COMPETITOR M

| | |
|------------------|--------------------------------|
| SPEED (RPM) | 1600 |
| FEED (IPM) | 9.6 |
| HOLE DIAMETER | 9.1mm (.3583) |
| HOLE DEPTH | 3.3" |
| COOLANT PRESSURE | 60 psi (BELOW RECOMMENDATIONS) |
| TYPE OF COOLANT | WATER SOLUBLE |
| TYPE OF MACHINE | CNC LATHE – LIVE PART |

CONDITION OF DRILLS AFTER 175 HOLES

SGS ICE-CARB



No damage found, good condition to continue using; .375" Ø throughout depth with good finish

FIRST HOLE

LAST HOLE



COMPETITOR 1



Point severely chipped with wear on margins; Coating loss below cutting lips; .375" Ø held but surface finish deteriorating

FIRST HOLE

LAST HOLE



COMPETITOR 2



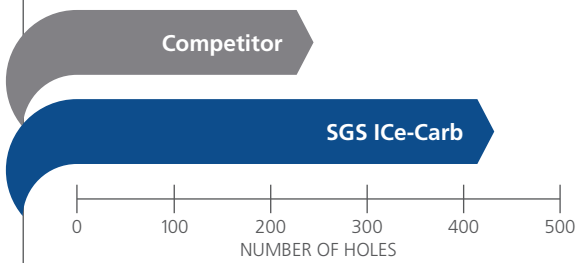
Better condition than Competitor 1 but unacceptable holes; Holes out of round, oversized to .385" Ø and tapered to .392" Ø with heavy swirl marks

FIRST HOLE

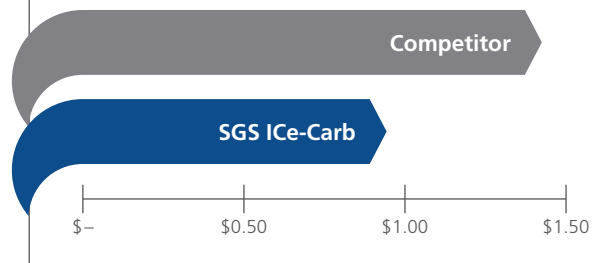
LAST HOLE

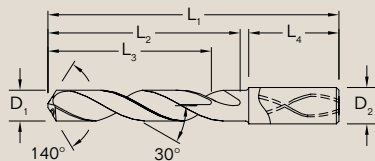


TOOL LIFE



COST PER PART





TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≥ 1/8 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

SERIES 140
5xD

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AITiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 3,0 mm | 0.1181 | | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 63901 |
| 3,1 mm | 0.1220 | | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 63902 |
| 1/8 | 0.1250 | | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 51901 |
| 3,2 mm | 0.1260 | M3,5 X 0,35 | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 63903 |
| 3,3 mm | 0.1299 | M4 X 0,7 | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 63904 |
| 3,4 mm | 0.1339 | | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 63905 |
| 29 | 0.1360 | 8-32,8-36 | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 51902 |
| 3,5 mm | 0.1378 | M4 X 0,5 | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 63906 |
| 9/64 | 0.1406 | | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 51903 |
| 3,6 mm | 0.1417 | M4 X 0,35 | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 63907 |
| 3,7 mm | 0.1457 | M4,5 X 0,75 | 6,0 | 66,0 | 28,0 | 23,0 | 36,0 | 63908 |
| 3,8 mm | 0.1496 | 10-24 | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 51904 |
| 3,9 mm | 0.1535 | | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 63909 |
| 5/32 | 0.1562 | | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 51905 |
| 4,0 mm | 0.1575 | M4,5 X 0,5 | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 63910 |
| 21 | 0.1590 | 10-32 | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 51906 |
| 4,1 mm | 0.1614 | | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 63911 |
| 4,2 mm | 0.1654 | M5 / M5 x 0,75 | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 63912 |
| 4,3 mm | 0.1693 | | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 63913 |
| 11/64 | 0.1719 | | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 51907 |
| 4,4 mm | 0.1732 | 12-24 | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 63914 |
| 4,5 mm | 0.1772 | M5 X 0,5 | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 63915 |
| 4,6 mm | 0.1811 | 12-28 | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 63916 |
| 4,7 mm | 0.1850 | 12-32 | 6,0 | 74,0 | 36,0 | 29,0 | 36,0 | 63917 |
| 3/16 | 0.1875 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 51908 |
| 4,8 mm | 0.1890 | 7/32-32 | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63918 |
| 4,9 mm | 0.1929 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63919 |
| 5,0 mm | 0.1969 | M6 X 1 | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63920 |
| 5,1 mm | 0.2008 | 1/4-20 | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63900 |
| 13/64 | 0.2031 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 51910 |
| 5,2 mm | 0.2047 | M6 X 0,75 | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63921 |
| 5,3 mm | 0.2087 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63922 |
| 5,4 mm | 0.2126 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63998 |
| 5,5 mm | 0.2165 | M6 X 0,5 | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63923 |
| 7/32 | 0.2188 | 1/4-32 | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 51912 |
| 5,6 mm | 0.2205 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63924 |
| 5,7 mm | 0.2244 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63925 |
| 5,8 mm | 0.2283 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63926 |
| 5,9 mm | 0.2323 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63927 |
| 15/64 | 0.2344 | | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 51913 |

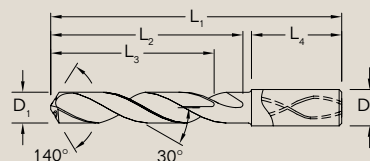
(continued on next page)

TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≥ 1/8 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

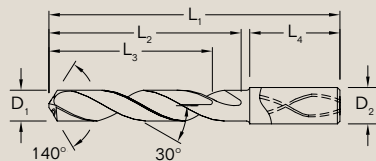
| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |



SERIES 140
5xD
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 6,0 mm | 0.2362 | M7 X 1 | 6,0 | 82,0 | 44,0 | 35,0 | 36,0 | 63928 |
| 6,1 mm | 0.2402 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63929 |
| 6,2 mm | 0.2441 | M7 X 0,75 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63930 |
| 6,3 mm | 0.2480 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63931 |
| 1/4 | 0.2500 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 51914 |
| 6,4 mm | 0.2520 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63932 |
| 6,5 mm | 0.2559 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63933 |
| F | 0.2570 | 5/16-18 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 51915 |
| 6,6 mm | 0.2598 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63934 |
| 6,7 mm | 0.2638 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63935 |
| 17/64 | 0.2657 | 5/16-20 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 51916 |
| 6,8 mm | 0.2677 | M8 X 1,25 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63936 |
| 6,9 mm | 0.2717 | 5/16-24 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63999 |
| 7,0 mm | 0.2756 | M8 X 1 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63937 |
| 7,1 mm | 0.2795 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63938 |
| 9/32 | 0.2812 | 5/16-32 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 51918 |
| 7,2 mm | 0.2835 | M8 X 0,75 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63939 |
| 7,3 mm | 0.2874 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63940 |
| 7,4 mm | 0.2913 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63941 |
| 7,5 mm | 0.2953 | M8 X 0,5 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63942 |
| 19/64 | 0.2969 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 51919 |
| 7,6 mm | 0.2992 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63943 |
| 7,7 mm | 0.3031 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63944 |
| 7,8 mm | 0.3071 | M9 X 1,25 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63945 |
| 7,9 mm | 0.3110 | | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63946 |
| 5/16 | 0.3125 | 3/8-16 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 51920 |
| 8,0 mm | 0.3150 | M9 X 1 | 8,0 | 91,0 | 53,0 | 43,0 | 36,0 | 63947 |
| 8,1 mm | 0.3189 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63948 |
| 8,2 mm | 0.3228 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63949 |
| 8,3 mm | 0.3268 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63950 |
| 21/64 | 0.3281 | 3/8-20 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 51921 |
| 8,4 mm | 0.3307 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63951 |
| Q | 0.3320 | 3/8-24 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 51922 |
| 8,5 mm | 0.3346 | M10 X 1,5 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63952 |
| 8,6 mm | 0.3386 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63953 |
| 8,7 mm | 0.3425 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63954 |
| 11/32 | 0.3438 | 3/8-32 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 51923 |
| 8,8 mm | 0.3465 | M10 X 1,25 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63955 |
| 8,9 mm | 0.3504 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63956 |
| 9,0 mm | 0.3543 | M10 X 1 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63957 |

(continued on next page)



TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≥ 1/8 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

SERIES 140
5xD
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AITiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 9,1 mm | 0.3583 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63958 |
| 23/64 | 0.3594 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 51924 |
| 9,2 mm | 0.3622 | M10 X 0,75 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63959 |
| 9,3 mm | 0.3661 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63960 |
| U | 0.3680 | 7/16-14 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 51925 |
| 9,4 mm | 0.3701 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63961 |
| 9,5 mm | 0.3740 | M11 / M10 X 0,5 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63962 |
| 3/8 | 0.3750 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 51926 |
| 9,6 mm | 0.3780 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63963 |
| 9,7 mm | 0.3819 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63964 |
| 9,8 mm | 0.3858 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63965 |
| 9,9 mm | 0.3898 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63966 |
| 25/64 | 0.3906 | 7/16-20 | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 51927 |
| 10,0 mm | 0.3937 | | 10,0 | 103,0 | 61,0 | 49,0 | 40,0 | 63967 |
| 10,1 mm | 0.3976 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63968 |
| 10,2 mm | 0.4016 | M12 X 1,75 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63969 |
| 10,3 mm | 0.4055 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63970 |
| 13/32 | 0.4062 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 51928 |
| 10,4 mm | 0.4094 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63971 |
| 10,5 mm | 0.4134 | M12 X 1,5 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63972 |
| 10,6 mm | 0.4173 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63973 |
| 10,7 mm | 0.4213 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63974 |
| 27/64 | 0.4219 | 1/2-13 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 51929 |
| 10,8 mm | 0.4252 | M12 X 1,25 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63975 |
| 10,9 mm | 0.4291 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63976 |
| 11,0 mm | 0.4331 | M12 X 1 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63977 |
| 11,1 mm | 0.4370 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63978 |
| 7/16 | 0.4375 | 1/4-18NPT | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 51930 |
| 11,2 mm | 0.4409 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63979 |
| 11,3 mm | 0.4449 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63980 |
| 11,4 mm | 0.4488 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63981 |
| 11,5 mm | 0.4528 | M12 X 0,5 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 64000 |
| 11,6 mm | 0.4567 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63982 |
| 11,7 mm | 0.4606 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63983 |
| 11,8 mm | 0.4646 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63984 |
| 11,9 mm | 0.4685 | | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63985 |
| 15/32 | 0.4688 | 1/2-28 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 51932 |
| 12,0 mm | 0.4724 | M14 X 2 | 12,0 | 118,0 | 71,0 | 56,0 | 45,0 | 63986 |
| 31/64 | 0.4844 | 9/16-12 | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 51933 |
| 12,5 mm | 0.4921 | M14 X 1,5 | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 63987 |

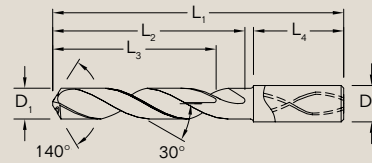
(continued on next page)

TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≥ 1/8 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |
| > 3/4 - 1 | +0.0003 / -0.0011 | h6 |

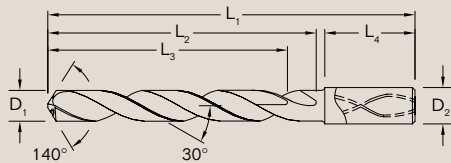
TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |



**SERIES 140
5xD**
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 1/2 | 0.5000 | | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 51934 |
| 12,8 mm | 0.5039 | M14 X 1,25 | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 63988 |
| 13,0 mm | 0.5118 | M14 X 1 | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 63989 |
| 33/64 | 0.5156 | 9/16-18 | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 51935 |
| 13,5 mm | 0.5315 | 5/8-11 | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 64001 |
| 13,8 mm | 0.5433 | | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 63990 |
| 14,0 mm | 0.5512 | M16 X 2 | 14,0 | 124,0 | 77,0 | 60,0 | 45,0 | 63991 |
| 9/16 | 0.5625 | | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 51937 |
| 14,5 mm | 0.5709 | M16 X 1,5 | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 63992 |
| 37/64 | 0.5781 | 5/8-18 | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 51938 |
| 14,8 mm | 0.5827 | | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 63993 |
| 15,0 mm | 0.5906 | M16 X 1 | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 63994 |
| 15,5 mm | 0.6102 | M18 X 2,5 | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 63995 |
| 15,8 mm | 0.6220 | | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 63996 |
| 5/8 | 0.6250 | 11/16-16 | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 51939 |
| 16,0 mm | 0.6299 | | 16,0 | 133,0 | 83,0 | 63,0 | 48,0 | 63997 |
| 21/32 | 0.6562 | 3/4-10 | 18,0 | 143,0 | 93,0 | 71,0 | 48,0 | 51940 |
| 11/16 | 0.6875 | 3/4-16 | 18,0 | 143,0 | 93,0 | 71,0 | 48,0 | 51941 |
| 3/4 | 0.7500 | 13/16-16 | 20,0 | 153,0 | 101,0 | 77,0 | 50,0 | 51942 |



TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≥ 1/8 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

SERIES 140
8xD

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AITiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 3,0 mm | 0.1181 | | 6,0 | 72,0 | 34,0 | 29,0 | 36,0 | 63575 |
| 3,1 mm | 0.1220 | | 6,0 | 72,0 | 34,0 | 29,0 | 36,0 | 63576 |
| 1/8 | 0.1250 | | 6,0 | 72,0 | 34,0 | 29,0 | 36,0 | 51801 |
| 3,2 mm | 0.1260 | M3,5 X 0,35 | 6,0 | 72,0 | 34,0 | 29,0 | 36,0 | 63577 |
| 3,3 mm | 0.1299 | M4 X 0,7 | 6,0 | 72,0 | 34,0 | 29,0 | 36,0 | 63578 |
| 3,4 mm | 0.1339 | | 6,0 | 72,0 | 34,0 | 29,0 | 36,0 | 63579 |
| 29 | 0.1360 | 8-32,8-36 | 6,0 | 72,0 | 34,0 | 29,0 | 36,0 | 51802 |
| 3,5 mm | 0.1378 | M4 X 0,5 | 6,0 | 72,0 | 34,0 | 29,0 | 36,0 | 63580 |
| 9/64 | 0.1406 | | 6,0 | 72,0 | 34,0 | 29,0 | 36,0 | 51803 |
| 3,6 mm | 0.1417 | M4 X 0,35 | 6,0 | 72,0 | 34,0 | 29,0 | 36,0 | 63581 |
| 3,7 mm | 0.1457 | M4,5 X 0,75 | 6,0 | 72,0 | 34,0 | 29,0 | 36,0 | 63582 |
| 3,8 mm | 0.1496 | 10-24 | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 63583 |
| 3,9 mm | 0.1535 | | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 63584 |
| 5/32 | 0.1562 | | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 51804 |
| 4,0 mm | 0.1575 | M4,5 X 0,5 | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 63585 |
| 21 | 0.1590 | 10-32 | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 51805 |
| 4,1 mm | 0.1614 | | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 63586 |
| 4,2 mm | 0.1654 | M5 / M5 X 0,75 | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 63587 |
| 4,3 mm | 0.1693 | | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 63588 |
| 11/64 | 0.1719 | | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 51806 |
| 4,4 mm | 0.1732 | 12-24 | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 63589 |
| 4,5 mm | 0.1772 | M5 X 0,5 | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 63590 |
| 4,6 mm | 0.1811 | 12-28 | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 63591 |
| 4,7 mm | 0.1850 | 12-32 | 6,0 | 81,0 | 43,0 | 36,0 | 36,0 | 63592 |
| 3/16 | 0.1875 | | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 51807 |
| 4,8 mm | 0.1890 | 7/32-32 | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63593 |
| 4,9 mm | 0.1929 | | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63594 |
| 5,0 mm | 0.1969 | M6 X 1 | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63595 |
| 5,1 mm | 0.2008 | 1/4-20 | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63596 |
| 13/64 | 0.2031 | | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 51808 |
| 5,2 mm | 0.2047 | M6 X 0,75 | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63597 |
| 5,3 mm | 0.2087 | | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63598 |
| 5,4 mm | 0.2126 | | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63599 |
| 5,5 mm | 0.2165 | M6 X 0,5 | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63600 |
| 7/32 | 0.2188 | 1/4-32 | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 51809 |
| 5,6 mm | 0.2205 | | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63601 |
| 5,7 mm | 0.2244 | | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63602 |
| 5,8 mm | 0.2283 | | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63603 |
| 5,9 mm | 0.2323 | | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63604 |
| 15/64 | 0.2344 | | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 51810 |

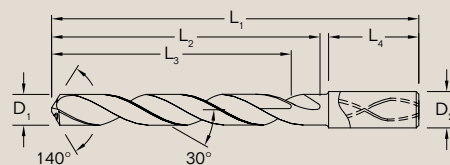
(continued on next page)

TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≥ 1/8 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |

TOLERANCES (mm)

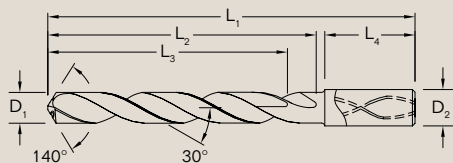
| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |



**SERIES 140
8xD
(CONTINUED)**

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 6,0 mm | 0.2362 | M7 X 1 | 6,0 | 95,0 | 57,0 | 48,0 | 36,0 | 63605 |
| 6,1 mm | 0.2402 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63606 |
| 6,2 mm | 0.2441 | M7 X 0,75 | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63607 |
| 6,3 mm | 0.2480 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63608 |
| 1/4 | 0.2500 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 51811 |
| 6,4 mm | 0.2520 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63609 |
| 6,5 mm | 0.2559 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63610 |
| F | 0.2570 | 5/16-18 | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 51812 |
| 6,6 mm | 0.2598 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63611 |
| 6,7 mm | 0.2638 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63612 |
| 17/64 | 0.2657 | 5/16-20 | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 51813 |
| 6,8 mm | 0.2677 | M8 X 1,25 | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63613 |
| 6,9 mm | 0.2717 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63614 |
| 7,0 mm | 0.2756 | M8 X 1 | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63615 |
| 7,1 mm | 0.2795 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63616 |
| 9/32 | 0.2812 | 5/16-32 | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 51814 |
| 7,2 mm | 0.2835 | M8 X 0,75 | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63617 |
| 7,3 mm | 0.2874 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63618 |
| 7,4 mm | 0.2913 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63619 |
| 7,5 mm | 0.2953 | M8 X 0,5 | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63620 |
| 19/64 | 0.2969 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 51815 |
| 7,6 mm | 0.2992 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63621 |
| 7,7 mm | 0.3031 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63622 |
| 7,8 mm | 0.3071 | M9 X 1,25 | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63623 |
| 7,9 mm | 0.3110 | | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63624 |
| 5/16 | 0.3125 | 3/8-16 | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 51816 |
| 8,0 mm | 0.3150 | M9 X 1 | 8,0 | 114,0 | 76,0 | 64,0 | 36,0 | 63625 |
| 8,1 mm | 0.3189 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63626 |
| 8,2 mm | 0.3228 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63627 |
| 8,3 mm | 0.3268 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63628 |
| 21/64 | 0.3281 | 3/8-20 | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 51817 |
| 8,4 mm | 0.3307 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63629 |
| Q | 0.3320 | 3/8-24 | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 51818 |
| 8,5 mm | 0.3346 | M10 X 1,5 | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63630 |
| 8,6 mm | 0.3386 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63631 |
| 8,7 mm | 0.3425 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63632 |
| 11/32 | 0.3438 | 3/8-32 | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 51819 |
| 8,8 mm | 0.3465 | M10 X 1,25 | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63633 |
| 8,9 mm | 0.3504 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63634 |
| 9,0 mm | 0.3543 | M10 X 1 | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63635 |

(continued on next page)



TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≥ 1/8 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |

SERIES 140
8xD
(CONTINUED)

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AITiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 9,1 mm | 0.3583 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63636 |
| 23/64 | 0.3594 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 51820 |
| 9,2 mm | 0.3622 | M10 X 0,75 | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63637 |
| 9,3 mm | 0.3661 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63638 |
| U | 0.3680 | 7/16-14 | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 51821 |
| 9,4 mm | 0.3701 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63639 |
| 9,5 mm | 0.3740 | M11 / M10 X 0,5 | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63640 |
| 3/8 | 0.3750 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 51822 |
| 9,6 mm | 0.3780 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63641 |
| 9,7 mm | 0.3819 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63642 |
| 9,8 mm | 0.3858 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63643 |
| 9,9 mm | 0.3898 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63644 |
| 25/64 | 0.3906 | 7/16-20 | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 51823 |
| 10,0 mm | 0.3937 | | 10,0 | 142,0 | 95,0 | 80,0 | 40,0 | 63645 |
| 10,1 mm | 0.3976 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63646 |
| 10,2 mm | 0.4016 | M12 X 1,75 | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63647 |
| 10,3 mm | 0.4055 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63648 |
| 13/32 | 0.4062 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 51824 |
| 10,4 mm | 0.4094 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63649 |
| 10,5 mm | 0.4134 | M12 X 1,5 | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63650 |
| 10,6 mm | 0.4173 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63651 |
| 10,7 mm | 0.4213 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63652 |
| 27/64 | 0.4219 | 1/2-13 | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 51825 |
| 10,8 mm | 0.4252 | M12 X 1,25 | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63653 |
| 10,9 mm | 0.4291 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63654 |
| 11,0 mm | 0.4331 | M12 X 1 | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63655 |
| 11,1 mm | 0.4370 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63656 |
| 7/16 | 0.4375 | 1/4-18NPT | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 51826 |
| 11,2 mm | 0.4409 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63657 |
| 11,3 mm | 0.4449 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63658 |
| 11,4 mm | 0.4488 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63659 |
| 11,5 mm | 0.4528 | M12 X 0,5 | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63660 |
| 11,6 mm | 0.4567 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63661 |
| 11,7 mm | 0.4606 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63662 |
| 11,8 mm | 0.4646 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63663 |
| 11,9 mm | 0.4685 | | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63664 |
| 15/32 | 0.4688 | 1/2-28 | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 51827 |
| 12,0 mm | 0.4724 | M14 X 2 | 12,0 | 162,0 | 114,0 | 96,0 | 45,0 | 63665 |
| 31/64 | 0.4844 | 9/16-12 | 14,0 | 178,0 | 133,0 | 112,0 | 45,0 | 51828 |
| 12,5 mm | 0.4921 | M14 X 1,5 | 14,0 | 178,0 | 133,0 | 112,0 | 45,0 | 63666 |

(continued on next page)

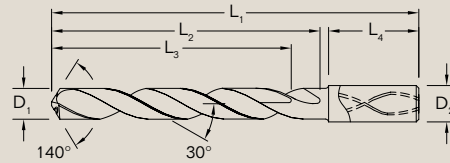


TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|-------------|-------------------|----------------|
| ≥ 1/8 - 1/4 | +0.0002 / -0.0006 | h6 |
| > 1/4 - 3/8 | +0.0002 / -0.0008 | h6 |
| > 3/8 - 3/4 | +0.0003 / -0.0010 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|-----------|-------------------|----------------|
| ≤ 3 | +0,0025 / -0,0127 | h6 |
| > 3 - 6 | +0,0050 / -0,0152 | h6 |
| > 6 - 10 | +0,0050 / -0,0200 | h6 |
| > 10 - 18 | +0,0076 / -0,0254 | h6 |
| > 18 - 30 | +0,0076 / -0,0279 | h6 |



**SERIES 140
8xD
(CONTINUED)**

| Cutting Diameter D ₁ | Decimal Equivalent | Tap Size Reference Only | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ | Min. Cleared Length L ₃ | Shank Length L ₄ | Ti-NAMITE-A (AlTiN) EDP No. |
|---------------------------------|--------------------|-------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------|
| 1/2 | 0.5000 | | 14,0 | 178,0 | 133,0 | 112,0 | 45,0 | 51829 |
| 12,8 mm | 0.5039 | M14 X 1,25 | 14,0 | 178,0 | 133,0 | 112,0 | 45,0 | 63667 |
| 13,0 mm | 0.5118 | M14 X 1 | 14,0 | 178,0 | 133,0 | 112,0 | 45,0 | 63668 |
| 33/64 | 0.5156 | 9/16-18 | 14,0 | 178,0 | 133,0 | 112,0 | 45,0 | 51830 |
| 13,5 mm | 0.5315 | 5/8-11 | 14,0 | 178,0 | 133,0 | 112,0 | 45,0 | 63669 |
| 13,8 mm | 0.5433 | | 14,0 | 178,0 | 133,0 | 112,0 | 45,0 | 63670 |
| 14,0 mm | 0.5512 | M16 X 2 | 14,0 | 178,0 | 133,0 | 112,0 | 45,0 | 63671 |
| 9/16 | 0.5625 | | 16,0 | 203,0 | 152,0 | 128,0 | 48,0 | 51831 |
| 14,5 mm | 0.5709 | M16 X 1,5 | 16,0 | 203,0 | 152,0 | 128,0 | 48,0 | 63672 |
| 37/64 | 0.5781 | 5/8-18 | 16,0 | 203,0 | 152,0 | 128,0 | 48,0 | 51832 |
| 14,8 mm | 0.5827 | | 16,0 | 203,0 | 152,0 | 128,0 | 48,0 | 63673 |
| 15,0 mm | 0.5906 | M16 X 1 | 16,0 | 203,0 | 152,0 | 128,0 | 48,0 | 63674 |
| 15,5 mm | 0.6102 | M18 X 2,5 | 16,0 | 203,0 | 152,0 | 128,0 | 48,0 | 63675 |
| 15,8 mm | 0.6220 | | 16,0 | 203,0 | 152,0 | 128,0 | 48,0 | 63676 |
| 5/8 | 0.6250 | 11/16-16 | 16,0 | 203,0 | 152,0 | 128,0 | 48,0 | 51833 |
| 16,0 mm | 0.6299 | | 16,0 | 203,0 | 152,0 | 128,0 | 48,0 | 63677 |
| 21/32 | 0.6562 | 3/4-10 | 18,0 | 222,0 | 171,0 | 144,0 | 48,0 | 51834 |
| 11/16 | 0.6875 | 3/4-16 | 18,0 | 222,0 | 171,0 | 144,0 | 48,0 | 51835 |
| 3/4 | 0.7500 | 13/16-16 | 20,0 | 243,0 | 190,0 | 160,0 | 50,0 | 51836 |

| Series 140 5D Fractional | Hardness (Brinell) | Vc (SFM) | Diameter (D ₁) (inch) | | | | | | | | |
|--|--|-------------|--------------------------------------|------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | | |
| P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536 | ≤ 175 | 425 | RPM | 12988 | 8659 | 6494 | 4329 | 3247 | 2598 | 2165 | |
| | | (340-510) | Fr | 0.0039 | 0.0059 | 0.0079 | 0.0118 | 0.0157 | 0.0196 | 0.0236 | |
| | | | Feed (IPM) | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | 51.0 | |
| | > 175 ≤ 275 | 380 | RPM | 11613 | 7742 | 5806 | 3871 | 2903 | 2323 | 1935 | |
| | | (304-456) | Fr | 0.0035 | 0.0053 | 0.0071 | 0.0106 | 0.0141 | 0.0177 | 0.0212 | |
| | | | Feed (IPM) | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 | 41.0 | |
| | > 275 ≤ 425 | 220 | RPM | 6723 | 4482 | 3362 | 2241 | 1681 | 1345 | 1121 | |
| | | (176-264) | Fr | 0.0030 | 0.0045 | 0.0059 | 0.0089 | 0.0119 | 0.0149 | 0.0178 | |
| | | | Feed (IPM) | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | |
| | P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100 | ≤ 275 | 330 | RPM | 10085 | 6723 | 5042 | 3362 | 2521 | 2017 | 1681 |
| | | | (264-396) | Fr | 0.0030 | 0.0045 | 0.0059 | 0.0089 | 0.0119 | 0.0149 | 0.0178 |
| | | | | Feed (IPM) | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| > 275 ≤ 375 | | 200 | RPM | 6112 | 4075 | 3056 | 2037 | 1528 | 1222 | 1019 | |
| | | (160-240) | Fr | 0.0025 | 0.0038 | 0.0051 | 0.0076 | 0.0101 | 0.0127 | 0.0152 | |
| | | | Feed (IPM) | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | 15.5 | |
| > 375 ≤ 450 | | 140 | RPM | 4278 | 2852 | 2139 | 1426 | 1070 | 856 | 713 | |
| | | (112-168) | Fr | 0.0018 | 0.0027 | 0.0036 | 0.0054 | 0.0072 | 0.0090 | 0.0108 | |
| | | | Feed (IPM) | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 | |
| P TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2 | | ≤ 200 | 145 | RPM | 4431 | 2954 | 2216 | 1477 | 1108 | 886 | 739 |
| | | | (116-174) | Fr | 0.0026 | 0.0039 | 0.0052 | 0.0078 | 0.0104 | 0.0130 | 0.0156 |
| | | | | Feed (IPM) | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 |
| | > 200 ≤ 375 | 95 | RPM | 2903 | 1935 | 1452 | 968 | 726 | 581 | 484 | |
| | | (76-114) | Fr | 0.0012 | 0.0018 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 | |
| | | | Feed (IPM) | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | |
| | > 375 ≤ 475 | 85 | RPM | 2598 | 1732 | 1299 | 866 | 649 | 520 | 433 | |
| | | (68-102) | Fr | 0.0008 | 0.0012 | 0.0015 | 0.0023 | 0.0031 | 0.0038 | 0.0046 | |
| | | | Feed (IPM) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | |
| | K CAST IRONS Gray, Malleable, Ductile | ≤ 220 | 360 | RPM | 11002 | 7334 | 5501 | 3667 | 2750 | 2200 | 1834 |
| | | | (288-432) | Fr | 0.0045 | 0.0068 | 0.0091 | 0.0136 | 0.0182 | 0.0227 | 0.0273 |
| | | | | Feed (IPM) | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 | 50.0 |
| > 220 ≤ 260 | | 335 | RPM | 10238 | 6825 | 5119 | 3413 | 2559 | 2048 | 1706 | |
| | | (268-402) | Fr | 0.0045 | 0.0068 | 0.0091 | 0.0136 | 0.0182 | 0.0227 | 0.0273 | |
| | | | Feed (IPM) | 46.5 | 46.5 | 46.5 | 46.5 | 46.5 | 46.5 | 46.5 | |
| M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F | ≤ 185 | 305 | RPM | 9321 | 6214 | 4660 | 3107 | 2330 | 1864 | 1553 | |
| | | (244-366) | Fr | 0.0026 | 0.0039 | 0.0051 | 0.0077 | 0.0103 | 0.0129 | 0.0154 | |
| | | | Feed (IPM) | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | |
| | > 185 ≤ 275 | 195 | RPM | 5959 | 3973 | 2980 | 1986 | 1490 | 1192 | 993 | |
| | | (156-234) | Fr | 0.0020 | 0.0030 | 0.0040 | 0.0060 | 0.0081 | 0.0101 | 0.0121 | |
| | | | Feed (IPM) | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 | |
| M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450 | ≤ 275 | 150 | RPM | 4584 | 3056 | 2292 | 1528 | 1146 | 917 | 764 | |
| | | (120-180) | Fr | 0.0020 | 0.0030 | 0.0040 | 0.0060 | 0.0079 | 0.0099 | 0.0119 | |
| | | | Feed (IPM) | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | 9.1 | |
| | > 275 ≤ 375 | 110 | RPM | 3362 | 2241 | 1681 | 1121 | 840 | 672 | 560 | |
| | | (88-132) | Fr | 0.0018 | 0.0027 | 0.0036 | 0.0054 | 0.0071 | 0.0089 | 0.0107 | |
| | | | Feed (IPM) | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | |

continued on next page

| Series 140 5D Fractional | Hardness (Brinell) | Vc (SFM) | Diameter (D ₁) (inch) | | | | | | | |
|---|-----------------------|-------------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | |
| | | | | | | | | | | |
| S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy | ≤ 300 | 95 | RPM | 2903 | 1935 | 1452 | 968 | 726 | 581 | 484 |
| | | (76-114) | Fr | 0.0008 | 0.0012 | 0.0016 | 0.0024 | 0.0032 | 0.0040 | 0.0048 |
| | | | Feed (IPM) | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 |
| | > 300 ≤ 400 | 50 | RPM | 1528 | 1019 | 764 | 509 | 382 | 306 | 255 |
| | | (40-60) | Fr | 0.0007 | 0.0010 | 0.0013 | 0.0020 | 0.0026 | 0.0033 | 0.0039 |
| | | | Feed (IPM) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| S TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V | ≤ 275 | 215 | RPM | 6570 | 4380 | 3285 | 2190 | 1643 | 1314 | 1095 |
| | | (172-258) | Fr | 0.0018 | 0.0026 | 0.0035 | 0.0053 | 0.0070 | 0.0088 | 0.0105 |
| | | | Feed (IPM) | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 |
| | > 275 ≤ 350 | 160 | RPM | 4890 | 3260 | 2445 | 1630 | 1222 | 978 | 815 |
| | | (128-192) | Fr | 0.0016 | 0.0024 | 0.0032 | 0.0048 | 0.0064 | 0.0080 | 0.0096 |
| | | | Feed (IPM) | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 | 7.8 |
| > 350 ≤ 440 | 85 | RPM | 2598 | 1732 | 1299 | 866 | 649 | 520 | 433 | |
| | (68-102) | Fr | 0.0012 | 0.0018 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 | |
| | | Feed (IPM) | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | |
| N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075 | ≤ 80 | 770 | RPM | 23531 | 15687 | 11766 | 7844 | 5883 | 4706 | 3922 |
| | | (616-924) | Fr | 0.0049 | 0.0073 | 0.0098 | 0.0147 | 0.0195 | 0.0244 | 0.0293 |
| | | | Feed (IPM) | 115.0 | 115.0 | 115.0 | 115.0 | 115.0 | 115.0 | 115.0 |
| | > 80 | 660 | RPM | 20170 | 13446 | 10085 | 6723 | 5042 | 4034 | 3362 |
| | | (528-792) | Fr | 0.0050 | 0.0074 | 0.0099 | 0.0149 | 0.0198 | 0.0248 | 0.0297 |
| | | | Feed (IPM) | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| N COPPER ALLOYS Alum Bronze, C110, Muntz Brass | ≤ 140 | 550 | RPM | 16808 | 11205 | 8404 | 5603 | 4202 | 3362 | 2801 |
| | | (440-660) | Fr | 0.0020 | 0.0030 | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0120 |
| | | | Feed (IPM) | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 |
| | > 140 | 440 | RPM | 13446 | 8964 | 6723 | 4482 | 3362 | 2689 | 2241 |
| | | (352-528) | Fr | 0.0020 | 0.0030 | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0120 |
| | | | Feed (IPM) | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 | 27.0 |

Note:

- rpm = sfm x 3.82 / D₁
- ipm = (inch / revolution) x rpm
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



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| Series 140M 5D Metric | Hardness (Brinell) | Vc (m/min) | Diameter (D ₁) (mm) | | | | | | | | |
|--|--|---------------|------------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|
| | | | 3 | 6 | 8 | 10 | 12 | 14 | 16 | | |
| P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536 | ≤ 175 | 130 | RPM | 13733 | 6867 | 5150 | 4120 | 3433 | 2943 | 2575 | |
| | | (104-155) | Fr | 0.095 | 0.189 | 0.252 | 0.316 | 0.379 | 0.442 | 0.505 | |
| | | | Feed (mm/min) | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 | 1300 | |
| | > 175 ≤ 275 | 116 | RPM | 12279 | 6140 | 4605 | 3684 | 3070 | 2631 | 2302 | |
| | | (93-139) | Fr | 0.086 | 0.171 | 0.228 | 0.285 | 0.342 | 0.399 | 0.456 | |
| | | | Feed (mm/min) | 1050 | 1050 | 1050 | 1050 | 1050 | 1050 | 1050 | |
| | > 275 ≤ 425 | 67 | RPM | 7109 | 3555 | 2666 | 2133 | 1777 | 1523 | 1333 | |
| | | (54-80) | Fr | 0.071 | 0.142 | 0.189 | 0.237 | 0.284 | 0.332 | 0.379 | |
| | | | Feed (mm/min) | 505 | 505 | 505 | 505 | 505 | 505 | 505 | |
| | P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100 | ≤ 275 | 101 | RPM | 10664 | 5332 | 3999 | 3199 | 2666 | 2285 | 1999 |
| | | | (80-121) | Fr | 0.071 | 0.143 | 0.190 | 0.238 | 0.285 | 0.333 | 0.380 |
| | | | | Feed (mm/min) | 760 | 760 | 760 | 760 | 760 | 760 | 760 |
| > 275 ≤ 375 | | 61 | RPM | 6463 | 3231 | 2424 | 1939 | 1616 | 1385 | 1212 | |
| | | (49-73) | Fr | 0.062 | 0.124 | 0.165 | 0.206 | 0.248 | 0.289 | 0.330 | |
| | | | Feed (mm/min) | 400 | 400 | 400 | 400 | 400 | 400 | 400 | |
| > 375 ≤ 450 | | 43 | RPM | 4524 | 2262 | 1696 | 1357 | 1131 | 969 | 848 | |
| | | (34-51) | Fr | 0.043 | 0.086 | 0.115 | 0.144 | 0.172 | 0.201 | 0.230 | |
| | | | Feed (mm/min) | 195 | 195 | 195 | 195 | 195 | 195 | 195 | |
| P TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2 | | ≤ 200 | 44 | RPM | 4686 | 2343 | 1757 | 1406 | 1171 | 1004 | 879 |
| | | | (35-53) | Fr | 0.061 | 0.122 | 0.162 | 0.203 | 0.243 | 0.284 | 0.324 |
| | | | | Feed (mm/min) | 285 | 285 | 285 | 285 | 285 | 285 | 285 |
| | > 200 ≤ 375 | 29 | RPM | 3070 | 1535 | 1151 | 921 | 767 | 658 | 576 | |
| | | (23-35) | Fr | 0.029 | 0.059 | 0.078 | 0.098 | 0.117 | 0.137 | 0.156 | |
| | | | Feed (mm/min) | 90 | 90 | 90 | 90 | 90 | 90 | 90 | |
| | > 375 ≤ 475 | 26 | RPM | 2747 | 1373 | 1030 | 824 | 687 | 589 | 515 | |
| | | (21-31) | Fr | 0.018 | 0.036 | 0.049 | 0.061 | 0.073 | 0.085 | 0.097 | |
| | | | Feed (mm/min) | 50 | 50 | 50 | 50 | 50 | 50 | 50 | |
| | K CAST IRONS Gray, Malleable, Ductile | ≤ 220 | 110 | RPM | 11633 | 5816 | 4362 | 3490 | 2908 | 2493 | 2181 |
| | | | (88-132) | Fr | 0.109 | 0.218 | 0.291 | 0.364 | 0.437 | 0.509 | 0.582 |
| | | | | Feed (mm/min) | 1270 | 1270 | 1270 | 1270 | 1270 | 1270 | 1270 |
| > 220 ≤ 260 | | 102 | RPM | 10825 | 5413 | 4059 | 3248 | 2706 | 2320 | 2030 | |
| | | (82-123) | Fr | 0.109 | 0.218 | 0.291 | 0.363 | 0.436 | 0.509 | 0.581 | |
| | | | Feed (mm/min) | 1180 | 1180 | 1180 | 1180 | 1180 | 1180 | 1180 | |
| M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F | ≤ 185 | 93 | RPM | 9856 | 4928 | 3696 | 2957 | 2464 | 2112 | 1848 | |
| | | (74-112) | Fr | 0.061 | 0.123 | 0.164 | 0.205 | 0.246 | 0.286 | 0.327 | |
| | | | Feed (mm/min) | 605 | 605 | 605 | 605 | 605 | 605 | 605 | |
| | > 185 ≤ 275 | 59 | RPM | 6301 | 3151 | 2363 | 1890 | 1575 | 1350 | 1181 | |
| | | (48-71) | Fr | 0.048 | 0.095 | 0.127 | 0.159 | 0.190 | 0.222 | 0.254 | |
| | | | Feed (mm/min) | 300 | 300 | 300 | 300 | 300 | 300 | 300 | |
| M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450 | ≤ 275 | 46 | RPM | 4847 | 2424 | 1818 | 1454 | 1212 | 1039 | 909 | |
| | | (37-55) | Fr | 0.047 | 0.095 | 0.127 | 0.158 | 0.190 | 0.221 | 0.253 | |
| | | | Feed (mm/min) | 230 | 230 | 230 | 230 | 230 | 230 | 230 | |
| | > 275 ≤ 375 | 34 | RPM | 3555 | 1777 | 1333 | 1066 | 889 | 762 | 666 | |
| | | (27-40) | Fr | 0.042 | 0.084 | 0.113 | 0.141 | 0.169 | 0.197 | 0.225 | |
| | | | Feed (mm/min) | 150 | 150 | 150 | 150 | 150 | 150 | 150 | |

continued on next page

| Series 140M 5D Metric | Hardness (Brinell) | Vc (m/min) | Diameter (D ₁) (mm) | | | | | | | |
|---|-----------------------|---------------|------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| | | | 3 | 6 | 8 | 10 | 12 | 14 | 16 | |
| S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy | ≤ 300 | 29 | RPM | 3070 | 1535 | 1151 | 921 | 767 | 658 | 576 |
| | | (23-35) | Fr | 0.020 | 0.039 | 0.052 | 0.065 | 0.078 | 0.091 | 0.104 |
| | | | Feed (mm/min) | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| | > 300 ≤ 400 | 15 | RPM | 1616 | 808 | 606 | 485 | 404 | 346 | 303 |
| | | (12-18) | Fr | 0.015 | 0.031 | 0.041 | 0.052 | 0.062 | 0.072 | 0.083 |
| | | | Feed (mm/min) | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| S TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V | ≤ 275 | 66 | RPM | 6947 | 3474 | 2605 | 2084 | 1737 | 1489 | 1303 |
| | | (52-79) | Fr | 0.040 | 0.079 | 0.106 | 0.132 | 0.158 | 0.185 | 0.211 |
| | | | Feed (mm/min) | 275 | 275 | 275 | 275 | 275 | 275 | 275 |
| | > 275 ≤ 350 | 49 | RPM | 5170 | 2585 | 1939 | 1551 | 1293 | 1108 | 969 |
| | | (39-59) | Fr | 0.039 | 0.077 | 0.103 | 0.129 | 0.155 | 0.181 | 0.206 |
| | | | Feed (mm/min) | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| > 350 ≤ 440 | 26 | RPM | 2747 | 1373 | 1030 | 824 | 687 | 589 | 515 | |
| | (21-31) | Fr | 0.029 | 0.058 | 0.078 | 0.097 | 0.117 | 0.136 | 0.155 | |
| | | Feed (mm/min) | 80 | 80 | 80 | 80 | 80 | 80 | 80 | |
| N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075 | ≤ 80 | 235 | RPM | 24882 | 12441 | 9331 | 7465 | 6220 | 5332 | 4665 |
| | | (188-282) | Fr | 0.118 | 0.237 | 0.316 | 0.395 | 0.473 | 0.552 | 0.631 |
| | | | Feed (mm/min) | 2945 | 2945 | 2945 | 2945 | 2945 | 2945 | 2945 |
| | > 80 | 201 | RPM | 21327 | 10664 | 7998 | 6398 | 5332 | 4570 | 3999 |
| | | (161-241) | Fr | 0.119 | 0.238 | 0.318 | 0.397 | 0.476 | 0.556 | 0.635 |
| | | | Feed (mm/min) | 2540 | 2540 | 2540 | 2540 | 2540 | 2540 | 2540 |
| N COPPER ALLOYS Alum Bronze, C110, Muntz Brass | ≤ 140 | 168 | RPM | 17773 | 8886 | 6665 | 5332 | 4443 | 3808 | 3332 |
| | | (134-201) | Fr | 0.048 | 0.096 | 0.128 | 0.159 | 0.191 | 0.223 | 0.255 |
| | | | Feed (mm/min) | 850 | 850 | 850 | 850 | 850 | 850 | 850 |
| | > 140 | 134 | RPM | 14218 | 7109 | 5332 | 4265 | 3555 | 3047 | 2666 |
| | | (107-161) | Fr | 0.048 | 0.096 | 0.128 | 0.161 | 0.193 | 0.225 | 0.257 |
| | | | Feed (mm/min) | 685 | 685 | 685 | 685 | 685 | 685 | 685 |

Note:

- rpm = (1000 x m / min) / (3.14 x D₁)
- mm / min = (mm / revolution) x rpm
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



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| Series 140 8D Fractional | Hardness (Brinell) | Vc (SFM) | Diameter (D ₁) (inch) | | | | | | | | |
|--|--|-------------|--------------------------------------|------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | | |
| P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536 | ≤ 175 | 405 | RPM | 12377 | 8251 | 6188 | 4126 | 3094 | 2475 | 2063 | |
| | | (324-486) | Fr | 0.0036 | 0.0053 | 0.0071 | 0.0107 | 0.0142 | 0.0178 | 0.0213 | |
| | | | Feed (IPM) | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 | 44.0 | |
| | > 175 ≤ 275 | 370 | RPM | 11307 | 7538 | 5654 | 3769 | 2827 | 2261 | 1885 | |
| | | (296-444) | Fr | 0.0030 | 0.0045 | 0.0060 | 0.0090 | 0.0120 | 0.0150 | 0.0180 | |
| | | | Feed (IPM) | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | 34.0 | |
| | > 275 ≤ 425 | 210 | RPM | 6418 | 4278 | 3209 | 2139 | 1604 | 1284 | 1070 | |
| | | (168-252) | Fr | 0.0026 | 0.0039 | 0.0051 | 0.0077 | 0.0103 | 0.0129 | 0.0154 | |
| | | | Feed (IPM) | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | 16.5 | |
| | P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100 | ≤ 275 | 320 | RPM | 9779 | 6519 | 4890 | 3260 | 2445 | 1956 | 1630 |
| | | | (256-384) | Fr | 0.0026 | 0.0038 | 0.0051 | 0.0077 | 0.0102 | 0.0128 | 0.0153 |
| | | | | Feed (IPM) | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 |
| > 275 ≤ 375 | | 190 | RPM | 5806 | 3871 | 2903 | 1935 | 1452 | 1161 | 968 | |
| | | (152-228) | Fr | 0.0020 | 0.0030 | 0.0040 | 0.0059 | 0.0079 | 0.0099 | 0.0119 | |
| | | | Feed (IPM) | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 | 11.5 | |
| > 375 ≤ 450 | | 135 | RPM | 4126 | 2750 | 2063 | 1375 | 1031 | 825 | 688 | |
| | | (108-162) | Fr | 0.0016 | 0.0024 | 0.0032 | 0.0047 | 0.0063 | 0.0079 | 0.0095 | |
| | | | Feed (IPM) | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | 6.5 | |
| P TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2 | | ≤ 200 | 140 | RPM | 4278 | 2852 | 2139 | 1426 | 1070 | 856 | 713 |
| | | | (112-168) | Fr | 0.0020 | 0.0030 | 0.0040 | 0.0060 | 0.0079 | 0.0099 | 0.0119 |
| | | | | Feed (IPM) | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 |
| | > 200 ≤ 375 | 90 | RPM | 2750 | 1834 | 1375 | 917 | 688 | 550 | 458 | |
| | | (72-108) | Fr | 0.0011 | 0.0016 | 0.0022 | 0.0033 | 0.0044 | 0.0055 | 0.0065 | |
| | | | Feed (IPM) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| | > 375 ≤ 475 | 80 | RPM | 2445 | 1630 | 1222 | 815 | 611 | 489 | 407 | |
| | | (64-96) | Fr | 0.0006 | 0.0009 | 0.0012 | 0.0018 | 0.0025 | 0.0031 | 0.0037 | |
| | | | Feed (IPM) | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | |
| | K CAST IRONS Gray, Malleable, Ductile | ≤ 220 | 350 | RPM | 10696 | 7131 | 5348 | 3565 | 2674 | 2139 | 1783 |
| | | | (280-420) | Fr | 0.0037 | 0.0056 | 0.0075 | 0.0112 | 0.0150 | 0.0187 | 0.0224 |
| | | | | Feed (IPM) | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 | 40.0 |
| > 220 ≤ 260 | | 310 | RPM | 9474 | 6316 | 4737 | 3158 | 2368 | 1895 | 1579 | |
| | | (248-372) | Fr | 0.0039 | 0.0059 | 0.0078 | 0.0117 | 0.0156 | 0.0195 | 0.0234 | |
| | | | Feed (IPM) | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | |
| M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F | ≤ 185 | 290 | RPM | 8862 | 5908 | 4431 | 2954 | 2216 | 1772 | 1477 | |
| | | (232-348) | Fr | 0.0020 | 0.0030 | 0.0039 | 0.0059 | 0.0079 | 0.0099 | 0.0118 | |
| | | | Feed (IPM) | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | |
| | > 185 ≤ 275 | 180 | RPM | 5501 | 3667 | 2750 | 1834 | 1375 | 1100 | 917 | |
| | | (144-216) | Fr | 0.0018 | 0.0027 | 0.0036 | 0.0055 | 0.0073 | 0.0091 | 0.0109 | |
| | | | Feed (IPM) | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | |
| M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450 | ≤ 275 | 130 | RPM | 3973 | 2649 | 1986 | 1324 | 993 | 795 | 662 | |
| | | (104-156) | Fr | 0.0018 | 0.0026 | 0.0035 | 0.0053 | 0.0070 | 0.0088 | 0.0106 | |
| | | | Feed (IPM) | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 | |
| | > 275 ≤ 375 | 95 | RPM | 2903 | 1935 | 1452 | 968 | 726 | 581 | 484 | |
| | | (76-114) | Fr | 0.0016 | 0.0023 | 0.0031 | 0.0047 | 0.0062 | 0.0078 | 0.0093 | |
| | | | Feed (IPM) | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | |

continued on next page

| Series 140 8D Fractional | Hardness (Brinell) | Vc (SFM) | Diameter (D ₁) (inch) | | | | | | | |
|---|-----------------------|-------------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|
| | | | 1/8 | 3/16 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | |
| S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy | ≤ 300 | 65 | RPM | 1986 | 1324 | 993 | 662 | 497 | 397 | 331 |
| | | (52-78) | Fr | 0.0009 | 0.0013 | 0.0017 | 0.0026 | 0.0034 | 0.0043 | 0.0051 |
| | | | Feed (IPM) | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 |
| | > 300 ≤ 400 | 35 | RPM | 1070 | 713 | 535 | 357 | 267 | 214 | 178 |
| | | (28-42) | Fr | 0.0006 | 0.0008 | 0.0011 | 0.0017 | 0.0022 | 0.0028 | 0.0034 |
| | | | Feed (IPM) | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| S TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V | ≤ 275 | 185 | RPM | 5654 | 3769 | 2827 | 1885 | 1413 | 1131 | 942 |
| | | (148-222) | Fr | 0.0016 | 0.0024 | 0.0032 | 0.0048 | 0.0064 | 0.0080 | 0.0096 |
| | | | Feed (IPM) | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 | 9.0 |
| | > 275 ≤ 350 | 140 | RPM | 4278 | 2852 | 2139 | 1426 | 1070 | 856 | 713 |
| | | (112-168) | Fr | 0.0012 | 0.0018 | 0.0023 | 0.0035 | 0.0047 | 0.0058 | 0.0070 |
| | | | Feed (IPM) | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| > 350 ≤ 440 | 75 | RPM | 2292 | 1528 | 1146 | 764 | 573 | 458 | 382 | |
| | (60-90) | Fr | 0.0010 | 0.0015 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 | |
| | | Feed (IPM) | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | |
| N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075 | ≤ 80 | 730 | RPM | 22309 | 14873 | 11154 | 7436 | 5577 | 4462 | 3718 |
| | | (584-876) | Fr | 0.0045 | 0.0067 | 0.0090 | 0.0134 | 0.0179 | 0.0224 | 0.0269 |
| | | | Feed (IPM) | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| | > 80 | 635 | RPM | 19406 | 12937 | 9703 | 6469 | 4851 | 3881 | 3234 |
| | | (508-762) | Fr | 0.0046 | 0.0070 | 0.0093 | 0.0139 | 0.0186 | 0.0232 | 0.0278 |
| | | | Feed (IPM) | 90.0 | 90.0 | 90.0 | 90.0 | 90.0 | 90.0 | 90.0 |
| N COPPER ALLOYS Alum Bronze, C110, Muntz Brass | ≤ 100 | 255 | RPM | 7793 | 5195 | 3896 | 2598 | 1948 | 1559 | 1299 |
| | | (204-306) | Fr | 0.0018 | 0.0027 | 0.0036 | 0.0054 | 0.0072 | 0.0090 | 0.0108 |
| | | | Feed (IPM) | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| | ≤ 200 | 235 | RPM | 7182 | 4788 | 3591 | 2394 | 1795 | 1436 | 1197 |
| | | (188-282) | Fr | 0.0018 | 0.0027 | 0.0036 | 0.0054 | 0.0072 | 0.0091 | 0.0109 |
| | | | Feed (IPM) | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 | 13.0 |

Note:

- rpm = sfm x 3.82 / D₁
- ipm = (inch / revolution) x rpm
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



Tool Wizard
CALCULATE APPLICATION PARAMETERS

www.sgstool.com

| Series 140M 8D Metric | Hardness (Brinell) | Vc (m/min) | Diameter (D ₁) (mm) | | | | | | | | |
|--|--|---------------|------------------------------------|---------------|-------|-------|-------|-------|-------|--------|-------|
| | | | 3 | 6 | 8 | 10 | 12 | 14 | 16 | | |
| P CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536 | ≤ 175 | 123 | RPM | 13087 | 6544 | 4908 | 3926 | 3272 | 2804 | 2454 | |
| | | (100-170) | Fr | 0.085 | 0.171 | 0.228 | 0.285 | 0.342 | 0.399 | 0.455 | |
| | | | Feed (mm/min) | 1118 | 1118 | 1118 | 1118 | 1118 | 1118 | 1118 | |
| | > 175 ≤ 275 | 113 | RPM | 11956 | 5978 | 4484 | 3587 | 2989 | 2562 | 32 | |
| | | (90-135) | Fr | 0.072 | 0.144 | 0.193 | 0.241 | 0.289 | 0.337 | 26.908 | |
| | | | Feed (mm/min) | 864 | 864 | 864 | 864 | 864 | 864 | 864 | |
| | > 275 ≤ 425 | 64 | RPM | 6786 | 3393 | 2545 | 2036 | 1696 | 1454 | 1272 | |
| | | (51-77) | Fr | 0.062 | 0.124 | 0.165 | 0.206 | 0.247 | 0.288 | 0.329 | |
| | | | Feed (mm/min) | 419 | 419 | 419 | 419 | 419 | 419 | 419 | |
| | P ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100 | ≤ 275 | 98 | RPM | 10340 | 5170 | 3878 | 3102 | 2585 | 2216 | 1939 |
| | | | (78-117) | Fr | 0.061 | 0.123 | 0.164 | 0.205 | 0.246 | 0.287 | 0.328 |
| | | | | Feed (mm/min) | 635 | 635 | 635 | 635 | 635 | 635 | 635 |
| > 275 ≤ 375 | | 58 | RPM | 6140 | 3070 | 2302 | 1842 | 1535 | 1316 | 1151 | |
| | | (46-69) | Fr | 0.048 | 0.095 | 0.127 | 0.159 | 0.190 | 0.222 | 0.254 | |
| | | | Feed (mm/min) | 292 | 292 | 292 | 292 | 292 | 292 | 292 | |
| > 375 ≤ 450 | | 41 | RPM | 4362 | 2181 | 1636 | 1309 | 1091 | 935 | 818 | |
| | | (33-49) | Fr | 0.038 | 0.076 | 0.101 | 0.126 | 0.151 | 0.177 | 0.202 | |
| | | | Feed (mm/min) | 165 | 165 | 165 | 165 | 165 | 165 | 165 | |
| P TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2 | | ≤ 200 | 43 | RPM | 4524 | 2262 | 1696 | 1357 | 1131 | 969 | 848 |
| | | | (34-51) | Fr | 0.048 | 0.095 | 0.127 | 0.159 | 0.191 | 0.223 | 0.255 |
| | | | | Feed (mm/min) | 216 | 216 | 216 | 216 | 216 | 216 | 216 |
| | > 200 ≤ 375 | 27 | RPM | 2908 | 1454 | 1091 | 872 | 727 | 623 | 545 | |
| | | (22-33) | Fr | 0.026 | 0.052 | 0.070 | 0.087 | 0.105 | 0.122 | 0.140 | |
| | | | Feed (mm/min) | 76 | 76 | 76 | 76 | 76 | 76 | 76 | |
| | > 375 ≤ 475 | 24 | RPM | 2585 | 1293 | 969 | 776 | 646 | 554 | 485 | |
| | | (20-29) | Fr | 0.015 | 0.029 | 0.039 | 0.049 | 0.059 | 0.069 | 0.079 | |
| | | | Feed (mm/min) | 38 | 38 | 38 | 38 | 38 | 38 | 38 | |
| | K CAST IRONS Gray, Malleable, Ductile | ≤ 220 | 107 | RPM | 11310 | 5655 | 4241 | 3393 | 2827 | 2424 | 2121 |
| | | | (85-128) | Fr | 0.090 | 0.180 | 0.240 | 0.299 | 0.359 | 0.419 | 0.479 |
| | | | | Feed (mm/min) | 1016 | 1016 | 1016 | 1016 | 1016 | 1016 | 1016 |
| > 220 ≤ 260 | | 94 | RPM | 10017 | 5009 | 3756 | 3005 | 2504 | 2147 | 1878 | |
| | | (76-113) | Fr | 0.094 | 0.188 | 0.250 | 0.313 | 0.375 | 0.438 | 0.500 | |
| | | | Feed (mm/min) | 940 | 940 | 940 | 940 | 940 | 940 | 940 | |
| M STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F | ≤ 185 | 88 | RPM | 9371 | 4686 | 3514 | 2811 | 2343 | 2008 | 1757 | |
| | | (71-106) | Fr | 0.047 | 0.095 | 0.126 | 0.158 | 0.190 | 0.221 | 0.253 | |
| | | | Feed (mm/min) | 445 | 445 | 445 | 445 | 445 | 445 | 445 | |
| | > 185 ≤ 275 | 55 | RPM | 5816 | 2908 | 2181 | 1745 | 1454 | 1246 | 1091 | |
| | | (44-66) | Fr | 0.044 | 0.087 | 0.116 | 0.146 | 0.175 | 0.204 | 0.233 | |
| | | | Feed (mm/min) | 254 | 254 | 254 | 254 | 254 | 254 | 254 | |
| M STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, CUSTOM 450 | ≤ 275 | 40 | RPM | 4201 | 2100 | 1575 | 1260 | 1050 | 900 | 788 | |
| | | (32-48) | Fr | 0.042 | 0.085 | 0.113 | 0.141 | 0.169 | 0.198 | 0.226 | |
| | | | Feed (mm/min) | 178 | 178 | 178 | 178 | 178 | 178 | 178 | |
| | > 275 ≤ 375 | 29 | RPM | 3070 | 1535 | 1151 | 921 | 767 | 658 | 576 | |
| | | (23-35) | Fr | 0.037 | 0.074 | 0.099 | 0.124 | 0.149 | 0.174 | 0.199 | |
| | | | Feed (mm/min) | 114 | 114 | 114 | 114 | 114 | 114 | 114 | |

continued on next page

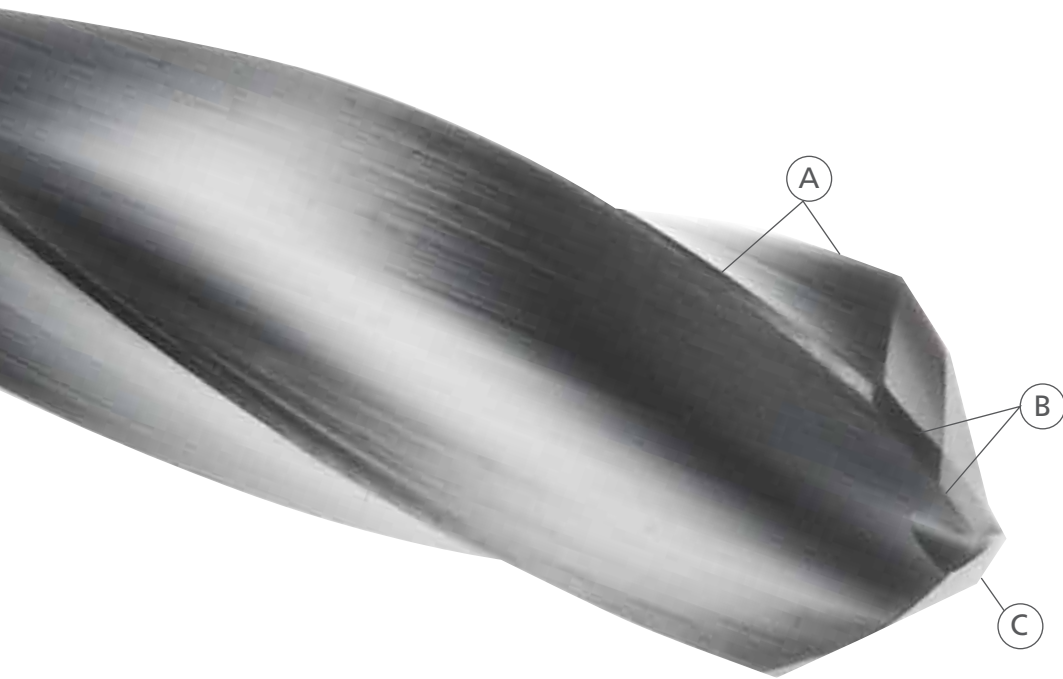
| Series 140M 8D Metric | Hardness (Brinell) | Vc (m/min) | Diameter (D ₁) (mm) | | | | | | | |
|---|-----------------------|---------------|------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| | | | 3 | 6 | 8 | 10 | 12 | 14 | 16 | |
| S SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoloy, Monel 400, Rene, Waspaloy | ≤ 300 | 20 | RPM | 2100 | 1050 | 788 | 630 | 525 | 450 | 394 |
| | | (16-24) | Fr | 0.021 | 0.041 | 0.055 | 0.069 | 0.082 | 0.096 | 0.110 |
| | | | Feed (mm/min) | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| | > 300 ≤ 400 | 11 | RPM | 1131 | 565 | 424 | 339 | 283 | 242 | 212 |
| | | (9-13) | Fr | 0.013 | 0.027 | 0.036 | 0.045 | 0.054 | 0.063 | 0.072 |
| | | | Feed (mm/min) | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| S TITANIUM ALLOYS Pure Titanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V | ≤ 275 | 56 | RPM | 5978 | 2989 | 2242 | 1793 | 1495 | 1281 | 1121 |
| | | (45-68) | Fr | 0.038 | 0.076 | 0.102 | 0.127 | 0.153 | 0.178 | 0.204 |
| | | | Feed (mm/min) | 229 | 229 | 229 | 229 | 229 | 229 | 229 |
| | > 275 ≤ 350 | 43 | RPM | 4524 | 2262 | 1696 | 1357 | 1131 | 969 | 848 |
| | | (34-51) | Fr | 0.028 | 0.056 | 0.075 | 0.094 | 0.112 | 0.131 | 0.150 |
| | | | Feed (mm/min) | 127 | 127 | 127 | 127 | 127 | 127 | 127 |
| > 350 ≤ 440 | 23 | RPM | 2424 | 1212 | 909 | 727 | 606 | 519 | 454 | |
| | (18-27) | Fr | 0.024 | 0.048 | 0.064 | 0.080 | 0.096 | 0.112 | 0.129 | |
| | | Feed (mm/min) | 58 | 58 | 58 | 58 | 58 | 58 | 58 | |
| N ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075 | ≤ 80 | 223 | RPM | 23589 | 11795 | 8846 | 7077 | 5897 | 5055 | 4423 |
| | | (178-267) | Fr | 0.108 | 0.215 | 0.287 | 0.359 | 0.431 | 0.502 | 0.574 |
| | | | Feed (mm/min) | 2540 | 2540 | 2540 | 2540 | 2540 | 2540 | 2540 |
| | > 80 | 194 | RPM | 20519 | 10260 | 7695 | 6156 | 5130 | 4397 | 3847 |
| | | (155-232) | Fr | 0.111 | 0.223 | 0.297 | 0.371 | 0.446 | 0.520 | 0.594 |
| | | | Feed (mm/min) | 2286 | 2286 | 2286 | 2286 | 2286 | 2286 | 2286 |
| N COPPER ALLOYS Alum Bronze, C110, Muntz Brass | ≤ 140 | 78 | RPM | 8240 | 4120 | 3090 | 2472 | 2060 | 1766 | 1545 |
| | | (62-93) | Fr | 0.043 | 0.086 | 0.115 | 0.144 | 0.173 | 0.201 | 0.230 |
| | | | Feed (mm/min) | 356 | 356 | 356 | 356 | 356 | 356 | 356 |
| | > 140 | 72 | RPM | 7594 | 3797 | 2848 | 2278 | 1898 | 1627 | 1424 |
| | | (57-86) | Fr | 0.043 | 0.087 | 0.116 | 0.145 | 0.174 | 0.203 | 0.232 |
| | | | Feed (mm/min) | 330 | 330 | 330 | 330 | 330 | 330 | 330 |

Note:

- rpm = (1000 x m / min) / (3.14 x D₁)
- mm / min = (mm / revolution) x rpm
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



www.sgstool.com



SERIES 120 COMPOSITE DRILL

The key features of the 8 Facet Double Angle Series 120 drill design offers application benefits beyond that of other high performance drills in its category. Each feature of this 8 facet design was engineered as a solution towards addressing the issues commonly encountered during Composite drilling. This unique High Performance design successfully creates an accurate hole without splintering or delamination.

- A** DOUBLE MARGIN CONSTRUCTION
 - improves drill stability for better hole finish and size control
 - allows coolant to reach the point for improved hole quality and extended tool life
- B** DOUBLE ANGLE POINT
 - minimizes workpiece delamination on drill entry and exit
 - redistributes loads along multiple cutting edges for improved performance
- C** NOTCHED POINT
 - reduces cutting forces at the drill center for enhanced performance and tool life
 - manufactured exclusively with Di-NAMITE coating for even wear, extended tool life, and improved finishes.

PERFORMANCE. PRECISION. PASSION.
WITH SERIES 120 COMPOSITE DRILL

PERFORMANCE.

- Double margin construction design stabilized the drill for greater hole accuracy and improved surface finish in final hole.
- Minimized delamination at hole entry/exit.
- Manufactured exclusively with Di-NAMITE coating for even wear, extended tool life and improved finishes.



Di-NAMITE[®]
CRYSTALLINE DIAMOND COATING

PRECISION.

A test was conducted of our CFRP drill to determine the necessity of coating when drilling Carbon Fiber material. Fifty holes were drilled using a special size .190" CFRP drill. The tool's design produces acceptable quality holes; but as shown in the photos, early edge wear on the uncoated drill resulted in holes with frayed edges. The diamond coated drill produced all 50 holes with little to no fraying and edge wear was 38% less than the uncoated drills.

The geometry of the 8 Facet drill with the Di-NAMITE coating is a necessity for additional tool life and productivity when manufacturing Carbon Fiber material.

PASSION.

- The compound angle creates 4 cutting edges along the drill point.
- Distinct double angle prevents abrasiveness of the Composite from localizing along the point and diminishing tool life.

SPEED

5,000 rpm

FEED

5.0 ipm

DIAMETER

.190"

HOLE DEPTH

.240"

WORKPIECE

CFRP

MACHINE TYPE

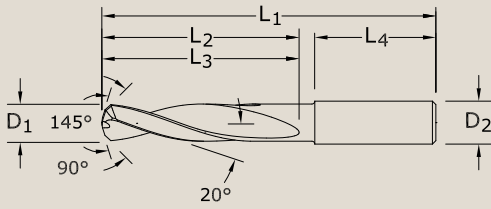
Vertical Machining Center

COOLANT

none

| TOOL NO. | TYPE DESCRIPTION | TIR IN MACHINE | USAGE |
|---|---------------------------|--|---|
| 1 | .190" CFRP drill uncoated | .0001" | 50 holes |
| INSPECTION NOTES | | Good hole quality for 1st 3 holes. fraying starting by 3rd hole, .0021" wear | |
| 1ST HOLE | | 3RD HOLE | 50TH HOLE |
| AFTER 50 HOLES | | | |
|  | |  |  |
|  | | | |

| TOOL NO. | TYPE DESCRIPTION | TIR IN MACHINE | USAGE |
|--|--------------------------|---|--|
| 2 | .190" CFRP drill diamond | .0002" | 50 holes |
| INSPECTION NOTES | | Good hole quality all 50 holes slight fraying, .0013" wear | |
| 1ST HOLE | | 25TH HOLE | 50TH HOLE |
| AFTER 50 HOLES | | | |
|  | |  |  |
|  | | | |



TOLERANCES (inch)

| DIAMETER | D ₁ | D ₂ |
|----------|-------------------|----------------|
| #40-1/2 | +0.0000 / -0.0005 | h6 |

TOLERANCES (mm)

| DIAMETER | D ₁ | D ₂ |
|----------|-----------------|----------------|
| 2,7-12 | +0,000 / -0,013 | h6 |

SERIES 120

| Cutting Diameter D ₁ | Decimal Equivalent | Shank Diameter D ₂ | Overall Length L ₁ | Flute Length L ₂ / L ₃ | Shank Length L ₄ | Di-NAMITE (TD) EDP No. |
|---------------------------------|--------------------|-------------------------------|-------------------------------|--|-----------------------------|------------------------|
| #40 | 0.0980 | 1/8 | 2 | 9/16 | 1-1/4 | 50000 |
| 2,7 mm | 0.1063 | 6,0 | 63,0 | 20,0 | 32,0 | 50001 |
| 3,0 mm | 0.1181 | 6,0 | 63,0 | 20,0 | 36,0 | 50002 |
| 1/8 | 0.1250 | 1/4 | 2-1/2 | 3/4 | 1-7/16 | 50003 |
| 3,2 mm | 0.1260 | 6,0 | 63,0 | 20,0 | 36,0 | 50004 |
| #30 | 0.1285 | 1/4 | 2-1/2 | 3/4 | 1-7/16 | 50005 |
| #28 | 0.1405 | 1/4 | 2-1/2 | 3/4 | 1-7/16 | 50006 |
| #22 | 0.1570 | 1/4 | 2-5/8 | 7/8 | 1-7/16 | 50007 |
| #21 | 0.1590 | 1/4 | 2-5/8 | 7/8 | 1-7/16 | 50008 |
| 4,1 mm | 0.1614 | 6,0 | 66,0 | 24,0 | 36,0 | 50009 |
| #19 | 0.1660 | 1/4 | 2-5/8 | 7/8 | 1-7/16 | 50010 |
| 11/64 | 0.1719 | 1/4 | 2-5/8 | 7/8 | 1-7/16 | 50011 |
| 3/16 | 0.1875 | 1/4 | 2-5/8 | 1 | 1-7/16 | 50012 |
| #11 | 0.1910 | 1/4 | 2-5/8 | 1 | 1-7/16 | 50013 |
| #8 | 0.1990 | 1/4 | 2-5/8 | 1 | 1-7/16 | 50014 |
| #7 | 0.2010 | 1/4 | 2-5/8 | 1 | 1-7/16 | 50015 |
| #2 | 0.2210 | 1/4 | 2-5/8 | 1 | 1-7/16 | 50016 |
| 6,0 mm | 0.2362 | 6,0 | 66,0 | 28,0 | 36,0 | 50017 |
| 1/4 | 0.2500 | 1/4 | 3-1/8 | 1-5/16 | 1-7/16 | 50018 |
| .2510 | 0.2510 | 5/16 | 3-1/8 | 1-5/16 | 1-7/16 | 50019 |
| F | 0.2570 | 5/16 | 3-1/8 | 1-5/16 | 1-7/16 | 50020 |
| I | 0.2720 | 5/16 | 3-1/8 | 1-5/16 | 1-7/16 | 50021 |
| J | 0.2770 | 5/16 | 3-1/8 | 1-5/16 | 1-7/16 | 50022 |
| K | 0.2810 | 5/16 | 3-1/8 | 1-9/16 | 1-7/16 | 50023 |
| 5/16 | 0.3125 | 5/16 | 3-1/8 | 1-9/16 | 1-7/16 | 50024 |
| 8,0 mm | 0.3150 | 8,0 | 79,0 | 41,0 | 36,0 | 50025 |
| 3/8 | 0.3750 | 3/8 | 3-1/2 | 1-27/32 | 1-9/16 | 50026 |
| V | 0.3770 | 1/2 | 3-1/2 | 1-27/32 | 1-9/16 | 50027 |
| 10,0 mm | 0.3937 | 10,0 | 89,0 | 47,0 | 40,0 | 50028 |
| 7/16 | 0.4375 | 1/2 | 4-1/4 | 2-3/16 | 1-9/16 | 50029 |
| 12,0 mm | 0.4724 | 12,0 | 102,0 | 55,0 | 45,0 | 50030 |
| 1/2 | 0.5000 | 1/2 | 4-1/4 | 2-5/16 | 1-3/4 | 50031 |

| Series 120 Fractional | Vc (SFM) | | Diameter (D ₁) (inch) | | | | | | |
|---|-------------|------------|--------------------------------------|--------|--------|--------|--------|--------|--------|
| | | | 1/8 | 3/16 | 1/4 | 5/16 | 3/8 | 7/16 | 1/2 |
| CFRP, AFRP (CARBON FIBER, ARAMID FIBER) | 320 | RPM | 9779 | 6519 | 4890 | 3912 | 3260 | 2794 | 2445 |
| | (256-384) | Fr | 0.0006 | 0.0008 | 0.0012 | 0.0015 | 0.0018 | 0.0021 | 0.0024 |
| | | Feed (IPM) | 5.9 | 5.2 | 5.9 | 5.9 | 5.9 | 5.9 | 5.9 |
| GFRP (FIBERGLASS) | 240 | RPM | 7334 | 4890 | 3667 | 2934 | 2445 | 2096 | 1834 |
| | (192-288) | Fr | 0.0006 | 0.0008 | 0.0012 | 0.0015 | 0.0018 | 0.0021 | 0.0024 |
| | | Feed (IPM) | 4.4 | 3.9 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| CARBON, GRAPHITE | 400 | RPM | 12224 | 8149 | 6112 | 4890 | 4075 | 3493 | 3056 |
| | (320-480) | Fr | 0.0008 | 0.0012 | 0.0016 | 0.0020 | 0.0024 | 0.0028 | 0.0032 |
| | | Feed (IPM) | 9.8 | 9.8 | 9.8 | 9.8 | 9.8 | 9.8 | 9.8 |

Note:

- rpm = sfm x 3.82 / D₁
- ipm = (inch / revolution) x rpm
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

| Series 120 Metric | Vc (m/min) | | Diameter (D ₁) (mm) | | | | | | |
|---|---------------|---------------|------------------------------------|-------|-------|-------|-------|-------|-------|
| | | | 2.5 | 3 | 4 | 6 | 8 | 10 | 12 |
| CFRP, AFRP (CARBON FIBER, ARAMID FIBER) | 100 | RPM | 12722 | 10602 | 7951 | 5301 | 3976 | 3181 | 2650 |
| | (80-120) | Fr | 0.015 | 0.018 | 0.020 | 0.030 | 0.038 | 0.046 | 0.053 |
| | | Feed (mm/min) | 191 | 191 | 159 | 159 | 151 | 146 | 140 |
| GFRP (FIBERGLASS) | 75 | RPM | 9542 | 7951 | 5963 | 3976 | 2982 | 2385 | 1988 |
| | (65-90) | Fr | 0.015 | 0.018 | 0.020 | 0.030 | 0.038 | 0.046 | 0.053 |
| | | Feed (mm/min) | 143 | 143 | 119 | 119 | 113 | 110 | 105 |
| CARBON, GRAPHITE | 120 | RPM | 15266 | 12722 | 9542 | 6361 | 4771 | 3817 | 3181 |
| | (96-144) | Fr | 0.020 | 0.024 | 0.030 | 0.041 | 0.051 | 0.061 | 0.071 |
| | | Feed (mm/min) | 305 | 305 | 286 | 261 | 243 | 233 | 226 |

Note:

- rpm = (1000 x m / min) / (3.14 x D₁)
- mm / min = (mm / revolution) x rpm
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



Tool Wizard
CALCULATE APPLICATION PARAMETERS

www.sgstool.com