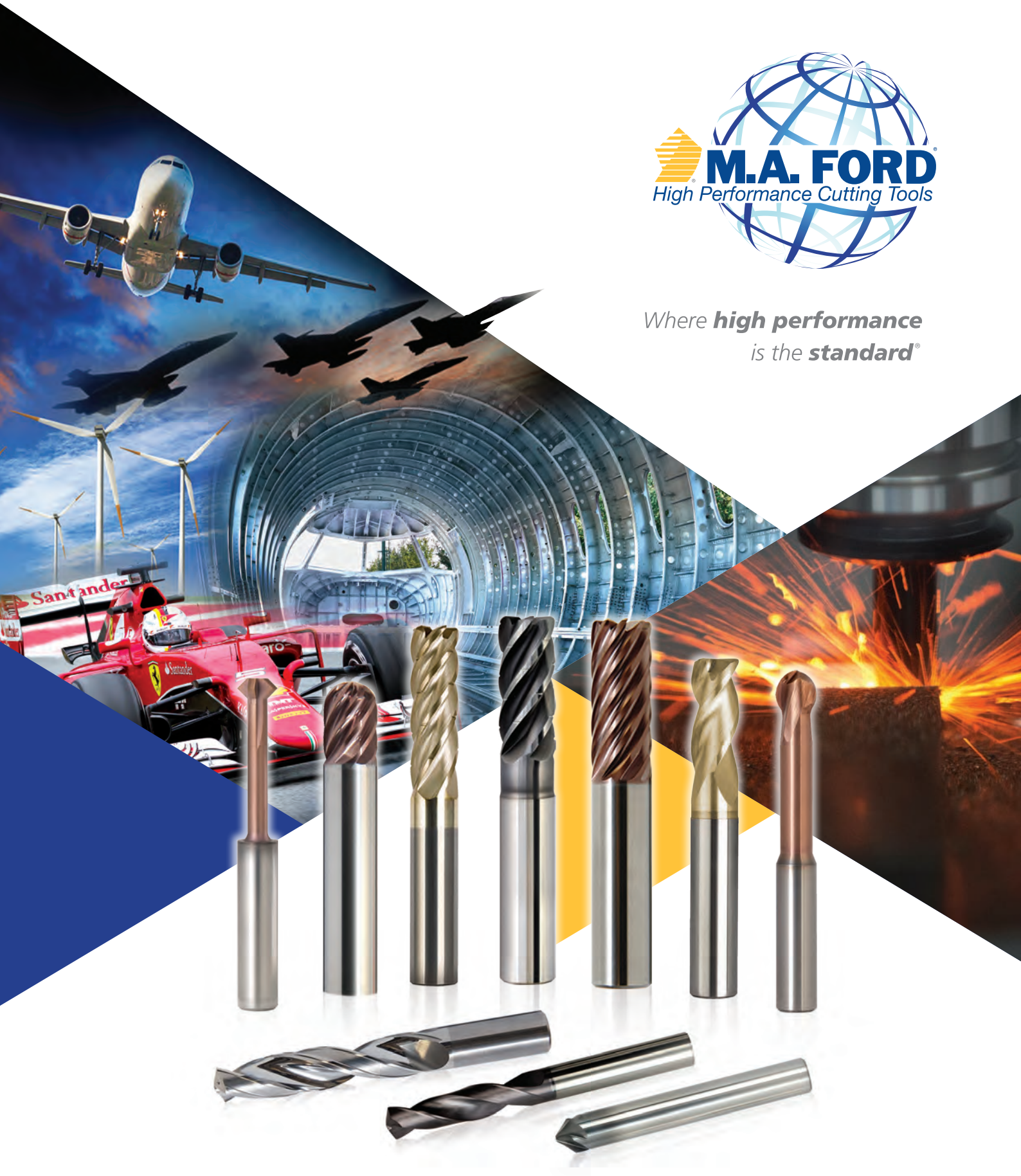
M.A. FORD
High Performance Cutting Tools

*Where **high performance** is the **standard***®




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UKAS MANAGEMENT SYSTEMS

# *Product Catalogue*

*Issue 4*

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M.A. FORD
High Performance Cutting Tools

*Where **high performance** is the **standard***®




Innovation is what drives us. Actively searching for fresh solutions to new technical and manufacturing challenges that enable our customers to improve productivity, accuracy and performance by relying on M.A.Ford® to deliver.

Our extensive range of tooling and 'Integrated Manufacturing Solutions' has developed and evolved to become a virtual byword for precision and performance. The principles of high precision and high quality extend beyond our tooling and are present in every aspect of M.A.Ford® Europe to ensure customer demands are consistently met at all levels.

"L'innovation est ce qui nous motive. Nous sommes constamment à la recherche de solutions techniques et d'usinage innovantes qui permettront à nos clients de surmonter les nouveaux défis dans le but d'améliorer la productivité, la précision et la performance tout en comptant sur M.A.Ford® pour répondre à leurs attentes.

Notre large gamme d'outils et de "Solutions d'Usinage Intégrées" a évolué au fil des années pour devenir à présent unsynonyme de précision et de performance. Les valeurs de haute précision et de qualité haut de gamme vont au-delà de nos outils et sont présents dans chacun des aspects de M.A.Ford® Europe, nous donnant ainsi l'assurance que les exigences des consommateurs soient respectées à tous les niveaux."

Innovation ist unsere Antriebskraft. Wir suchen aktiv nach bahnbrechenden Lösungen zu neuen Herausforderungen in den Bereichen Technik und Fertigung. Auf diese Weise ermöglichen wir unseren Kunden, ihre Produktivität, Präzision und Leistungsfähigkeit zu verbessern und sich dabei voll und ganz auf M.A.Ford® zu verlassen.

Unser umfangreiches Sortiment an Werkzeugausstattungen und "integrierten Herstellungslösungen" hat sich quasi zu einem Inbegriff für Präzision und Leistungsfähigkeit entwickelt. Die Grundsätze der hohen Präzision und hochwertigen Qualität gehen weit über unsere Werkzeugausstattung hinaus und durchziehen jeden Aspekt von M.A.Ford® Europe. So stellen wir sicher, dass wir den Anforderungen unserer Kunden stets auf allen Ebenen gerecht werden.

L'innovazione è il nostro motore. La continua ricerca di soluzioni innovative per le nuove sfide tecniche e produttive, che permettono ai nostri clienti di migliorare la produttività, la precisione e la performance sapendo di poter contare su M.A.Ford®.

La nostra vasta gamma di utensili e soluzioni integrate per la produzione si è sviluppata ed evoluta fino a diventare sinonimo di precisione e prestazioni. Alta qualità e precisione sono i principi su cui si basa ogni aspetto della filosofia di M.A.Ford® Europe, che si estende al di là dei nostri utensili, per assicurare che le richieste dei nostri clienti siano costantemente soddisfatte a tutti i livelli.

Innowacyjność to jest to, co nas napędza. Aktywnie poszukujemy rozwiązań dla nowych wymagań technicznych i produkcyjnych, które umożliwiają naszym klientom poprawę produktywności, dokładności i wydajności, dzięki wdrażaniu produktów firmy M.A.Ford®.

Zintegrowane rozwiązania produkcyjne w połączeniu z naszą szeroką ofertą narzędzi stały się synonimem dla precyzji i wydajności Precyzja i wysoka jakość łączy się w naszych narzędziach i są obecne w każdym detalu firmy M.A.Ford® Europe, aby spełniać wymagania wszystkich naszych klientów.


intertek
CERTIFICATE
OF REGISTRATION
M.A. Ford Europe Limited
ISO 9001:2015

www.mafordeurope.com Tel: +44 (0) 1332 267960 Email: sales@mafordeurope.com

**M.A. Ford®**
Achieving the outstanding cutting speeds, tool life, finish quality and overall manufacturing performance that our tooling delivers is a result of more than 100 years of experience, dedication and expertise, which has enabled us to build an enviable global reputation for performance and precision.

Every product in our range is designed to perform beyond expectations, whilst our constant process of innovative design and technological development ensures that we constantly push the boundaries of tool performance for the ultimate benefit of our customers.

(FR)

**M.A. Ford®**
"Atteindre une vitesse de coupe exceptionnelle, une longue durée de vie, une qualité de finition et une performance d'usinage générale, délivrée par nos outils, est le résultat de 100 ans d'expérience, de passion et d'expertise, qui nous ont permis de construire une enviable réputation mondiale basée sur la performance et la précision.

Chaque produit de notre gamme est conçu pour atteindre des résultats allant au-delà des attentes et notre processus permanent de conception innovante et de développement technologique nous permet de repousser constamment les limites de performance des outils dans le but de donner toujours plus d'avantages à nos clients."

(DE)

**M.A. Ford®**
Die ausgezeichnete Schnittgeschwindigkeit, Werkzeugstandzeit, Oberflächenqualität und Gesamtfertigungsleistung unserer Werkzeuge sind das Ergebnis von über 100 Jahren Erfahrung, Engagement und Fachkompetenz, wodurch wir in der Lage waren, uns weltweit einen hervorragenden Ruf in Bezug auf Leistungsfähigkeit und Präzision zu verschaffen.

Jedes Produkt in unserem Sortiment wird mit dem Ziel konzipiert, die Erwartungen hinsichtlich der Leistungsfähigkeit zu übertreffen. Gleichzeitig ermöglicht uns der fortlaufende Prozess des innovativen Designs und der technologischen Entwicklung, stets die Möglichkeiten der Werkzeugleistung zum höchsten Nutzen unserer Kunden zu überschreiten.

(IT)

**M.A. Ford®**
Il raggiungimento di eccezionali velocità di taglio, la durata degli utensili, la qualità della finitura e le prestazioni che i nostri utensili offrono sono frutto di oltre 100 anni di esperienza, dedizione e competenza che ci hanno permesso di costruire una reputazione invidiabile a livello globale per prestazioni e precisione.

Ciascun prodotto della nostra gamma è progettato per offrire prestazioni al di là delle aspettative, il nostro processo di progettazione e sviluppo tecnologico è in continua innovazione e fa si che limiti delle prestazioni degli utensili vengano spinti sempre più avanti, per offrire il massimo beneficio ai nostri clienti.

(PL)

**M.A. Ford®**
Osiągnięcie doskonałych prędkości skrawania, trwałości narzędzia, jakości wykończenia i ogólnej wydajności produkcji, jaką zapewniają nasze narzędzia, jest wynikiem ponad 100-letniego doświadczenia, poświęcenia i wiedzy specjalistycznej, która pozwoliła nam zbudować godną pozazdroszczenia reputację w zakresie wydajności i precyzji.

Każdy produkt w naszej ofercie zaprojektowany jest powyżej oczekiwań naszych klientów. Proces innowacyjnego projektowania i rozwoju technologicznego zapewnia, że stale podnosimy granice wydajności narzędzi, co zapewnia naszym klientom najwyższa jakość.

## New Products


### Carbide End Mills

| | Page |
|---|---|
| APG TuffCut® XR - XT | 16 - 44 |
| APG TuffCut® X - AL | 45 - 62 |
| Technical Information | 63 - 79 |
| FORDMAX Carbide End Mills | 81 - 95 |
| FORDMAX Carbide End Mills For Aluminium | 96 - 98 |
| Technical Information | 99 - 106 |

### Routers

| | |
|---|---|
| APG Diamond Grind Routers | 107 - 108 |
| Technical Information | 109 |
| FORDMAX Diamond Grind Routers | 110 - 111 |
| Technical Information | 112 |

### Drills

| | |
|---|---|
| APG High Performance Drills | 113 - 144 |
| Technical Information | 145 - 156 |
| FORDMAX General Purpose Drills | 157 - 179 |
| Technical Information | 180 - 184 |

### Reamers

| | |
|---|---|
| FORDMAX Reamers | 185 - 195 |
| Technical Information | 196 |

### Countersinks

| | |
|---|---|
| FORDMAX Countersinks | 197 - 205 |
| Technical Information | 206 - 208 |

### Burrs

| | |
|---|---|
| FORDMAX Carbide Burrs | 209 - 222 |
| Technical Information | 223 - 224 |

## TuffCut® X-AL
### Series 137V5

- Vari-Helix 5 flute design enables high feed rates with reduced vibration for stable machining
- Fordlube coating prevents built up edge and increases tool-life
- Chipbreaker technology ensures excellent chip management and safer process
- Through coolant feature for rapid chip evacuation in pocketing applications




## TuffCut® XT9
### Series 380CB

- Uneven 9 flute design offers high feed rates with reduced harmonics for stable machining
- ALtima® Xtreme coating provides excellent high heat and wear resistance
- Staggered chipbreaker technology reduces cutting forces and improves chip management




## TuffCut® XT9
### Series 380L

- Stiff core technology reduces deflection for long reach applications
- Uneven 9 flute design offers high feed rates with reduced harmonics for stable machining
- ALtima® Xtreme coating provides excellent high heat and wear resistance
- 4 and 5xØ long flute versions to suit long reach profiling applications




## TuffCut® XT9
### Series 380CB L

- Stiff core technology reduces deflection for long reach applications
- Uneven 9 flute design offers high feed rates with reduced harmonics for stable machining
- ALtima® Xtreme coating provides excellent high heat and wear resistance
- 4 and 5xØ long flute versions to suit long reach profiling applications




## TuffCut® XT9
### Series 380 N4 - N5

- Stiff core technology reduces deflection for long reach applications
- Uneven 9 flute design offers high feed rates with reduced harmonics for stable machining
- ALtima® Xtreme coating provides excellent high heat and wear resistance
- 4 and 5xØ reach necked versions to suit long reach profiling applications
- Staggered chipbreaker technology reduces cutting forces and improves chip management




## TuffCut® XT9
### Series 380CB N4 - N5

- Stiff core technology reduces deflection for long reach applications
- Uneven 9 flute design offers high feed rates with reduced harmonics for stable machining
- ALtima® Xtreme coating provides excellent high heat and wear resistance
- 4 and 5xØ reach necked versions to suit long reach profiling applications
- Staggered chipbreaker technology reduces cutting forces and improves chip management



## TuffCut® GP
### Series FBPM

- 254° Spherical Ball designed for 5 axis machining, undercutting and deburring
- ALtima® Xtreme coating works in wide range of material groups




## TuffCut® GP
### Series FBCM

- Multi flutes for increased feed and improved surface finish
- Dual angled cutting edges deburrs and chamfers front and back of surfaces
- ALtima® Xtreme coating works in wide range of material groups




## TuffCut® 3D
### Series 250

- High performance geometry for roughing and finishing applications
- Radius tolerance + 0.010mm for accurate finishing in 3D shapes
- ALtima® Blaze coating for machining hardened steels <50HRC - alloy steel - stainless steel - titanium
- Economical price level reduces tooling costs




## TuffCut®
### Series 5HC

- Helical flute form gives a smooth cutting action, higher feed and improved surface finish
- Precision flat tip diameter for increased strength, easy programming and excellent repeatability
- ALtima® Blaze coating works in extensive material range and offers increased tool-life




## TuffCut® X-AL
### Series 137V N3, N4 & N5 AL

Designed to deliver exceptional metal removal rates and chip evacuation on aluminium, aluminium alloys and non-ferrous materials

- New end cut geometry allows plunge machining into solid material (max 1xD)
- Unique variable helix for vibration free machining at high feeds and depths of cut
- Roughing and finishing applications
- Fordlube coating increases tool-life and reduces chip adhesion




**Range Extension - See page 53 - 58**

## Twister® HPD 3xD
### Series HPDSS, HPDCS

Economical choice perfect for contract machining and small batch production requiring a high-performance drill

- Wide material application area for Steels, Stainless Steels, Cast Irons, Titanium & Heat resistant alloys
- Self centring point which eliminates the need for spot drilling
- h7 tolerance making precision holes
- h6 shank tolerance for shrink fit applications

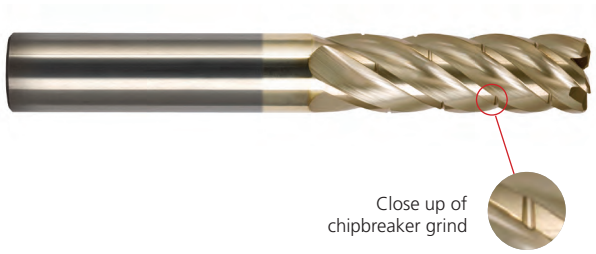



**Range Extension - See page 165 - 167**

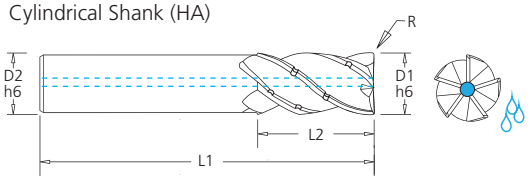
# TuffCut® X-AL Series 137V5



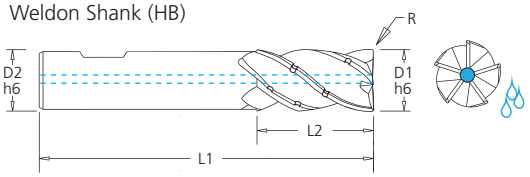



Cylindrical Shank (HA)




Weldon Shank (HB)




## Cylindrical Shank (HA)

| Tool Number | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| 137V5 1003-ALCC | 10.0 | 10.0 | 75.0 | 32.0 | - |
| 137V5 1003-1.0RALCC | 10.0 | 10.0 | 75.0 | 32.0 | 1.0 |
| 137V5 1203-ALCC | 12.0 | 12.0 | 87.0 | 38.0 | - |
| 137V5 1203-1.0RALCC | 12.0 | 12.0 | 87.0 | 38.0 | 1.0 |
| 137V5 1203-3.0RALCC | 12.0 | 12.0 | 87.0 | 38.0 | 3.0 |
| 137V5 1603-ALCC | 16.0 | 16.0 | 104.0 | 50.0 | - |
| 137V5 1603-1.0RALCC | 16.0 | 16.0 | 104.0 | 50.0 | 1.0 |
| 137V5 1603-3.0RALCC | 16.0 | 16.0 | 104.0 | 50.0 | 3.0 |
| 137V5 2003-ALCC | 20.0 | 20.0 | 120.0 | 62.0 | - |
| 137V5 2003-1.0RALCC | 20.0 | 20.0 | 120.0 | 62.0 | 1.0 |

## Weldon Shank (HB)

| Tool Number | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| 137V5 1003-ALCCW | 10.0 | 10.0 | 75.0 | 32.0 | - |
| 137V5 1003-1.0RALCCW | 10.0 | 10.0 | 75.0 | 32.0 | 1.0 |
| 137V5 1203-ALCCW | 12.0 | 12.0 | 87.0 | 38.0 | - |
| 137V5 1203-1.0RALCCW | 12.0 | 12.0 | 87.0 | 38.0 | 1.0 |
| 137V5 1603-ALCCW | 16.0 | 16.0 | 104.0 | 50.0 | - |
| 137V5 1603-1.0RALCCW | 16.0 | 16.0 | 104.0 | 50.0 | 1.0 |
| 137V5 2003-ALCCW | 20.0 | 20.0 | 120.0 | 62.0 | - |
| 137V5 2003-1.0RALCCW | 20.0 | 20.0 | 120.0 | 62.0 | 1.0 |

## Recommended cutting data

| Series | | Type of cut | | Vc | Diameter - mm | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 10.0 | 12.0 | 16.0 | 20.0 |
| | | Ae | Ap | m/min | fz | fz | fz | fz |
| 137V5 3 x D | | 0.1 x D | 3 x D | 300-1000 | 0.1 | 0.12 | 0.16 | 0.2 |
| | | 0.15 x D | 3 x D | 300-1000 | 0.1 | 0.12 | 0.16 | 0.2 |
| | | 0.2 x D | 3 x D | 300-1000 | 0.1 | 0.12 | 0.16 | 0.2 |
| | | 0.3 x D | 2 x D | 300-1000 | 0.1 | 0.12 | 0.16 | 0.2 |
| | | | | | | | | |
| | | 1 x D | 1 x D Max | 300-1000 | 0.05 | 0.06 | 0.08 | 0.1 |
| | | | | | | | | |

| Radial Cut (Ae) | Chip thickness Compensation factor |
|---|---|
| 30% | 1.10 |
| 20% | 1.20 |
| 15% | 1.40 |
| 10% | 1.80 |
| 5% | 2.30 |
| 1% | 5.00 |

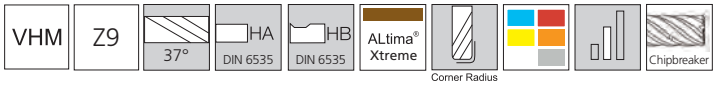
**Note:**
Ramping (10° max) to 3 x D at slotting feed rates.

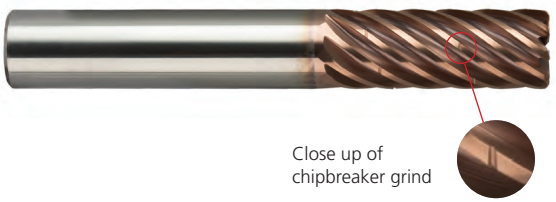
To achieve the highest torque when using this tool on low powered machines, the rpm may need to be adjusted.

When using higher Ae please ensure to use an appropriate chuck with sufficient clamping pressure.

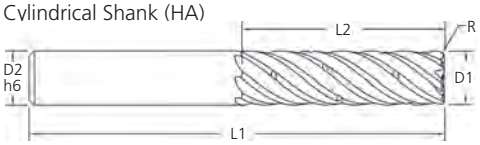
During profile milling less than 50% of the cutter diameter radial width, the actual chip thickness at the cutting edge is less than the programmed chipload.
The accompanying table shows the increase in tooth load by given radial percentage engagement. Multiply your feed per tooth by the factor before finalising your table feed.

# TuffCut® XT9 Series 380CB

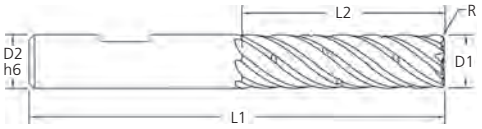



Cylindrical Shank (HA)




Weldon Shank (HB)




## Cylindrical Shank (HA)

| Tool No. | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| 380CBM0800-0.5RAX | 8.0 | 8.0 | 63.0 | 22.0 | 0.5 |
| 380CBM0800-1.0RAX | 8.0 | 8.0 | 63.0 | 22.0 | 1.0 |
| 380CBM1000-0.5RAX | 10.0 | 10.0 | 72.0 | 27.0 | 0.5 |
| 380CBM1000-1.0RAX | 10.0 | 10.0 | 72.0 | 27.0 | 1.0 |
| 380CBM1200-0.5RAX | 12.0 | 12.0 | 81.0 | 32.0 | 0.5 |
| 380CBM1200-1.0RAX | 12.0 | 12.0 | 81.0 | 32.0 | 1.0 |
| 380CBM1600-0.5RAX | 16.0 | 16.0 | 92.0 | 42.0 | 0.5 |
| 380CBM1600-1.0RAX | 16.0 | 16.0 | 92.0 | 42.0 | 1.0 |
| 380CBM2000-0.5RAX | 20.0 | 20.0 | 104.0 | 52.0 | 0.5 |
| 380CBM2000-1.0RAX | 20.0 | 20.0 | 104.0 | 52.0 | 1.0 |

## Weldon Shank (HB)

| Tool No. | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| 380CBM0800-0.5RAXW | 8.0 | 8.0 | 63.0 | 22.0 | 0.5 |
| 380CBM0800-1.0RAXW | 8.0 | 8.0 | 63.0 | 22.0 | 1.0 |
| 380CBM1000-0.5RAXW | 10.0 | 10.0 | 72.0 | 27.0 | 0.5 |
| 380CBM1000-1.0RAXW | 10.0 | 10.0 | 72.0 | 27.0 | 1.0 |
| 380CBM1200-0.5RAXW | 12.0 | 12.0 | 81.0 | 32.0 | 0.5 |
| 380CBM1200-1.0RAXW | 12.0 | 12.0 | 81.0 | 32.0 | 1.0 |
| 380CBM1600-0.5RAXW | 16.0 | 16.0 | 92.0 | 42.0 | 0.5 |
| 380CBM1600-1.0RAXW | 16.0 | 16.0 | 92.0 | 42.0 | 1.0 |
| 380CBM2000-0.5RAXW | 20.0 | 20.0 | 104.0 | 52.0 | 0.5 |
| 380CBM2000-1.0RAXW | 20.0 | 20.0 | 104.0 | 52.0 | 1.0 |

NEW Products
Nouveaux produits
Neue Produkte
Nuovi Prodotti
Nowe Produkty

# TuffCut® XT9 Series 380CB, 380CB-W

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | ISO | Hardness | Coolant • Preferred o Possible x Not Possible | | | Profiling (ae) | | End Mill Diameter (mm) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 5% | 10% | 8 | 10 | 12 | 16 | 20 |
| | | | | | | 2.3 | 1.67 | ← Multiply fz by this Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing. | | | | |
| | | | Max. | Air | MMS | vc - m/min | | fz - mm/tooth | | | | |
| Low Carbon Steels 1018, 1020 | P | up to 28 Rc | • | • | • | 450 | 350 | .080 | .100 | .110 | .150 | .254 |
| Medium Carbon Steels 1140, 1145 | P | 28 to 38 Rc | • | • | • | 345 | 275 | .080 | .100 | .110 | .150 | .254 |
| Alloy Steels 4140, 4145 | P | 28 to 44 Rc | • | • | • | 315 | 255 | .080 | .100 | .110 | .150 | .254 |
| Die / Tool Steels A2, D2, H13, P20 | P | 28 to 44 Rc | • | • | • | 275 | 220 | .080 | .100 | .110 | .150 | .254 |
| Stainless Steel - Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430 | M | up to 28 Rc | • | x | o | 205 | 165 | .030-.040 | .038-.050 | .050-.078 | .050-.083 | .060-.099 |
| Stainless Steel - Austenitic 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH | M | up to 28 Rc | • | x | o | 160 | 130 | .030-.040 | .038-.050 | .050-.078 | .050-.083 | .060-.099 |
| Stainless Steel - Difficult to Machine 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321 | M | up to 28 Rc | • | x | o | 125 | 100 | .030-.040 | .038-.050 | .050-.078 | .050-.083 | .060-.099 |
| Stainless Steel - Difficult to Machine 17-4 PH, PH13-8Mo, Nitronics | M | over 28 Rc | • | x | o | 160 | 130 | .030-.040 | .038-.050 | .050-.078 | .050-.083 | .060-.099 |
| Cobalt Chrome Alloys | M | | • | x | o | 125 | 100 | .040 | .050 | .078 | .083 | .099 |
| Duplex (22%) | M | | • | x | o | 75 | 60 | .040 | .050 | .078 | .083 | .099 |
| Super Duplex (25%) | M | | • | x | o | 75 | 60 | .040 | .050 | .078 | .083 | .099 |
| High Temp Alloys | S | up to 42 Rc | • | x | x | 55 | 45 | .030-.040 | .038-.050 | .025-.040 | .025-.043 | .030-.050 |
| Inconel | S | | • | x | x | 55 | 45 | .020-.030 | .025-.040 | .025-.040 | .025-.043 | .030-.050 |
| Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al | S | up to 42 Rc | • | x | x | 115 | 105 | .020-.030 | .025-.040 | .050-.078 | .050-.083 | .030-.050 |
| Cast-Iron - Gray CG, ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40 | K | up to 240 HB | • | o | o | 495 | 395 | .080 | .100 | .110 | .150 | .254 |
| Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450 | K | over 240 HB | • | o | o | 205 | 165 | .065 | .080 | .110 | .150 | .254 |
| Hardened Steels | H | 40-50 Rc | • | o | o | 185 | 150 | .050 | .060 | .101 | .116 | .152 |
| Hardened Steels | | 50-55 Rc | • | o | o | 155 | 125 | .030 | .040 | .061 | .076 | .088 |
| Hardened Steels | | >55 Rc | • | o | o | 100 | 95 | .020 | .025 | .045 | .055 | .063 |

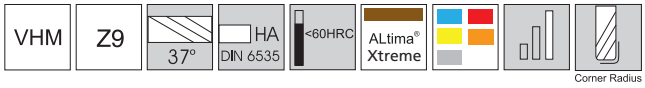
### Safety Note

Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should be fully guarded.

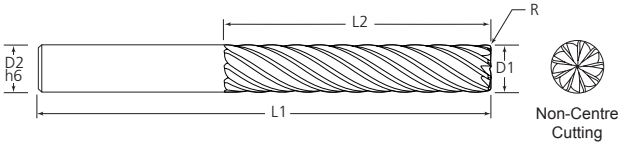
Spindle Maximum - Should the calculated spindle speed be more than your actual spindle maximum, use this formula: (Calculated Feed x Spindle Maximum)/Calculated Speed.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

# TuffCut® XT9 Series 380L





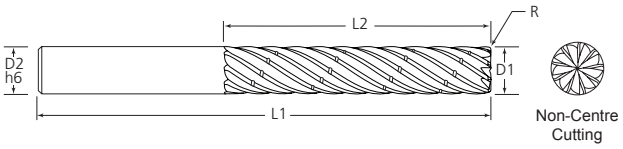

| Tool Number | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| 380M1204-1.0RAX | 12.0 | 12.0 | 100.0 | 50.0 | 1.0 |
| 380M1205-1.0RAX | 12.0 | 12.0 | 120.0 | 62.0 | 1.0 |
| 380M1604-1.0RAX | 16.0 | 16.0 | 120.0 | 66.0 | 1.0 |
| 380M1605-1.0RAX | 16.0 | 16.0 | 150.0 | 82.0 | 1.0 |

# TuffCut® XT9 Series 380CB L





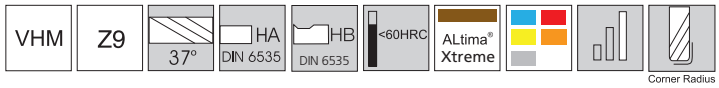





| Tool Number | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| 380CBM1204-1.0RAX | 12.0 | 12.0 | 100.0 | 50.0 | 1.0 |
| 380CBM1205-1.0RAX | 12.0 | 12.0 | 120.0 | 62.0 | 1.0 |
| 380CBM1604-1.0RAX | 16.0 | 16.0 | 120.0 | 66.0 | 1.0 |
| 380CBM1605-1.0RAX | 16.0 | 16.0 | 150.0 | 82.0 | 1.0 |

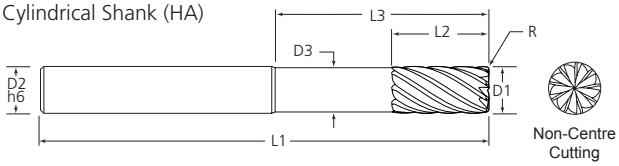
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# TuffCut® XT9 Series 380 N4 & N5

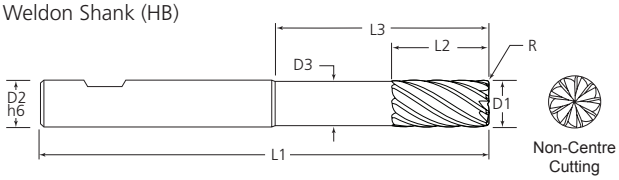





Cylindrical Shank (HA)




Weldon Shank (HB)



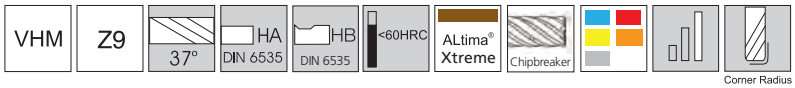

## Cylindrical Shank (HA)

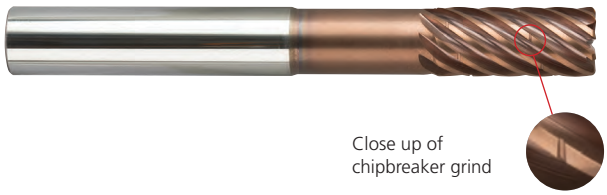
| Tool Number | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 380M1200N4-1.0RAX | 12.0 | 12.0 | 11.4 | 100.0 | 18.0 | 50.0 | 1.0 |
| 380M1200N5-1.0RAX | 12.0 | 12.0 | 11.4 | 110.0 | 18.0 | 62.0 | 1.0 |
| 380M1600N4-1.0RAX | 16.0 | 16.0 | 15.2 | 120.0 | 35.0 | 66.0 | 1.0 |
| 380M1600N5-1.0RAX | 16.0 | 16.0 | 15.2 | 133.0 | 35.0 | 82.0 | 1.0 |

## Weldon Shank (HB)

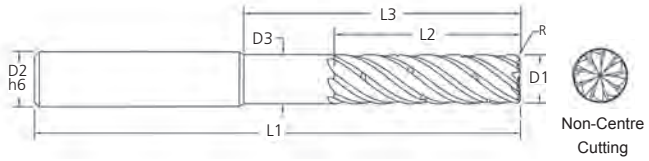
| Tool Number | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 380M1200N4-1.0RAXW | 12.0 | 12.0 | 11.4 | 100.0 | 18.0 | 50.0 | 1.0 |
| 380M1200N5-1.0RAXW | 12.0 | 12.0 | 11.4 | 110.0 | 18.0 | 62.0 | 1.0 |
| 380M1600N4-1.0RAXW | 16.0 | 16.0 | 15.2 | 120.0 | 35.0 | 66.0 | 1.0 |
| 380M1600N5-1.0RAXW | 16.0 | 16.0 | 15.2 | 133.0 | 35.0 | 82.0 | 1.0 |

# TuffCut® XT9 Series 380CB N4 - N5

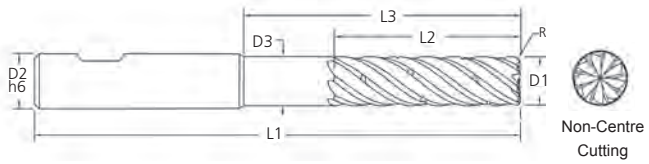



Cylindrical Shank (HA)




Weldon Shank (HB)




## Cylindrical Shank (HA)

| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 380CBM12N4-1.0RAX | 12.0 | 12.0 | 11.4 | 100.0 | 27.0 | 50.0 | 1.0 |
| 380CBM12N5-1.0RAX | 12.0 | 12.0 | 11.4 | 110.0 | 27.0 | 62.0 | 1.0 |
| 380CBM16N4-1.0RAX | 16.0 | 16.0 | 15.2 | 120.0 | 35.0 | 66.0 | 1.0 |
| 380CBM16N5-1.0RAX | 16.0 | 16.0 | 15.2 | 133.0 | 35.0 | 82.0 | 1.0 |

## Weldon Shank (HB)

| Tool Number | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 380CBM12N4-1.0RAXW | 12.0 | 12.0 | 11.4 | 100.0 | 27.0 | 50.0 | 1.0 |
| 380CBM12N5-1.0RAXW | 12.0 | 12.0 | 11.4 | 110.0 | 27.0 | 62.0 | 1.0 |
| 380CBM16N4-1.0RAXW | 16.0 | 16.0 | 15.2 | 120.0 | 35.0 | 66.0 | 1.0 |
| 380CBM16N5-1.0RAXW | 16.0 | 16.0 | 15.2 | 133.0 | 35.0 | 82.0 | 1.0 |

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# TuffCut® XT9 Series 380L, 380CB L, 380N4 & N5 - W & 380CB N4 & N5 - W

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

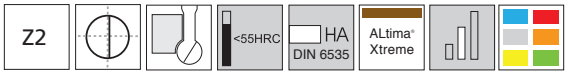
| Workpiece Material Group | ISO | Hardness | Coolant • Preferred o Possible x Not Possible | | | Profiling (ae) | | | End Mill Diameter (mm) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 5% | 7% | 10% | 12 | 16 |
| | | | | | | 2.3 | 2.0 | 1.8 | ← Multiply fz by this Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing. | |
| | | | Max. | Air | MMS | vc - m/min | | | fz - mm/tooth | |
| Low Carbon Steels 1018, 1020 | P | up to 28 Rc | • | • | • | 385 | 350 | 310 | 0.050 | 0.060 |
| Medium Carbon Steels 1140, 1145 | P | 28 to 38 Rc | • | • | • | 250 | 230 | 200 | 0.050 | 0.060 |
| Alloy Steels 4140, 4145 | P | 28 to 44 Rc | • | • | • | 250 | 230 | 200 | 0.050 | 0.060 |
| Die / Tool Steels A2, D2, H13, P20 | P | 28 to 44 Rc | • | • | • | 220 | 200 | 180 | 0.050 | 0.060 |
| Stainless Steel - Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430 | M | up to 28 Rc | • | x | o | 165 | 150 | 130 | 0.050 | 0.060 |
| Stainless Steel - Austenitic 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH | M | up to 28 Rc | • | x | o | 130 | 120 | 100 | 0.050 | 0.060 |
| Stainless Steel - Difficult to Machine 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321 | M | up to 28 Rc | • | x | o | 100 | 90 | 80 | 0.050 | 0.060 |
| Stainless Steel - Difficult to Machine 17-4 PH, PH13-8Mo, Nitronics | M | over 28 Rc | • | x | o | 100 | 90 | 80 | 0.050 | 0.060 |
| Cobalt Chrome Alloys | M | | • | x | o | 100 | 90 | 80 | 0.050 | 0.060 |
| Duplex (22%) | M | | • | x | o | 60 | 50 | 45 | 0.050 | 0.060 |
| Super Duplex (25%) | M | | • | x | o | 60 | 50 | 45 | 0.050 | 0.060 |
| High Temp Alloys | S | up to 42 Rc | • | x | x | 45 | 40 | 35 | 0.050 | 0.060 |
| Inconel | S | | • | x | x | 45 | 40 | 35 | 0.025 | 0.030 |
| Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, | S | up to 42 Rc | • | x | x | 90 | 85 | 80 | 0.030 | 0.040 |
| Cast-Iron - Gray CG, ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40 | K | up to 240 HB | • | o | o | 395 | 355 | 315 | 0.050 | 0.060 |
| Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450 | K | over 240 HB | • | o | o | 165 | 150 | 130 | 0.050 | 0.060 |
| Hardened Steels | H | 40-50 Rc | • | o | o | 150 | 130 | 120 | 0.040 | 0.050 |
| Hardened Steels | | 50-55 Rc | • | o | o | 125 | 110 | 100 | 0.025 | 0.030 |
| Hardened Steels | | >55 Rc | • | o | o | 80 | 75 | 75 | 0.020 | 0.025 |

**Safety Note**
Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should be fully guarded.

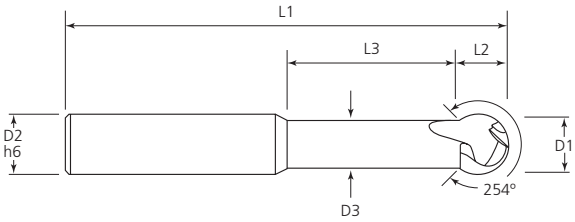
Spindle Maximum - Should the calculated spindle speed be more than your actual spindle maximum, use this formula: (Calculated Feed x Spindle Maximum)/Calculated Speed.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

# TuffCut® GP Series FBPM






| Tool Number | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| FBPM 03N3H | 3.0 | 4.0 | 2.4 | 50.0 | 2.5 | 9.0 | R1.5 |
| FBPM 04N3H | 4.0 | 4.0 | 3.2 | 50.0 | 3.5 | 11.5 | R2.0 |
| FBPM 05N3H | 5.0 | 6.0 | 4.0 | 57.0 | 4.5 | 14.0 | R2.5 |
| FBPM 06N3H | 6.0 | 6.0 | 4.8 | 64.0 | 5.4 | 16.6 | R3.0 |
| FBPM 08N3H | 8.0 | 8.0 | 6.4 | 63.0 | 7.4 | 21.6 | R4.0 |
| FBPM 10N3H | 10.0 | 10.0 | 8.0 | 72.0 | 9.4 | 26.6 | R5.0 |
| FBPM 12N3H | 12.0 | 12.0 | 9.6 | 83.0 | 11.4 | 31.6 | R6.0 |

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# TuffCut® GP Series FBPM

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

### Recommended Speeds and Depths of Cut by Material Group

| Workpiece Material Group | | Material Type | | | | Roughing | Finishing |
|---|---|---|---|---|---|---|---|
| | | | Ap | | | 0.05 - 0.1 x D | 0.02 - 0.05 x D |
| | | | Ae | | | 0.2 - 0.3 x D | 0.02 - 0.05 x D |
| | | | Coolant | | | Vc-m/min | |
| | | | Max | Air | MMS | | |
| Steels | P | Low Carbon Steels ≤180HB | ○ | ● | ● | 250 | 280 |
| | | Med Carbon / Alloy Steels 180-350HB | ○ | ● | ● | 200 | 220 |
| | | Pre-Hardened Steels 35-45HRC | ○ | ● | ● | 180 | 200 |
| Stainless Steels | M | Free Machining Stainless | ● | ○ | ○ | 160 | 180 |
| | | Austenitic Stainless | ● | ○ | ○ | 130 | 150 |
| | | Difficult Stainless | ● | ○ | ○ | 100 | 110 |
| Special Alloys | S | High Temp Alloys | ● | X | X | 50 | 55 |
| | | Titanium Alloys | ● | X | X | 110 | 120 |
| Cast Irons | K | Grey Cast Iron | ○ | ● | X | 220 | 250 |
| | | Ductile Cast Iron | ○ | ● | X | 180 | 200 |
| Hardened Steels | H | Hardened Steels 45 - 50HRC | ○ | ● | ○ | 160 | 170 |
| Non-Ferrous | N | Aluminium Alloys | ● | X | ○ | 300 | 500 |
| | | Brass / Bronze / Copper | ● | X | ○ | 250 | 400 |

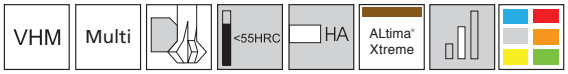
● Preferred ○ Possible X Not Possible

### Recommended Feed per Tooth by Material Group

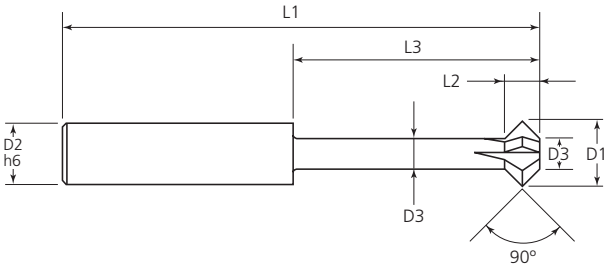
| Workpiece Material Group | | Material Type | Tool Diameter & Radius (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3 | | 4 | | 5 | | 6 | |
| | | | 1.5 | | 2 | | 2.5 | | 3 | |
| | | | Rough | Finish | Rough | Finish | Rough | Finish | Rough | Finish |
| | | | Fz - mm/tooth | | | | | | | |
| Steels | P | Low Carbon Steels ≤180HB | 0.060 | 0.045 | 0.080 | 0.060 | 0.100 | 0.075 | 0.120 | 0.090 |
| | | Med Carbon / Alloy Steels 180-350HB | 0.060 | 0.045 | 0.080 | 0.060 | 0.100 | 0.075 | 0.120 | 0.090 |
| | | Pre-Hardened Steels 35-45HRC | 0.054 | 0.045 | 0.072 | 0.060 | 0.090 | 0.075 | 0.108 | 0.090 |
| Stainless Steels | M | Free Machining Stainless | 0.054 | 0.045 | 0.072 | 0.060 | 0.090 | 0.075 | 0.108 | 0.090 |
| | | Austenitic Stainless | 0.045 | 0.045 | 0.060 | 0.060 | 0.075 | 0.075 | 0.090 | 0.090 |
| | | Difficult Stainless | 0.045 | 0.045 | 0.060 | 0.060 | 0.075 | 0.075 | 0.090 | 0.090 |
| Special Alloys | S | High Temp Alloys | 0.024 | 0.030 | 0.032 | 0.040 | 0.040 | 0.050 | 0.048 | 0.060 |
| | | Titanium Alloys | 0.036 | 0.030 | 0.048 | 0.040 | 0.060 | 0.050 | 0.072 | 0.060 |
| Cast Irons | K | Grey Cast Iron | 0.060 | 0.045 | 0.080 | 0.060 | 0.100 | 0.075 | 0.120 | 0.090 |
| | | Ductile Cast Iron | 0.054 | 0.045 | 0.072 | 0.060 | 0.090 | 0.075 | 0.108 | 0.090 |
| Hardened Steels | H | Hardened Steels 45 - 50HRC | 0.039 | 0.038 | 0.052 | 0.050 | 0.065 | 0.063 | 0.078 | 0.075 |
| Non-Ferrous | N | Aluminium Alloys | 0.075 | 0.045 | 0.100 | 0.060 | 0.125 | 0.075 | 0.150 | 0.090 |
| | | Brass / Bronze / Copper | 0.060 | 0.045 | 0.080 | 0.060 | 0.100 | 0.075 | 0.120 | 0.090 |

| Workpiece Material Group | | Material Type | Tool Diameter & Radius (mm) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 8 | | 10 | | 12 | |
| | | | 4 | | 5 | | 6 | |
| | | | Rough | Finish | Rough | Finish | Rough | Finish |
| | | | Fz - mm/tooth | | | | | |
| Steels | P | Low Carbon Steels ≤180HB | 0.160 | 0.120 | 0.200 | 0.150 | 0.240 | 0.180 |
| | | Med Carbon / Alloy Steels 180-350HB | 0.160 | 0.120 | 0.200 | 0.150 | 0.240 | 0.180 |
| | | Pre-Hardened Steels 35-45HRC | 0.144 | 0.120 | 0.180 | 0.150 | 0.216 | 0.180 |
| Stainless Steels | M | Free Machining Stainless | 0.144 | 0.120 | 0.180 | 0.150 | 0.216 | 0.180 |
| | | Austenitic Stainless | 0.120 | 0.120 | 0.150 | 0.150 | 0.180 | 0.180 |
| | | Difficult Stainless | 0.120 | 0.120 | 0.150 | 0.150 | 0.180 | 0.180 |
| Special Alloys | S | High Temp Alloys | 0.064 | 0.080 | 0.080 | 0.100 | 0.096 | 0.120 |
| | | Titanium Alloys | 0.096 | 0.080 | 0.120 | 0.100 | 0.144 | 0.120 |
| Cast Irons | K | Grey Cast Iron | 0.160 | 0.120 | 0.200 | 0.150 | 0.240 | 0.180 |
| | | Ductile Cast Iron | 0.144 | 0.120 | 0.180 | 0.150 | 0.216 | 0.180 |
| Hardened Steels | H | Hardened Steels 45 - 50HRC | 0.104 | 0.100 | 0.130 | 0.125 | 0.156 | 0.150 |
| Non-Ferrous | N | Aluminium Alloys | 0.200 | 0.120 | 0.250 | 0.150 | 0.300 | 0.180 |
| | | Brass / Bronze / Copper | 0.160 | 0.120 | 0.200 | 0.150 | 0.240 | 0.180 |

# TuffCut® GP Series FBCM

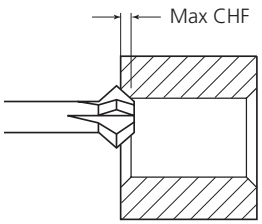




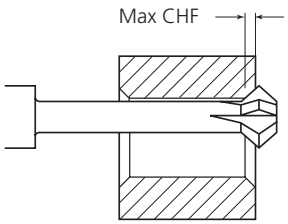




| Tool Number | D1 | D2 | D3 | L1 | L2 | L3 | Z | Max CHF |
|---|---|---|---|---|---|---|---|---|
| FBCM 03N3H | 3.0 | 4.0 | 1.5 | 50.0 | 1.5 | 11.5 | 3 | 0.6 |
| FBCM 04N3H | 4.0 | 4.0 | 2.0 | 50.0 | 2.0 | 15.0 | 3 | 0.9 |
| FBCM 05N3H | 5.0 | 6.0 | 2.5 | 57.0 | 2.5 | 18.5 | 3 | 1.1 |
| FBCM 06N3H | 6.0 | 6.0 | 3.0 | 64.0 | 3.0 | 22.0 | 3 | 1.4 |
| FBCM 08N3H | 8.0 | 8.0 | 4.0 | 63.0 | 4.0 | 29.0 | 4 | 1.8 |
| FBCM 10N3H | 10.0 | 10.0 | 5.0 | 72.0 | 5.0 | 36.0 | 5 | 2.3 |
| FBCM 12N3H | 12.0 | 12.0 | 6.0 | 83.0 | 6.0 | 43.0 | 5 | 2.8 |

Front chamfer




Back chamfer



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# TuffCut® GP Series FBCM

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

### Recommended Speeds by Material Group

| Workpiece Material Group | | Material Type | Coolant | | | Deburr | Chamfer |
|---|---|---|---|---|---|---|---|
| | | | Max | Air | MMS | Vc-m/min | |
| Steels | P | Low Carbon Steels | ● | ● | ● | 230 | 220 |
| | | Medium Carbon Steels | ● | ● | ● | 200 | 185 |
| | | Alloy Tool Steels | ● | ● | ● | 175 | 165 |
| | | Die/Tool Steels | ● | ● | ● | 145 | 130 |
| Stainless Steels | M | Free Machining Stainless | ● | X | ○ | 120 | 110 |
| | | Austenitic Stainless | ● | X | ○ | 110 | 100 |
| | | Difficult Stainless | ● | X | ○ | 75 | 65 |
| | | PH Stainless | ● | X | ○ | 110 | 100 |
| | | Cobalt Chrome Alloys | ● | X | ○ | 75 | 65 |
| | | Duplex (22%) | ● | X | ○ | 75 | 65 |
| | | Super Duplex (25%) | ● | X | ○ | 55 | 45 |
| Special Alloys | S | High Temp Alloys | ● | X | X | 35 | 28 |
| | | Titanium Alloys | ● | X | X | 75 | 66 |
| Cast Irons | K | Grey Cast Iron | ● | ○ | ○ | 200 | 175 |
| | | Ductile Cast Iron | ● | ○ | ○ | 185 | 165 |
| Hardened Steels | H | Hardened Steels 45 - 50HRC | ○ | ● | ○ | 60 | 50 |
| | | Hardened Steels 50 - 55HRC | ○ | ● | ○ | 50 | 45 |
| Non Ferrous | N | Aluminium Alloys | ● | X | ○ | 300 | 250 |
| | | Brass / Bronze / Copper | ● | X | ○ | 180 | 170 |

● Preferred ○ Possible X Not Possible

Please note:
Use the following formula to calculate the effective cutting diameter:
(Major diameter D1 + minor diameter D3) / 2.
Alternatively, estimate the actual diameter that is in contact with the workpiece.

### Recommended Feed per Tooth by Material Group

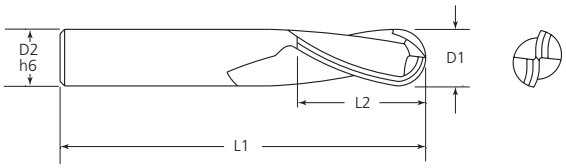
| Workpiece Material Group | | Type of Machining | Tool Diameter | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 3mm | 4mm | 5mm | 6mm | 8mm | 10mm | 12mm |
| | | | fz-mm/tooth | | | | | | |
| Steels | P | Deburr | 0.015 | 0.020 | 0.025 | 0.030 | 0.040 | 0.050 | 0.060 |
| | | Chamfer | 0.008 | 0.010 | 0.013 | 0.015 | 0.020 | 0.025 | 0.030 |
| Stainless Steels | M | Deburr | 0.015 | 0.020 | 0.025 | 0.030 | 0.040 | 0.050 | 0.060 |
| | | Chamfer | 0.008 | 0.010 | 0.013 | 0.015 | 0.020 | 0.025 | 0.030 |
| High Temp Alloys | S | Deburr | 0.004 | 0.006 | 0.007 | 0.016 | 0.019 | 0.022 | 0.026 |
| | | Chamfer | 0.002 | 0.003 | 0.004 | 0.008 | 0.010 | 0.011 | 0.013 |
| Titanium | | Deburr | 0.015 | 0.020 | 0.025 | 0.030 | 0.040 | 0.050 | 0.060 |
| | | Chamfer | 0.008 | 0.010 | 0.013 | 0.015 | 0.020 | 0.025 | 0.030 |
| Cast Irons | K | Deburr | 0.015 | 0.020 | 0.025 | 0.030 | 0.040 | 0.050 | 0.060 |
| | | Chamfer | 0.008 | 0.010 | 0.013 | 0.015 | 0.020 | 0.025 | 0.030 |
| Hardened Steels 45 - 50HRC | H | Deburr | 0.010 | 0.013 | 0.015 | 0.025 | 0.035 | 0.045 | 0.054 |
| | | Chamfer | 0.005 | 0.007 | 0.008 | 0.013 | 0.018 | 0.023 | 0.027 |
| Hardened Steels 50 - 55HRC | | Deburr | 0.008 | 0.010 | 0.011 | 0.020 | 0.030 | 0.040 | 0.050 |
| | | Chamfer | 0.004 | 0.005 | 0.006 | 0.010 | 0.015 | 0.020 | 0.025 |
| Non Ferrous | N | Deburr | 0.015 | 0.020 | 0.025 | 0.030 | 0.040 | 0.050 | 0.050 |
| | | Chamfer | 0.008 | 0.010 | 0.013 | 0.015 | 0.020 | 0.025 | 0.025 |

Please note: These are recommended starting conditions. However, please adjust the feed to suit the surface finish requirements.

# TuffCut® 3D Series 250






| Tool Number | D1 | R | D2 | L1 | L2 |
|---|---|---|---|---|---|
| 250M01041B | 1.0 | 0.5 | 4.0 | 50.0 | 2.0 |
| 250M015041B | 1.5 | 0.75 | 4.0 | 50.0 | 3.0 |
| 250M02041B | 2.0 | 1.0 | 4.0 | 50.0 | 4.0 |
| 250M03041B | 3.0 | 1.5 | 4.0 | 50.0 | 6.0 |
| 250M04041B | 4.0 | 2.0 | 4.0 | 50.0 | 6.0 |
| 250M04061B | 4.0 | 2.0 | 6.0 | 50.0 | 6.0 |
| 250M05061B | 5.0 | 2.5 | 6.0 | 50.0 | 7.5 |
| 250M06061B | 6.0 | 3.0 | 6.0 | 50.0 | 9.0 |
| 250M06062B | 6.0 | 3.0 | 6.0 | 75.0 | 9.0 |
| 250M06063B | 6.0 | 3.0 | 6.0 | 100.0 | 12.0 |
| 250M08081B | 8.0 | 4.0 | 8.0 | 63.0 | 12.0 |
| 250M08082B | 8.0 | 4.0 | 8.0 | 75.0 | 12.0 |
| 250M08083B | 8.0 | 4.0 | 8.0 | 100.0 | 16.0 |
| 250M10101B | 10.0 | 5.0 | 10.0 | 75.0 | 15.0 |
| 250M10102B | 10.0 | 5.0 | 10.0 | 100.0 | 20.0 |
| 250M12121B | 12.0 | 6.0 | 12.0 | 75.0 | 18.0 |
| 250M12122B | 12.0 | 6.0 | 12.0 | 100.0 | 24.0 |
| 250M16161B | 16.0 | 8.0 | 16.0 | 75.0 | 24.0 |
| 250M16162B | 16.0 | 8.0 | 16.0 | 100.0 | 32.0 |

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Nuovi Prodotti
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# TuffCut® 3D Series 250

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | | Material Type | Ap | Ae | Coolant | | | Roughing | Finishing |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Max | Air | MMS | Vc-m/min | |
| | | | 0.05 - 0.1 x D | 0.2 - 0.3 x D | | | | 0.02 - 0.05 x D | 0.02 - 0.05 x D |
| Steels | P | Low Carbon Steels ≤180HB | | | ○ | ● | ● | 250 | 280 |
| | | Med Carbon / Alloy Steels 180-350HB | | | ○ | ● | ● | 200 | 220 |
| | | Pre-Hardened Steels 35-45HRC | | | ○ | ● | ● | 180 | 200 |
| Stainless Steels | M | Free Machining Stainless | | | ● | ○ | ○ | 160 | 180 |
| | | Austenitic Stainless | | | ● | ○ | ○ | 130 | 150 |
| | | Difficult Stainless | | | ● | ○ | ○ | 100 | 110 |
| Special Alloys | S | High Temp Alloys | | | ● | X | X | 50 | 55 |
| | | Titanium Alloys | | | ● | X | X | 110 | 120 |
| Cast Irons | K | Grey Cast Iron | | | ○ | ● | X | 220 | 250 |
| | | Ductile Cast Iron | | | ○ | ● | X | 180 | 200 |
| Hardened Steels | H | Hardened Steels 45 - 50HRC | | | ○ | ● | ○ | 160 | 170 |
| Non-Ferrous | N | Aluminium Alloys | | | ● | X | ○ | 300 | 500 |
| | | Brass / Bronze / Copper | | | ● | X | ○ | 250 | 400 |

● Preferred ○ Possible X Not Possible

## Recommended Feed per Tooth by Material Group

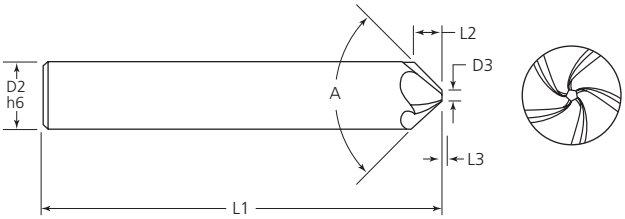
| Workpiece Material Group | | Material Type | Tool Diameter & Radius | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | | 1.5 | | 2 | | 3 | | 4 | | 5 | |
| | | | 0.5 | | 0.75 | | 1 | | 1.5 | | 2 | | 2.5 | |
| | | | Rough | Finish | Rough | Finish | Rough | Finish | Rough | Finish | Rough | Finish | Rough | Finish |
| | | | Fz - mm/tooth | | | | | | | | | | | |
| Steels | P | Low Carbon Steels ≤180HB | 0.020 | 0.015 | 0.030 | 0.023 | 0.040 | 0.030 | 0.060 | 0.045 | 0.080 | 0.060 | 0.100 | 0.075 |
| | | Med Carbon / Alloy Steels 180-350HB | 0.020 | 0.015 | 0.030 | 0.023 | 0.040 | 0.030 | 0.060 | 0.045 | 0.080 | 0.060 | 0.100 | 0.075 |
| | | Pre-Hardened Steels 35-45HRC | 0.018 | 0.015 | 0.027 | 0.023 | 0.036 | 0.030 | 0.054 | 0.045 | 0.072 | 0.060 | 0.090 | 0.075 |
| Stainless Steels | M | Free Machining Stainless | 0.018 | 0.015 | 0.027 | 0.023 | 0.036 | 0.030 | 0.054 | 0.045 | 0.072 | 0.060 | 0.090 | 0.075 |
| | | Austenitic Stainless | 0.015 | 0.015 | 0.023 | 0.023 | 0.030 | 0.030 | 0.045 | 0.045 | 0.060 | 0.060 | 0.075 | 0.075 |
| | | Difficult Stainless | 0.015 | 0.015 | 0.023 | 0.023 | 0.030 | 0.030 | 0.045 | 0.045 | 0.060 | 0.060 | 0.075 | 0.075 |
| Special Alloys | S | High Temp Alloys | 0.008 | 0.010 | 0.012 | 0.015 | 0.016 | 0.020 | 0.024 | 0.030 | 0.032 | 0.040 | 0.040 | 0.050 |
| | | Titanium Alloys | 0.012 | 0.010 | 0.018 | 0.015 | 0.024 | 0.020 | 0.036 | 0.030 | 0.048 | 0.040 | 0.060 | 0.050 |
| Cast Irons | K | Grey Cast Iron | 0.020 | 0.015 | 0.030 | 0.023 | 0.040 | 0.030 | 0.060 | 0.045 | 0.080 | 0.060 | 0.100 | 0.075 |
| | | Ductile Cast Iron | 0.018 | 0.015 | 0.027 | 0.023 | 0.036 | 0.030 | 0.054 | 0.045 | 0.072 | 0.060 | 0.090 | 0.075 |
| Hardened Steels | H | Hardened Steels 45 - 50HRC | 0.013 | 0.013 | 0.020 | 0.019 | 0.026 | 0.025 | 0.039 | 0.038 | 0.052 | 0.050 | 0.065 | 0.063 |
| Non-Ferrous | N | Aluminium Alloys | 0.025 | 0.015 | 0.038 | 0.023 | 0.050 | 0.030 | 0.075 | 0.045 | 0.100 | 0.060 | 0.125 | 0.075 |
| | | Brass / Bronze / Copper | 0.020 | 0.015 | 0.030 | 0.023 | 0.040 | 0.030 | 0.060 | 0.045 | 0.080 | 0.060 | 0.100 | 0.075 |

| Workpiece Material Group | | Material Type | Tool Diameter & Radius | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 6 | | 8 | | 10 | | 12 | | 16 | |
| | | | 3 | | 4 | | 5 | | 6 | | 8 | |
| | | | Rough | Finish | Rough | Finish | Rough | Finish | Rough | Finish | Rough | Finish |
| | | | Fz - mm/tooth | | | | | | | | | |
| Steels | P | Low Carbon Steels ≤180HB | 0.120 | 0.090 | 0.160 | 0.120 | 0.200 | 0.150 | 0.240 | 0.180 | 0.320 | 0.240 |
| | | Med Carbon / Alloy Steels 180-350HB | 0.120 | 0.090 | 0.160 | 0.120 | 0.200 | 0.150 | 0.240 | 0.180 | 0.320 | 0.240 |
| | | Pre-Hardened Steels 35-45HRC | 0.108 | 0.090 | 0.144 | 0.120 | 0.180 | 0.150 | 0.216 | 0.180 | 0.288 | 0.240 |
| Stainless Steels | M | Free Machining Stainless | 0.108 | 0.090 | 0.144 | 0.120 | 0.180 | 0.150 | 0.216 | 0.180 | 0.288 | 0.240 |
| | | Austenitic Stainless | 0.090 | 0.090 | 0.120 | 0.120 | 0.150 | 0.150 | 0.180 | 0.180 | 0.240 | 0.240 |
| | | Difficult Stainless | 0.090 | 0.090 | 0.120 | 0.120 | 0.150 | 0.150 | 0.180 | 0.180 | 0.240 | 0.240 |
| Special Alloys | S | High Temp Alloys | 0.048 | 0.060 | 0.064 | 0.080 | 0.080 | 0.100 | 0.096 | 0.120 | 0.128 | 0.160 |
| | | Titanium Alloys | 0.072 | 0.060 | 0.096 | 0.080 | 0.120 | 0.100 | 0.144 | 0.120 | 0.192 | 0.160 |
| Cast Irons | K | Grey Cast Iron | 0.120 | 0.090 | 0.160 | 0.120 | 0.200 | 0.150 | 0.240 | 0.180 | 0.320 | 0.240 |
| | | Ductile Cast Iron | 0.108 | 0.090 | 0.144 | 0.120 | 0.180 | 0.150 | 0.216 | 0.180 | 0.288 | 0.240 |
| Hardened Steels | H | Hardened Steels 45 - 50HRC | 0.078 | 0.075 | 0.104 | 0.100 | 0.130 | 0.125 | 0.156 | 0.150 | 0.208 | 0.200 |
| Non-Ferrous | N | Aluminium Alloys | 0.150 | 0.090 | 0.200 | 0.120 | 0.250 | 0.150 | 0.300 | 0.180 | 0.400 | 0.240 |
| | | Brass / Bronze / Copper | 0.120 | 0.090 | 0.160 | 0.120 | 0.200 | 0.150 | 0.240 | 0.180 | 0.320 | 0.240 |

# TuffCut® Series 5HC

VHM | Z5 | <48HRC | HA DIN 6535 | ALtima® BLAZE






| Tool Number | EDP | D2 | D3 | Angle | L1 | L2 | L3 |
|---|---|---|---|---|---|---|---|
| 5HCM06003B | 35026 | 6.0 | 1.5 | 90° | 57.0 | 2.25 | 0.75 |
| 5HCM08003B | 35027 | 8.0 | 1.75 | 90° | 63.0 | 3.125 | 0.875 |
| 5HCM10003B | 35028 | 10.0 | 1.75 | 90° | 72.0 | 4.125 | 0.875 |
| 5HCM12003B | 35029 | 12.0 | 2.0 | 90° | 83.0 | 5.0 | 1.0 |
| 5HCM16003B | 35030 | 16.0 | 2.25 | 90° | 92.0 | 6.875 | 1.125 |

# TuffCut® Series 5HC

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | | Material Type | Coolant | | | Vc-m/min | Tool Diameter | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Max | Air | MMS | | 6mm | 8mm | 10mm | 12mm | 16mm |
| | | | | | | | fz-mm/tooth | | | | |
| Steels | P | Low Carbon Steels | ● | ● | ● | 350 | 0.072 | 0.096 | 0.120 | 0.144 | 0.192 |
| | | Medium Carbon Steels | ● | ● | ● | 270 | 0.048 | 0.064 | 0.080 | 0.096 | 0.128 |
| | | Alloy Tool Steels | ● | ● | ● | 250 | 0.048 | 0.064 | 0.080 | 0.096 | 0.128 |
| | | Die/Tool Steels | ● | ● | ● | 220 | 0.042 | 0.056 | 0.070 | 0.084 | 0.112 |
| Stainless Steels | M | Free Machining Stainless | ● | X | ○ | 180 | 0.042 | 0.056 | 0.070 | 0.084 | 0.112 |
| | | Austenitic Stainless | ● | X | ○ | 130 | 0.036 | 0.048 | 0.060 | 0.072 | 0.096 |
| | | Difficult Stainless | ● | X | ○ | 75 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 |
| | | PH Stainless | ● | X | ○ | 130 | 0.036 | 0.048 | 0.060 | 0.072 | 0.096 |
| | | Cobalt Chrome Alloys | ● | X | ○ | 75 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 |
| | | Duplex (22%) | ● | X | ○ | 75 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 |
| | | Super Duplex (25%) | ● | X | ○ | 55 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 |
| Special Alloys | S | High Temp Alloys | ● | X | X | 45 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 |
| | | Titanium Alloys | ● | X | X | 100 | 0.036 | 0.048 | 0.060 | 0.072 | 0.096 |
| Cast Irons | K | Grey Cast Iron | ● | ○ | ○ | 300 | 0.084 | 0.112 | 0.140 | 0.168 | 0.224 |
| | | Ductile Cast Iron | ● | ○ | ○ | 190 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 |
| Hardened Steels | H | Hardened Steels 45 - 50HRC | ○ | ● | ○ | 80 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 |
| | | Hardened Steels 50 - 55HRC | ○ | ● | ○ | 60 | 0.036 | 0.048 | 0.060 | 0.072 | 0.096 |
| Non Ferrous | N | Aluminium Alloys | ● | X | ○ | 600 | 0.072 | 0.096 | 0.120 | 0.144 | 0.192 |
| | | Brass / Bronze / Copper | ● | X | ○ | 350 | 0.054 | 0.072 | 0.090 | 0.108 | 0.144 |

● Preferred ○ Possible X Not Possible

**Please note:**

Technical data provided should be considered as advisory only and alterations may be necessary depending on the specific application.

Decreased feeds and/or a finish pass may be required to reach the desired surface finish requirements.

Decreased speeds and feeds may be required for heavy duty cutting.

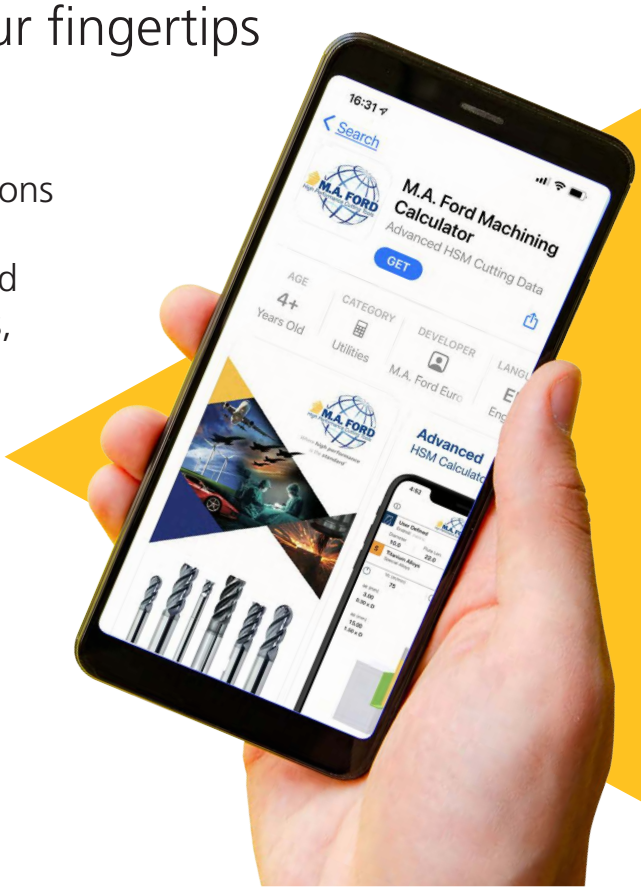
Cutting speed (Vc) should be calculated from the effective cutting diameter using the following formula:

(Major diameter D2 + minor diameter D3) / 2.

Alternatively, estimate the actual diameter that is in contact with the workpiece.

# The M.A. Ford interactive cutting data app
## - Everything you need at your fingertips

Our interactive app for iOS and Android devices makes tool cutting data calculations simpler and faster by minimising text input and using 3D graphics that respond instantly to changing cutting parameters, using smart-phone or tablet touch screens.




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## TuffCut® XR - XT Carbide End Mills

Fraises carbure en bout | Hartmetall-Schaftfräser | Frese in Metallo Duro Integrale | Frezy palcowe pełnowęglikowe

APG ADVANCED PRODUCT GROUP


15-106 End Mills, Fraise en bout, Schaftfräser, Frese a Candela, Frez

107-112 Routers, Fraises Diamant, Fräser, Router, Routery

113-184 Drills, Forets, Bohrer, Punte, Wiertła

185-196 Reamers, Alésoirs, Reibahlen, Alesatori, Rozwiertaki

197-208 Countersinks, Fraises, Senker, Svasatori, Pogłębiacze

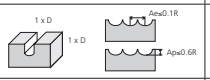
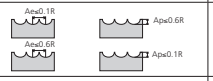
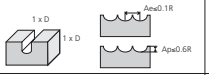
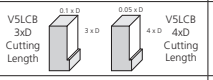
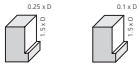
209-224 Burrs, Fraises Limes, Frässtifte, Lime Rotative, Zadziory


| Series | Tool Illustration | Z | Length | Ø Range (mm) | Corner Prep | Application Area | Matrial Group | Page |
|---|---|---|---|---|---|---|---|---|
| 3MVS |  | 3 | | 0.5 -3.0 | 0 - 0.5 | | | 16 |
| 3MVR |  | 3 | | 0.5 - 3.0 | 0 - 0.2 | | | 17 |
| 177 |  | 4 | | 1.5 - 3.0 | Sharp Corner | | | 18 |
| 177-W |  | 4 | | 6.0 - 20.0 | Sharp Corner | | | 18 |
| 177R |  | 4 | | 3.0 - 25.0 | 0.25 - 6.0mm Radius | | | 19 |
| 177RW |  | 4 | | 12.0 - 20.0 | 0.5 - 1.0mm Radius | | | 20 |
| 177S |  | 4 | | 3.0 - 20.0 | 0.2 - 1.0mm Radius | | | 20 |
| 177LR N5 |  | 4 | | 6.0 - 20.0 | 0.3 - 3.0mm Radius | | | 21 |
| 277N |  | 4 | | 3.0 - 20.0 | Sharp Corner | | | 22 |
| 277N-W |  | 4 | | 8.0 - 16.0 | Sharp Corner | | | 22 |
| 277NR |  | 4 | | 3.0 - 20.0 | 0.25 - 6.0mm Radius | | | 23 |
| 277NR-W |  | 4 | | 8.0 - 20.0 | 0.5 - 6.0mm Radius | | | 24 |
| 178 |  | 5 | | 3.0 - 25.0 | Sharp Corner | | | 25 |
| 178-W |  | 5 | | 6.0 - 20.0 | Sharp Corner | | | 26 |
| 178R |  | 5 | | 6.0 - 25.0 | 0.5 - 1.0mm Radius | | | 26 |
| 178-1 |  | 5 | | 3.0 - 20.0 | Sharp Corner | | | 27 |
| 178-1W |  | 5 | | 6.0 - 20.0 | Sharp Corner | | | 27 |
| 278R N3 |  | 5 | | 3.0 - 25.0 | 0.5 - 4.0mm Radius | | | 28 |
| 278R N3-W |  | 5 | | 10.0 - 16.0 | 0.5 - 4.0mm Radius | | | 29 |
| 278CBR N3 |  | 5 | | 10.0 - 16.0 | 1.0mm Radius | | | 30 |
| 278CBR N3-W |  | 5 | | 10.0 - 16.0 | 1.0mm Radius | | | 30 |
| 278R N4 |  | 5 | | 12.0 - 25.0 | 0.5 - 3.0mm Radius | | | 31 |
| 278R N5 |  | 5 | | 16.0 - 25.0 | 1.0 - 3.0mm Radius | | | 31 |
| 278R N5CT |  | 5 | | 12.0 | 0.5 - 4.0mm Radius | | | 32 |

## TuffCut® XR - XT Carbide End Mills

Fraises carbure en bout | Hartmetall-Schaftfräser | Frese in Metallo Duro Integrale | Frezy palcowe pełnowęglikowe

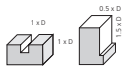
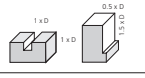
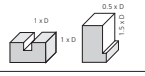
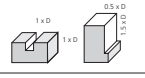
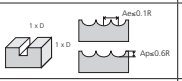
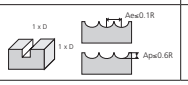
APG ADVANCED PRODUCT GROUP

| Series | Tool Illustration | Z | Length | Ø Range (mm) | Corner Prep | Application Area | Matrial Group | Page |
|---|---|---|---|---|---|---|---|---|
| 113A |  | 6 |  | 3.0 - 20.0 | Sharp Corner |  |  | 32 |
| 179 |  | 4 |  | 1.5 - 16.0 | N/A |  |  | 33 |
| 179L N5 |  | 4 |  | 3.0 - 16.0 | N/A |  |  | 33 |
| 279 |  | 4 |  | 3.0 - 16.0 | N/A |  |  | 34 |
| MFPB |  | Multi |  | 6.0 - 20.0 | N/A |  |  | 35 |
| MFTB |  | Multi |  | R2 – R8 | N/A |  |  | 35 |
| MFNB |  | Multi |  | 4.0 - 16.0 | N/A |  |  | 35 |
| 180 |  | 7 |  | 6.0 - 10.0 | Sharp Corner |  |  | 36 |
| 180R |  | 7 |  | 6.0 - 20.0 | 0.5 - 4.0mm Radius |  |  | 36 |
| 180CBR |  | 7 |  | 10.0 - 16.0 | 1.0mm Radius |  |  | 37 |
| 180 CBR-W |  | 7 |  | 10.0 - 16.0 | 1.0mm Radius |  |  | 37 |
| 180R N5 |  | 7 |  | 12.0 - 20.0 | 1.0 - 4.0mm Radius |  |  | 38 |
| 380 |  | 9 |  | 8.0 - 20.0 | 0.50 - 1.00mm Radius |  |  | 39 |
| 380-W |  | 9 |  | 10.0 - 20.0 | 0.50 - 1.00mm Radius |  |  | 39 |
| V5LCB |  | 5 |  | 6.0 - 16.0 | 0.5mm Radius |  |  | 40 |
| 158 |  | 4 |  | 2.0 - 16.0 | 0.1 - 3.00mm Radius |  |  | 42 |

## TuffCut® X-AL Carbide End Mills

Fraises carbure en bout | Hartmetall-Schaftfräser | Frese in Metallo Duro Integrale | Frezy palcowe pełnowęglikowe

APG ADVANCED PRODUCT GROUP

| Series | Tool Illustration | Z | Length | Ø Range (mm) | Corner Prep | Application Area | Matrial Group | Page |
|---|---|---|---|---|---|---|---|---|
| 135 |  | 2 |  | 3.0 - 25.0 | 0.2 - 0.75mm Radius |  |  | 46 |
| 135 N |  | 2 |  | 3.0 - 25.0 | 0.2 - 0.75mm Radius |  |  | 47 |
| 135 N3 |  | 2 |  | 3.0 - 25.0 | 0 - 5.0mm Radius |  |  | 48 |
| 135 N5 |  | 2 |  | 3.0 - 25.0 | 0 - 5.0mm Radius |  |  | 50 |
| 135B N3 |  | 2 |  | 3.0 - 16.0 | N/A |  |  | 52 |
| 135B N5 |  | 2 |  | 2.0 - 16.0 | N/A |  |  | 52 |

15-106 End Mills | Fraise en bout | Schaftfräser | Frese a Candela | Frez
107-112 Routers | Fraises Diamant | Fräser | Router | Routery
113-184 Drills | Forets | Bohrer | Punte | Wiertła
185-196 Reamers | Alésoirs | Reibahlen | Alesatori | Rozwiertaki
197-208 Countersinks | Fraises | Senker | Svasatori | Pogłębiacze
209-224 Burrs | Fraises Limes | Frässtifte | Lime Rotative | Zadziory

# Quick Find Contents

Trouvez Rapidement Des Produits | Inhaltsverzeichnis Mit Schnellsuche | Ricerca Rapida Dei Contenuti | Szybkie wyszukiwanie


15-106 End Mills, Fraise en bout, Schaftfräser, Frese a Candela, Frez

107-112 Routers, Fraises Diamant, Fräser, Router, Routery

113-184 Drills, Forets, Bohrer, Punte, Wiertła

185-196 Reamers, Alésoirs, Reibahlen, Alesatori, Rozwiertaki

197-208 Countersinks, Fraises, Senker, Svasatori, Pogłębiacze

209-224 Burrs, Fraises Limes, Frässtifte, Lime Rotative, Zadziory


## TuffCut® X-AL Carbide End Mills

Fraises carbure en bout | Hartmetall-Schaftfräser | Frese in Metallo Duro Integrale | Frezy palcowe pełnowęglikowe

APG ADVANCED PRODUCT GROUP

| Series | Tool Illustration | Z | Length | Ø Range (mm) | Corner Prep | Application Area | Matrial Group | Page |
|---|---|---|---|---|---|---|---|---|
| 137V N3 |  | 3 | | 3.0 - 20.0 | 0 - 6.0mm Radius | | | 53 |
| 137V N3 AL |  | 3 | | 3.0 - 20.0 | 0 - 6.0mm Radius | | | 53 |
| 137V N4 |  | 3 | | 3.0 - 20.0 | 0 - 4.0mm Radius | | | 55 |
| 137V N4 AL |  | 3 | | 3.0 - 20.0 | 0 - 4.0mm Radius | | | 55 |
| 137V N5 |  | 3 | | 3.0 - 20.0 | 0 - 4.0mm Radius | | | 57 |
| 137V N5 AL |  | 3 | | 3.0 - 20.0 | 0 - 4.0mm Radius | | | 57 |
| 138B |  | 3 | | 3.0- 16.0 | N/A | | | 59 |
| 138B N5 |  | 3 | | 2.0 - 16.0 | N/A | | | 59 |
| 137VR N3 |  | 3 | | 12.0 - 20.0 | 1.0mm Radius | | | 60 |
| 137VR N5 |  | 3 | | 12.0 - 20.0 | 1.0mm Radius | | | 60 |
| 137VF |  | 3 | | 3.0 - 20.0 | 0 - 2.0mm Radius | | | 61 |
| **Technical Information** Informations Techniques \| Technische Daten \| Informazioni Tecniche \| Informacje Techniczne | | | | | | | | 63-79 |

## Carbide End Mills

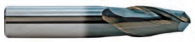
Fraises carbure en bout | Hartmetall-Schaftfräser | Frese in Metallo Duro Integrale | Frezy palcowe pełnowęglikowe

M.A. FORDMAX RANGE

| Series | Tool Illustration | Z | Length | Ø Range (mm) | Application Area | Matrial Group | Page |
|---|---|---|---|---|---|---|---|
| 164 |  | 2 | | 0.20 - 20.0 | | | 82 |
| 164A |  | 2 | | 3.0 - 20.0 | | | 82 |
| 169 |  | 3 | | 1.0 - 20.0 | | | 82 |
| 169A |  | 3 | | 3.0 - 20.0 | | | 82 |
| 163 |  | 4 | | 1.0 - 20.0 | | | 82 |
| 163A |  | 4 | | 1.5 - 20.0 | | | 82 |

# Carbide End Mills

Fraises carbure en bout | Hartmetall-Schaftfräser | Frese in Metallo Duro Integrale | Frezy palcowe pełnowęglikowe

| Series | Tool Illustration | Z | Length | Ø Range (mm) | Application Area | Matrial Group | Page |
|---|---|---|---|---|---|---|---|
| 166 |  | 2 | | 1.0 - 20.0 | | | 83 |
| 166A |  | 2 | | 3.0 - 20.0 | | | 83 |
| 165 |  | 4 | | 1.0 - 20.0 | | | 83 |
| 165A |  | 4 | | 1.0 - 20.0 | | | 83 |
| 192 |  | 3-4 | | 8.0 - 20.0 | | | 84 |
| 121 |  | 2 | | 0.2 - 25.0 | | | 84 |
| 121A |  | 2 | | 0.5 - 25.0 | | | 84 |
| 116 |  | 3 | | 1.0 - 25.0 | | | 84 |
| 116A |  | 3 | | 1.0 - 25.0 | | | 84 |
| 111 |  | 4 | | 0.2 - 25.0 | | | 84 |
| 111A |  | 4 | | 1.0 - 25.0 | | | 84 |
| 150 |  | 2 | | 0.4 - 25.0 | | | 86 |
| 150A |  | 2 | | 1.0 - 25.0 | | | 86 |
| 140 |  | 4 | | 1.0 - 25.0 | | | 86 |
| 140A |  | 4 | | 1.0 - 25.0 | | | 86 |
| VCM60 |  | 4, 6 | | 4.0 -16.0 | Chamfer | | 87 |
| VCM60A |  | 4, 6 | | 4.0 -16.0 | Chamfer | | 87 |
| VCM90 |  | 4, 6 | | 4.0 -16.0 | Chamfer | | 87 |
| VCM90A |  | 4, 6 | | 4.0 -16.0 | Chamfer | | 87 |
| ACR |  | 4 | | 3.0 - 16.0<br>R0.25 - R6.0 | Corner Rounding | | 87 |
| MV4 |  | 4 | | 6.0 - 20.0<br>R0.25 - R6.0 | | | 88 |

15-106 End Mills | Fraise en bout | Schaftfräser | Frese a Candela | Frez
107-112 Routers | Fraises Diamant | Fräser | Router | Routery
113-184 Drills | Forets | Bohrer | Punte | Wiertła
185-196 Reamers | Alésoirs | Reibahlen | Alesatori | Rozwiertaki
197-208 Countersinks | Fraises | Senker | Svasatori | Pogłębiacze
209-224 Burrs | Fraises Limes | Frässtifte | Lime Rotative | Zadziory

# Quick Find Contents

Trouvez Rapidement Des Produits | Inhaltsverzeichnis Mit Schnellsuche | Ricerca Rapida Dei Contenuti | Szybkie wyszukiwanie


15-106 End Mills Fraise en bout Schaftfräser Frese a Candela Frez

107-112 Routers Fraises Diamant Fräser Router Routery

113-184 Drills Forets Bohrer Punte Wiertła

185-196 Reamers Alésoirs Reibahlen Alesatori Rozwiertaki

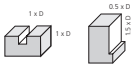
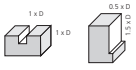
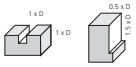
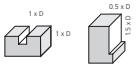
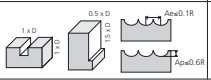
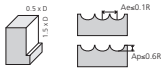
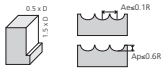
197-208 Countersinks Fraises Senker Svasatori Pogłębiacze

209-224 Burrs Fraises Limes Frässtifte Lime Rotative Zadziory


## Carbide End Mills Anti-Vibration

Fraises carbure en bout anti-vibrations | Hartmetall-Schaftfräser für vibrationsfreies Fräsen | Frese in Metallo Duro Integrale profilo antivibrante | Antywibracyjne frezy palcowe pełnowęglikowe

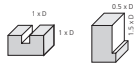
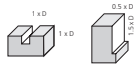
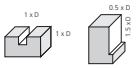
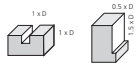
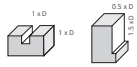
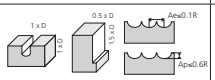
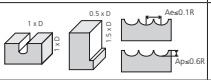
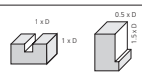
M.A. FORDMAX RANGE

| Series | Tool Illustration | Z | Length | Ø Range (mm) | Application Area | Matrial Group | Page |
|---|---|---|---|---|---|---|---|
| ASV4ACM |  | 4 |  | 3.0 - 20.0 |  |  | 91 |
| ASV 4ACM-R |  | 4 |  | 3.0 - 20.0 |  |  | 92 |
| VMH |  | 4 |  | 3.0 - 20.0 |  |  | 93 |
| VMH-W |  | 4 |  | 3.0 - 20.0 |  |  | 94 |
| V4L |  | 4 |  | 6.0 - 20.0 |  |  | 94 |
| V4LB Coated |  | 4 |  | 6.0 - 20.0 |  |  | 94 |
| ASV4ACB |  | 4 |  | 3.0 - 20.0 |  |  | 95 |
| V4LB |  | 4 |  | 6.0 - 20.0 |  |  | 95 |
| V4LB-B Coated |  | 4 |  | 6.0 - 20.0 |  |  | 95 |

## Carbide End Mills For Aluminium

Fraises carbure en bout pour l'aluminium | Hartmetall-Schaftfräser für Aluminium | Frese in Metallo Duro Integrale per alluminio | Frezy pełnowęglikowe palcowe do aluminium

M.A. FORDMAX RANGE

| Series | Tool Illustration | Z | Length | Ø Range (mm) | Application Area | Matrial Group | Page |
|---|---|---|---|---|---|---|---|
| GT2 |  | 2 |  | 1.0 - 20.0 |  |  | 96 |
| GT3 |  | 3 |  | 3.0 - 20.0 |  |  | 96 |
| ASVSM |  | 3 |  | 3.0 - 20.0 |  |  | 96 |
| GT2R |  | 2 |  | 2.0 - 20.0 |  |  | 97 |
| GT3R |  | 3 |  | 3.0 - 20.0 |  |  | 97 |
| GT2B |  | 2 |  | 3.0 - 20.0 |  |  | 98 |
| GT3B |  | 3 |  | 3.0 - 20.0 |  |  | 98 |
| 134 |  | 3 |  | 6.0 - 25.0 |  |  | 98 |


**Technical Information** | Informations Techniques | Technische Daten | Informazioni Tecniche | Informacje Techniczne 99-106

## Diamond Grind Routers

Fraises diamant pour composites | Diamant-Oberfräsen | Router con taglio a diamante | Pilnik obrotowy z pokryciem diamentowym

APG ADVANCED PRODUCT GROUP

| Series | Tool Illustration | Length | Ø Range (mm) | Coating | Matrial Group | Page |
|---|---|---|---|---|---|---|
| 239 |  | 38 - 100 | 3.0 -12.0 | Uncoated | | 108 |
| 239GX |  | 38 - 100 | 3.0 -12.0 | GemX | | 108 |
| **Technical Information** | Informations Techniques \| Technische Daten \| Informazioni Tecniche \| Informacje Techniczne | | | | | 109 |

## Diamond Grind Routers

Fraises diamant pour composites | Diamant-Oberfräsen | Router con taglio a diamante | Pilnik obrotowy z pokryciem diamentowym

M.A. FORDMAX RANGE

| Series | Tool Illustration | Length | Ø Range (mm) | Coating | Matrial Group | Page |
|---|---|---|---|---|---|---|
| 230 |  | 38 - 64 | 0.8 - 8.0 | - | | 111 |
| 231 |  | 38 - 64 | 0.8 - 8.0 | - | | 111 |
| 231B |  | 38 - 64 | 0.8 - 8.0 | - | | 111 |
| 231D |  | 38 - 64 | 0.8 - 8.0 | - | | 111 |
| 231F |  | 38 - 64 | 0.8 - 8.0 | - | | 111 |
| 230CE |  | 38 - 64 | 0.8 - 8.0 | CERAedge™ | | 111 |
| 231CE |  | 38 - 64 | 0.8 - 8.0 | CERAedge™ | | 111 |
| 231BCE |  | 38 - 64 | 0.8 - 8.0 | CERAedge™ | | 111 |
| 231DCE |  | 38 - 64 | 0.8 - 8.0 | CERAedge™ | | 111 |
| **Technical Information** | Informations Techniques \| Technische Daten \| Informazioni Tecniche \| Informacje Techniczne | | | | | 112 |

15-106 End Mills | Fraise en bout | Schaftfräser | Frese a Candela | Frez
107-112 Routers | Fraises Diamant | Fräser | Router | Routery
113-184 Drills | Forets | Bohrer | Punte | Wiertła
185-196 Reamers | Alésoirs | Reibahlen | Alesatori | Rozwiertaki
197-208 Countersinks | Fraises | Senker | Svasatori | Pogłębiacze
209-224 Burrs | Fraises Limes | Frässtifte | Lime Rotative | Zadziory

15-106 End Mills | Fraise en bout | Schaftfräser | Frese a Candela | Frez

107-112 Routers | Fraises Diamant | Fräser | Router | Routery

113-184 Drills | Forets | Bohrer | Punte | Wiertła

185-196 Reamers | Alésoirs | Reibahlen | Alesatori | Rozwiertaki

197-208 Countersinks | Fraises | Senker | Svasatori | Pogłębiacze

209-224 Burrs | Fraises Limes | Frässtifte | Lime Rotative | Zadziory


## High Performance Drills

Foret Haute Performance | Hochleistungsbohrer | Punte ad alte prestazioni | Wiertła wysoko wydajne

APG ADVANCED PRODUCT GROUP

| Series | Tool Illustration | Drilling Depth | Ø Range (mm) | Internal Coolant | Coating | Matrial Group | Page |
|---|---|---|---|---|---|---|---|
| 305 |  | Various | 0.1 - 3.0 | - | - | | 114 |
| 305AM |  | Various | 0.3 - 3.0 | - | ALtima® Micro | | 116 |
| MPDCS |  | 2 x D | 1.0 - 2.95 | | ALtima® | | 117 |
| MXDSR |  | 5 x D | 0.5 - 2.95 | - | ALtima® | | 118 |
| MXDCR |  | 5 x D | 1.0 - 2.95 | | ALtima® | | 119 |
| 200S |  | Spot Drill | 3.0 - 16.0 | - | ALtima® | | 120 |
| CXDSS |  | 3 x D | 3.0 - 20.0 | - | ALtima® Plus | | 120 |
| CXDCS |  | 3 x D | 3.0 - 16.0 | | ALtima® Plus | | 120 |
| XDSSM |  | 3 x D | 2.5 - 20.0 | - | ALtima® | | 124 |
| XDCSM |  | 3 x D | 3.0 - 16.0 | | ALtima® | | 124 |
| CXDSR |  | 5 x D | 3.0 - 16.0 | - | ALtima® Plus | | 127 |
| CXDCR |  | 5 x D | 3.0 - 20.0 | | ALtima® Plus | | 127 |
| XDSRM |  | 5 x D | 0.5 - 16.0 | - | ALtima® | | 130 |
| XDCRM |  | 5 x D | 3.0 - 20.0 | | ALtima® | | 130 |
| XDCLM |  | 7+ x D | 3.0 - 12.0 | | ALtima® | | 133 |
| CXDCLM |  | 8 x D | 3.0 - 16.0 | | ALtima® Plus | | 135 |
| CXDCEM |  | 15 x D | 3.0 - 12.0 | | ALtima® Plus | | 139 |
| MDCLM |  | 10 x D | 2.0 - 2.95 | | ALtima® | | 140 |
| MXDCL |  | 12 x D | 1.0 - 2.95 | | ALtima® | | 141 |
| XDCEM |  | 12+ x D | 4.0 - 12.7 | | ALtima® | | 142 |
| CDACRM |  | 5 x D | 3.0 - 12.5 | | - | | 143 |


**Technical Information** | Informations Techniques | Technische Daten | Informazioni Tecniche | Informacje Techniczne 145-156

## General Purpose Drills

Forets pour utilisation générale | Universalbohrer | Punte per uso generale | Wiertła ogólnego przeznaczenia

| Series | Tool Illustration | Drilling Depth | Ø Range (mm) | Internal Coolant | Coating | Matrial Group | Page |
|---|---|---|---|---|---|---|---|
| 302 |  | Various | 0.1 - 3.15 | - | - | | 158 |
| 200 |  | 3 x D | 0.8 - 20.0 | - | - | | 159 |
| 207 |  | 5 x D | 2.4 - 12.0 | - | - | | 161 |
| 205 |  | 5 x D | 0.3 - 20.0 | - | - | | 162 |
| 300 |  | 5 x D | 0.5 - 3.15 | - | - | | 164 |
| HPDSS |  | 3 x D | 3.0 - 16.0 | - | ALtima® | | 165 |
| HPDCS |  | 3 x D | 3.0 - 16.0 | | ALtima® | | 165 |
| HPDSR |  | 5 x D | 3.0 - 16.0 | - | ALtima® | | 168 |
| HPDCR |  | 5 x D | 3.0 - 16.0 | | ALtima® | | 168 |
| 229 |  | 4-5 x D | 2.0 - 16.0 | - | - | | 171 |
| 224 |  | 5 x D | 0.3 - 20.0 | - | - | | 172 |
| 402 |  | Centre Drill | 0.5 - 5.0 | - | - | | 174 |
| 404 |  | Spot Drill 90° | 5.0 - 12.0 | - | - | | 175 |
| 403 |  | Spot Drill 120° | 5.0 - 12.0 | - | - | | 176 |
| PRM-KSN |  | 8+xD | 0.3 - 0.9 | - | - | | 176 |
| PRXS-KST |  | Various | 1.0 - 13.0 | - | TiN | | 177 |
| PRXS-KMT |  | 7+xD | 1.0 - 13.0 | - | TiN | | 178 |
| **Technical Information** | Informations Techniques \| Technische Daten \| Informazioni Tecniche \| Informacje Techniczne | | | | | | 180-184 |

## Reamers

Alésoirs | Reibahlen | Alesatori | Rozwiertaki

| Series | Tool Illustration | Shank Form | Tool Material | Ø Range (mm) | Coating | Tolerance | Matrial Group | Page |
|---|---|---|---|---|---|---|---|---|
| 272 |  | M.A.FORD Standard | VHM | 0.33 - 16.0 | - | H7 | | 187 |
| **Technical Information** | Informations Techniques \| Technische Daten \| Informazioni Tecniche \| Informacje Techniczne | | | | | | | 196 |

15-106 End Mills | Fraise en bout | Schaftfräser | Frese a Candela | Frez
107-112 Routers | Fraises Diamant | Fräser | Router | Routery
113-184 Drills | Forets | Bohrer | Punte | Wiertła
185-196 Reamers | Alésoirs | Reibahlen | Alesatori | Rozwiertaki
197-208 Countersinks | Fraises | Senker | Svasatori | Pogłębiacze
209-224 Burrs | Fraises Limes | Frässtifte | Lime Rotative | Zadziory

## Countersinks

Fraises | Senker | Svasatori | Pogłębiacze

M.A. FORDMAX RANGE

| Series | Tool Illustration | Tool Material | Z | Included Angles | Ø Range (mm) | Type | Surface Treatment | Material Groups | Page |
|---|---|---|---|---|---|---|---|---|---|
| 60 |  | VHM | 1 | 60°, 82°, 90°, 100° | 3.2 - 25.4 | UniFlute® | X | | 198 |
| 61 |  | HSS | 1 | 60°, 82°, 90°, 100°, 120° | 3.2 - 76.2 | UniFlute® | Steam Treated | | 198 |
| 61B |  | HSS | 1 | 60°, 82°, 90°, 100°, 120° | 3.2 - 25.4 | UniFlute® | ALtima® Blaze | | 199 |
| 61T |  | HSS | 1 | 60°, 82°, 90°, 100°, 120° | 3.2 - 25.4 | UniFlute® | TiN | | 199 |
| 92 |  | HSS | 3 | 60°, 82°, 90°, 100°, 120° | 6.4 - 50.8 | Aircraft 3 Flute | Bright Finish | | 204 |
| 893T |  | HSS | 3 | 90° | 4.3 - 31.0 | 3 Flute | TiN | | 205 |
| 78 |  | VHM | 6 | 60°, 82°, 90°, 100°, 120° | 3.2 - 38.1 | Vibration Free 6 Flute | X | | 201 |
| 79 |  | HSS | 6 | 60°, 82°, 90°, 100°, 120° | 3.2 - 76.2 | Vibration Free 6 Flute | Steam Treated | | 201 |
| 79B |  | HSS | 6 | 60°, 82°, 90°, 100°, 120° | 3.2 - 25.4 | Vibration Free 6 Flute | ALtima® Blaze | | 202 |
| 79T |  | HSS | 6 | 60°, 82°, 90°, 100°, 120° | 3.2 - 25.4 | Vibration Free 6 Flute | TiN | | 202 |
| 61 Set | UniFlute® HSS Countersink Sets - Series 61, 61T | | | | |  | Steam Treated | | 200 |
| 61T Set | | | | | | | TiN | | 200 |
| 79 Set | Vibration Free HSS Countersink Sets - Series 79, 79T | | | | |  | Steam Treated | | 203 |
| 79T Set | | | | | | | TiN | | 203 |
| 92 Set | 3 Flute Aircraft HSS Countersink Sets - Series 92 | | | | |  | Bright Finish | | 204 |
| 893T Set | 3 Flute HSS 90° Countersink Sets - Series 893T | | | | |  | TiN | | 205 |

**Technical Information** | Informations Techniques | Technische Daten | Informazioni Tecniche | Informacje Techniczne 206-208


15-106 End Mills | Fraise en bout | Schaftfräser | Frese a Candela | Frez

107-112 Routers | Fraises Diamant | Fräser | Router | Routery

113-184 Drills | Forets | Bohrer | Punte | Wiertła

185-196 Reamers | Alésoirs | Reibahlen | Alesatori | Rozwiertaki

197-208 Countersinks | Fraises | Senker | Svasatori | Pogłębiacze

209-224 Burrs | Fraises Limes | Fräsfeile | Lime Rotative | Zadziory

# Carbide Burrs

Fraise Lime Rotative Carbure | Hartmetall-Fräs(„Stifte") | Lime rotative in MD | Zadziory

M.A. FORDMAX RANGE

| Series | Tool Illustration | Lengths | Ø Range (mm) | Available Shank Ø | Page |
|---|---|---|---|---|---|
| SA |  | | Ø1.6 - Ø25.0 | 3.0<br>6.0<br>8.0* | 210 |
| SB |  | | Ø3.0 - Ø25.0 | 3.0<br>6.0<br>8.0* | 211 |
| SC |  | | Ø2.4 - Ø25.0 | 3.0<br>6.0<br>8.0* | 212 |
| SD |  | | Ø2.4 - Ø25.0 | 3.0<br>6.0<br>8.0* | 213 |
| SE |  | | Ø3.0 - Ø19.0 | 3.0<br>6.0<br>8.0* | 214 |
| SF |  | | Ø3.0 - Ø19.0 | 3.0<br>6.0<br>8.0* | 215 |
| SG |  | | Ø3.0 - Ø19.0 | 3.0<br>6.0<br>8.0* | 216 |
| SH |  | | Ø3.0 - Ø19.0 | 3.0<br>6.0<br>8.0* | 217 |
| SJ |  | | Ø3.0 - Ø25.0 | 3.0<br>6.0<br>8.0* | 218 |
| SK |  | | Ø3.0 - Ø25.0 | 3.0<br>6.0<br>8.0* | 219 |
| SL |  | | Ø3.0 - Ø19.0 | 3.0<br>6.0<br>8.0* | 220 |
| SM |  | | Ø3.0 - Ø16.0 | 3.0<br>6.0<br>8.0* | 221 |
| SN |  | | Ø2.4 - Ø19.0 | 3.0<br>6.0<br>8.0* | 222 |
| **Technical Information** \| Informations Techniques \| Technische Daten \| Informazioni Tecniche \| Informacje Techniczne | | | | | 223-224 |

* Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

15-106 End Mills | Fraise en bout | Schaftfräser | Frese a Candela | Frez
107-112 Routers | Fraises Diamant | Fräser | Router | Routery
113-184 Drills | Forets | Bohrer | Punte | Wiertła
185-196 Reamers | Alésoirs | Reibahlen | Alesatori | Rozwiertaki
197-208 Countersinks | Fraises | Senker | Svasatori | Pogłębiacze
209-224 Burrs | Fraises Limes | Frässtifte | Lime Rotative | Zadziory

# Key
Clé | Keile | Legenda | Klucz


15-106
End Mills
Fraise en bout
Schaftfräser
Frese a Candela
Frez

107-112
Routers
Fraises Diamant
Fräser
Router
Routery

113-184
Drills
Forets
Bohrer
Punte
Wiertła

185-196
Reamers
Alésoirs
Reibahlen
Alesatori
Rozwiertaki

197-208
Countersinks
Fraises
Senker
Svasatori
Pogłębiacze

209-224
Burrs
Fraises Limes
Frässtifte
Lime Rotative
Zadziory





**Tool Material**
Matière de l'outil
Werkzeugmaterial
Materiale Tagliente
Materiał Narzędzia




**Number of Flutes**
Nombre de Goujures
Anzahl der Schneiden
Numero di Taglienti
Ilość Ostrzy




**Helix Angle**
Angle d'hélice
Drallwinkel
Angolo dell'elica
Kąt linii śrubowej



**Centre Cutting**
Coupe au Centre
Zentrumschnitt
Taglio al Centro
Cięcie Centralne



**Lengths**
Longueurs
Längen
Lunghezze
Długość



**Cutting Directon**
Sens de Coupe
Schnittrichtung
Direzione di Taglio
Kierunek Cięcia



**Profiling**
Profilage
Profilerstellung
Contornatura
Profilowanie



**Slotting**
Rainurage
Nutfräsen
Scanalatura
Dłutowanie



**3D Scanning**
Numérisation 3D
3-D-Scannen
Copiatura di Profilo
Skanowanie 3D




**Shank**
Tiges
Schaft
Gambo
Chwyt




**Neck Relief**
Encolure
Abgesetzter Schaft
Collo Scaricato
Zwolnienie szyjki




**Material Hardness**
Dureté du matériau
Materialhärte
Durezza del materiale
Twardość materiału




**Coating**
Revêtement
Beschichtung
Rivestimento
Powłoka




**Uncoated or Coated**
Sans revêtement ou avec revêtement
Unbeschichtet oder beschichtet
Non rivestito o rivestito
Niepowlekane lub powlekane




**Uncoated**
Sans revêtement
Unbeschichtet
Non rivestito
Niepowlekane



**Solid**
Solide
Fest
Solido
Lity



**Coolant Feed**
Liquide de refroidissement
Kühlmittelzufuhr
Con fori di lubrificazione
Chłodziwo




**Drill Point Angle**
Foret à angle de pointe
Spitzenwinkel der Bohrerspitze
Angolo al vertice della punta
Kąt wiercenia




**DIN Specs**
Normes DIN
DIN-Normen
Norme DIN
Specyfikacje DIN




**Lead Chamfer**
Chanfrein de bec
Einführschräge
Smusso d'imbocco
Główna faza




**Right Hand Cutting**
Coupe à droite
Rechts schneidend
Taglio destro
Prawostronne cięcie




**Included Angles**
Angle inclus
Eingeschlossener Winkel
Angoli inclusi
Kąt zawarty




**Thread Angle**
Angle filetage
Spitzenwinkel
Angolo del profilo
Kąt gwintów




**Lead**
Conduire
Werkzeugmaterial
Imbocco
Nakrój



**Hole Depth Type**
Type de profondeur de trou
Lochtiefe
Profondità del foro
Głębokość otworu




**Hole Depth Type**
Type de profondeur de trou
Lochtiefe
Profondità del foro
Głębokość otworu



**Wear Safety Glassess**
Portez des lunettes de protection
Schutzbrille tragen
Indossare occhiali di sicurezza
Załóż okulary ochronne



**Wear Ear Defenders**
Portez des protège-oreilles
Gehörschutz tragen
Usare le protezioni auricolari
Załóż ochraniacze słuchu



**Wear Protective Mask**
Portez des protège-oreilles
Schutzmaske tragen
Indossare la maschera di protezione
Załóż maskę ochronną



**Wear Protective Gloves**
Portez des gants de protection
Schutzhandschuhe tragen
Indossare I guanti di protezione
Załóż ochronne rekawice




**Wiper Flat**
Essuie-glace Plat
Wischer Flach
Wiper Flat
Wycieraczka Płaska



**Read Instructions**
Lisez les instructions
Die Anleitung beachten
Leggere le istruzioni
Przeczytaj instrukcje




**Technical Information**
Informations techniques
Technische Daten
Informazioni tecniche
Informacje techniczne



**Corner Radius**
Rayon d'angle
Eckenradius
Spigolo Raggiato
Promień naroża



**Ballnose**
Nez boule
Kugelnase
Naso a palla
Nos kulisty




**Chipbreaker**
Brise-copeaux
Spanbrecher
Rompitruciolo
Łamacz wiórów




**Thread Forms**
Formes de fil
Faden bildet
Forme di filo
Formy wątków




**Cam Radius**
Rayon de came
Nockenradius
Raggio di camma
Promień krzywki




**Depth of Cut**
Profondeur de coupe
Schnitttiefe
Profondità di taglio
Głębokość cięcia




**Tolerance Range**
Plage de tolérance
Toleranzbereich
Intervallo di tolleranza
Zakres tolerancji



**Profiling**
Profilage
Profilierung
Profilazione
Profilowanie




**X Shape**
Forme en X
X-Form
Forma a X
X kształt

15-106
End Mills
Fraise en bout
Schaftfräser
Frese a Candela
Frez

107-112
Routers
Fraises Diamant
Fräser
Router
Routery

113-184
Drills
Forets
Bohrer
Punte
Wiertła

185-196
Reamers
Alésoirs
Reibahlen
Alesatori
Rozwiertaki

197-208
Countersinks
Fraises
Senker
Svasatori
Pogłębiacze

209-224
Burrs
Fraises Limes
Frässtifte
Lime Rotative
Zadziory

15-106
End Mills
Fraise en bout
Schaftfräser
Frese a Candela
Frez

107-112
Routers
Fraises Diamant
Fräser
Router
Routery

113-184
Drills
Forets
Bohrer
Punte
Wiertła

185-196
Reamers
Alésoirs
Reibahlen
Alesatori
Rozwiertaki

197-208
Countersinks
Fraises
Senker
Svasatori
Pogłębiacze

209-224
Burrs
Fraises Limes
Frässtifte
Lime Rotative
Zadziory

## Workpiece Material Group

¦ Groupe de matériaux des pièces ¦ Materialgruppen der Werkstücke
¦ Gruppo del materiale da lavorare ¦ Grupa materiałów obrabianego przedmiotu

### Steel
Acier
Stahl
Acciaio
Stal

### Cast Iron
Fontes
Gusseisen
Ghisa
Żeliwo

### Hardened Steels (35-65Rc)
Aciers trempés (35-65Rc)
Gehärteter Stahl (35-65Rc)
Acciai temprati (35-65Rc)
Stal Hartowana (35-65Rc)

### Special Alloys
Alliages spéciaux
Speziallegierungen
Leghe speciali
Stopy specjalne

### Stainless Steels
Aciers inoxydables
Rostfreier Stahl
Acciai inossidabili
Stale nierdzewne

### Non-Ferrous
Métaux non-ferreux
Nicht eisenhaltig
Non ferroso
Materiał nieżelazny



APG
ADVANCED PRODUCT GROUP

# TuffCut® XR-XT

## Carbide End Mills

Fraises carbure en bout | Hartmetall-Schaftfräser
Frese in Metallo Duro Integrale
Frezy palcowe pełnowęglikowe

TuffCut® XR and XT end mills form a key part of our high performance APG range and deliver outstanding results to maximise productivity, minimise process downtime and optimise cost efficiency on materials such as stainless steels, high temperature alloys and hardened steel.

(FR)

"Les fraises TuffCut® XR et XT font partie de notre gamme à haute performance APG et offrent des résultats exceptionnels afin de maximiser la productivité, de minimiser les temps d'arrêt et d'optimiser la rentabilité dans les matériaux comme les aciers inoxydables, les alliages haute température et l'acier trempé."

(DE)

TuffCut® XR- und XT-Schaftfräser sind ein wichtiger Bestandteil unseres APG-Hochleistungssortiments. Sie liefern ausgezeichnete Ergebnisse und erhöhen so die Produktivität, verringern die Ausfallzeiten im Prozess und optimieren die Kosteneffizienz bei Material wie rostfreiem Stahl, hochtemperaturfesten Legierungen sowie gehärtetem Stahl.

(IT)

Le frese TuffCut® XR e XT sono il fulcro del nostro programma di utensili ad alte prestazioni APG e permettono di ottenere risultati eccezionali per massimizzare la produttività, ridurre al minimo il tempo di inattività dei processi e ottimizzare i costi su materiali quali acciai inossidabili, leghe ad alta temperatura ed acciaio temprato.

(PL)

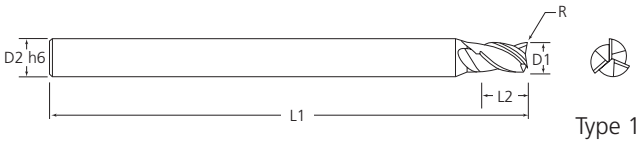
Frezy TuffCut® XR i XT stanowią kluczową część naszego wysokowydajnego asortymentu APG i zapewniają znakomite rezultaty. Gwarantujemy zwiększenie wydajności, obniżenie czasu obróbki i optymalizacji kosztów w takich materiałach jakstal nierdzewna, stopy wysokotemperaturowe i stal hartowana


| | Page |
|---|---|
| **TuffCut®** Series 3MVS, 3MVR | 16-17 |
| **TuffCut® XR** Series 177, 177-W, 177R | 18-19 |
| **TuffCut® XR** Series 177RW, 177S, 177LR N5 | 20-21 |
| **TuffCut® XT** Series 277N, 277N-W | 22 |
| **TuffCut® XT** Series 277NR | 23 |
| **TuffCut® XT** Series277NR-W | 24 |
| **TuffCut® XR** Series 178, 178-W | 25-26 |
| **TuffCut® XR** Series 178R, 178-1, 178-1W | 26-27 |
| **TuffCut® XT** Series 278R N3, 278R N3-W | 28-29 |
| **TuffCut® XT** Series 278CBR N3, 278CBR N3-W | 30 |
| **TuffCut® XT** Series 278R N4, 278R N5 | 31 |
| **TuffCut® XT** Series 278R N5CT | 32 |
| **TuffCut® XR** Series 113A | 32 |
| **TuffCut® XR** Series 179, 179L N5 | 33 |
| **TuffCut® XT** Series 279 | 34 |
| **TuffCut® XT** Series MFPB, MFTB, MFNB | 35 |
| **TuffCut® XR7** Series 180, 180R, 180CBR, 180CBR-W | 36-37 |
| **TuffCut® XR7** Series 180N5 | 38 |
| **TuffCut® XT9** Series 380, 380-W | 39 |
| **TuffCut® XT** Series V5LCB - CT with Central Coolant, V5LCB | 40-41 |
| **TuffCut®** Series 158 Corner Radius High Feed Roughing | 42 |
| **TuffCut®** Series 158 Corner Radius | 43 |
| **Technical Information** | 63-74 |

# TuffCut® Series 3MVS

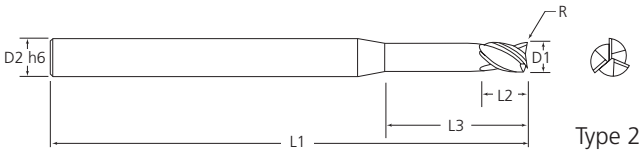





Type 1





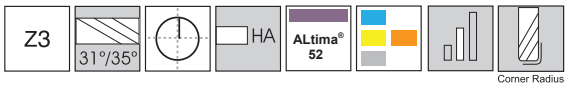

Type 2

new items

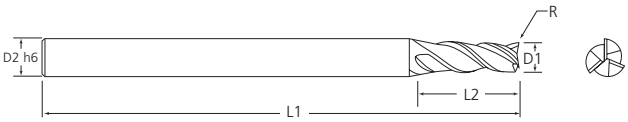
| Tool Number | EDP | D1 | D2 | L1 | L2 | L3 | R | Type |
|---|---|---|---|---|---|---|---|---|
| 3MVSM0050AH | 39004 | 0.5 | 4.0 | 50.0 | 0.75 | - | - | 1 |
| 3MVSM0050R.10AH | 39070 | 0.5 | 4.0 | 50.0 | 0.75 | - | 0.1 | 1 |
| 3MVSM0050R.10N5AH | 39072 | 0.5 | 4.0 | 50.0 | 0.75 | 2.5 | 0.1 | 2 |
| 3MVSM0050R.10N8AH | 39073 | 0.5 | 4.0 | 50.0 | 0.75 | 4.0 | 0.1 | 2 |
| 3MVSM0100AH | 39014 | 1.0 | 4.0 | 50.0 | 1.5 | - | - | 1 |
| 3MVSM0100N5AH | 39016 | 1.0 | 4.0 | 50.0 | 1.5 | 5.0 | - | 2 |
| 3MVSM0100N8AH | 39017 | 1.0 | 4.0 | 50.0 | 1.5 | 8.0 | - | 2 |
| 3MVSM0100R.10AH | 39082 | 1.0 | 4.0 | 50.0 | 1.5 | - | 0.1 | 1 |
| 3MVSM0100R.10N5AH | 39084 | 1.0 | 4.0 | 50.0 | 1.5 | 5.0 | 0.1 | 2 |
| 3MVSM0100R.10N8AH | 39085 | 1.0 | 4.0 | 50.0 | 1.5 | 8.0 | 0.1 | 2 |
| 3MVSM0150AH | 39023 | 1.5 | 4.0 | 50.0 | 2.25 | - | - | 1 |
| 3MVSM0150R.20AH | 39094 | 1.5 | 4.0 | 50.0 | 2.25 | - | 0.2 | 1 |
| 3MVSM0150R.20N5AH | 39096 | 1.5 | 4.0 | 50.0 | 2.25 | 7.5 | 0.2 | 2 |
| 3MVSM0150R.20N8AH | 39097 | 1.5 | 4.0 | 50.0 | 2.25 | 12 | 0.2 | 2 |
| 3MVSM0150R.50AH | 39162 | 1.5 | 4.0 | 50.0 | 2.25 | - | 0.5 | 1 |
| 3MVSM0150R.50N6AH | 39163 | 1.5 | 4.0 | 50.0 | 2.25 | 10.0 | 0.5 | 2 |
| 3MVSM0150R.50N8AH | 39164 | 1.5 | 4.0 | 50.0 | 2.25 | 12.0 | 0.5 | 2 |
| 3MVSM0200AH | 39038 | 2.0 | 4.0 | 50.0 | 3.0 | - | - | 1 |
| 3MVSM0200N5AH | 39040 | 2.0 | 4.0 | 50.0 | 3.0 | 10.0 | - | 2 |
| 3MVSM0200N8AH | 39041 | 2.0 | 4.0 | 50.0 | 3.0 | 16.0 | - | 2 |
| 3MVSM0200R.20AH | 39122 | 2.0 | 4.0 | 50.0 | 3.0 | - | 0.2 | 1 |
| 3MVSM0200R.20N5AH | 39124 | 2.0 | 4.0 | 50.0 | 3.0 | 10.0 | 0.2 | 2 |
| 3MVSM0200R.20N8AH | 39125 | 2.0 | 4.0 | 50.0 | 3.0 | 16.0 | 0.2 | 2 |
| 3MVSM0250AH | 39050 | 2.5 | 4.0 | 50.0 | 3.75 | - | - | 1 |
| 3MVSM0300AH | 39056 | 3.0 | 4.0 | 50.0 | 4.5 | - | - | 1 |
| 3MVSM0300N5AH | 39058 | 3.0 | 4.0 | 50.0 | 4.5 | 15.0 | - | 2 |
| 3MVSM0300N8AH | 39059 | 3.0 | 4.0 | 50.0 | 4.5 | 24.0 | - | 2 |
| 3MVSM0300R.20AH | 39142 | 3.0 | 4.0 | 50.0 | 4.5 | - | 0.2 | 1 |
| 3MVSM0300R.20N5AH | 39144 | 3.0 | 4.0 | 50.0 | 4.5 | 15.0 | 0.2 | 2 |
| 3MVSM0300R.20N8AH | 39145 | 3.0 | 4.0 | 50.0 | 4.5 | 24.0 | 0.2 | 2 |

P64

# TuffCut® Series 3MVR



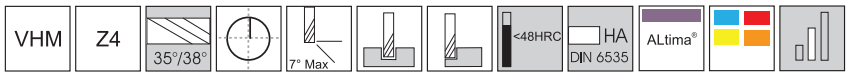


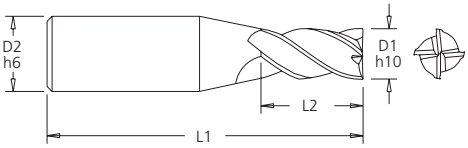

| Tool Number | EDP | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|---|
| 3MVRM0050AH | 39005 | 0.5 | 4.0 | 50.0 | 1.5 | - |
| 3MVRM0050R.10AH | 39071 | 0.5 | 4.0 | 50.0 | 1.5 | 0.1 |
| 3MVRM0100AH | 39015 | 1.0 | 4.0 | 50.0 | 3.0 | - |
| 3MVRM0100R.10AH | 39083 | 1.0 | 4.0 | 50.0 | 3.0 | 0.1 |
| 3MVRM0100R.20AH | 36166 | 1.0 | 4.0 | 50.0 | 3.0 | 0.2 |
| 3MVRM0150AH | 39024 | 1.5 | 4.0 | 50.0 | 4.5 | - |
| 3MVRM0150R.20AH | 39095 | 1.5 | 4.0 | 50.0 | 4.5 | 0.2 |
| 3MVRM0200AH | 39039 | 2.0 | 4.0 | 50.0 | 6.0 | - |
| 3MVRM0200R.20AH | 39123 | 2.0 | 4.0 | 50.0 | 6.0 | 0.2 |
| 3MVRM0250AH | 39051 | 2.5 | 4.0 | 50.0 | 7.5 | - |
| 3MVRM0300AH | 39057 | 3.0 | 4.0 | 50.0 | 9.0 | - |
| 3MVRM0300R.20AH | 39143 | 3.0 | 4.0 | 50.0 | 9.0 | 0.2 |

P64

# TuffCut® XR Series 177



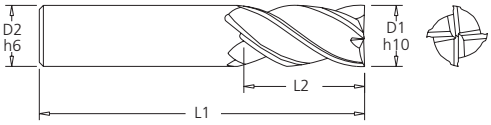



| Tool No. | EDP | D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|
| 177 0150A | 17680 | 1.5 | 3.0 | 38.0 | 3.0 |
| 177 0200A | 17682 | 2.0 | 3.0 | 38.0 | 4.0 |
| 177 0250A | 17684 | 2.5 | 3.0 | 38.0 | 5.0 |
| 177 0303A | 17686 | 3.0 | 3.0 | 38.0 | 6.0 |

P65

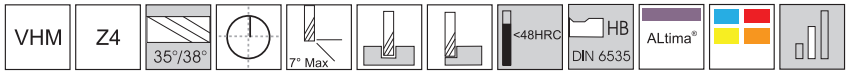




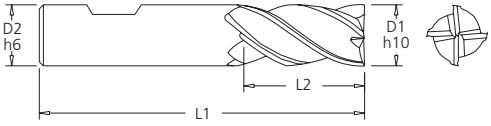

| Tool No. | EDP | D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|
| 177 0300A | 17928 | 3.0 | 6.0 | 57.0 | 8.0 |
| 177 0350A | 17688 | 3.5 | 6.0 | 57.0 | 7.0 |
| 177 0400A | 17930 | 4.0 | 6.0 | 57.0 | 11.0 |
| 177 0450A | 17690 | 4.5 | 6.0 | 57.0 | 9.0 |
| 177 0500A | 17932 | 5.0 | 6.0 | 57.0 | 13.0 |
| 177 0600A | 17934 | 6.0 | 6.0 | 57.0 | 13.0 |
| 177 0800A | 17937 | 8.0 | 8.0 | 63.0 | 19.0 |
| 177 1000A | 17940 | 10.0 | 10.0 | 72.0 | 22.0 |
| 177 1200A | 17943 | 12.0 | 12.0 | 83.0 | 26.0 |
| 177 1400A | 17946 | 14.0 | 14.0 | 83.0 | 26.0 |
| 177 1600A | 17950 | 16.0 | 16.0 | 92.0 | 32.0 |
| 177 1800A | 17952 | 18.0 | 18.0 | 92.0 | 32.0 |
| 177 2000A | 17955 | 20.0 | 20.0 | 104.0 | 38.0 |
| 177 2500A | 17957 | 25.0 | 25.0 | 104.0 | 38.0 |

P65

# TuffCut® XR Series 177-W



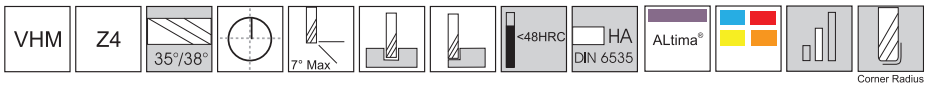


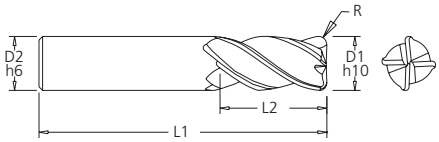

| Tool No. | EDP | D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|
| 177 0600AW | 19533 | 6.0 | 6.0 | 57.0 | 13.0 |
| 177 0800AW | 18526 | 8.0 | 8.0 | 63.0 | 19.0 |
| 177 1000AW | 75116 | 10.0 | 10.0 | 72.0 | 22.0 |
| 177 1200AW | 75121 | 12.0 | 12.0 | 83.0 | 26.0 |
| 177 1600AW | 75127 | 16.0 | 16.0 | 92.0 | 32.0 |
| 177 2000AW | 75133 | 20.0 | 20.0 | 104.0 | 38.0 |

P65

# TuffCut® XR Series 177R



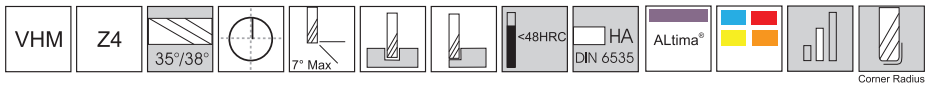


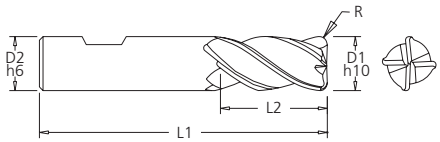

| Tool No. | EDP | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|---|
| 177 0300-0.25RA | 17929 | 3.0 | 6.0 | 57.0 | 8.0 | 0.25 |
| 177 0300-0.50RA | 17783 | 3.0 | 6.0 | 57.0 | 8.0 | 0.5 |
| 177 0400-0.25RA | 17931 | 4.0 | 6.0 | 57.0 | 11.0 | 0.25 |
| 177 0400-0.50RA | 17784 | 4.0 | 6.0 | 57.0 | 11.0 | 0.5 |
| 177 0500-0.25RA | 17933 | 5.0 | 6.0 | 57.0 | 13.0 | 0.25 |
| 177 0500-0.50RA | 17785 | 5.0 | 6.0 | 57.0 | 13.0 | 0.5 |
| 177 0600-0.25RA | 17786 | 6.0 | 6.0 | 57.0 | 13.0 | 0.25 |
| 177 0600-0.50RA | 17935 | 6.0 | 6.0 | 57.0 | 13.0 | 0.5 |
| 177 0600-1.0RA | 17787 | 6.0 | 6.0 | 57.0 | 13.0 | 1.0 |
| 177 0600-1.5RA | 17788 | 6.0 | 6.0 | 57.0 | 13.0 | 1.5 |
| 177 0600-2.0RA | 18070 | 6.0 | 6.0 | 57.0 | 13.0 | 2.0 |
| 177 0800-0.50RA | 17938 | 8.0 | 8.0 | 63.0 | 19.0 | 0.5 |
| 177 0800-1.0RA | 17789 | 8.0 | 8.0 | 63.0 | 19.0 | 1.0 |
| 177 0800-1.5RA | 17790 | 8.0 | 8.0 | 63.0 | 19.0 | 1.5 |
| 177 0800-2.0RA | 17791 | 8.0 | 8.0 | 63.0 | 19.0 | 2.0 |
| 177 0800-3.0RA | 18072 | 8.0 | 8.0 | 63.0 | 19.0 | 3.0 |
| 177 1000-0.50RA | 17941 | 10.0 | 10.0 | 72.0 | 22.0 | 0.5 |
| 177 1000-1.0RA | 17792 | 10.0 | 10.0 | 72.0 | 22.0 | 1.0 |
| 177 1000-1.5RA | 17793 | 10.0 | 10.0 | 72.0 | 22.0 | 1.5 |
| 177 1000-2.0RA | 17794 | 10.0 | 10.0 | 72.0 | 22.0 | 2.0 |
| 177 1000-3.0RA | 96603 | 10.0 | 10.0 | 72.0 | 22.0 | 3.0 |
| 177 1200-0.50RA | 17795 | 12.0 | 12.0 | 83.0 | 26.0 | 0.5 |
| 177 1200-0.75RA | 17944 | 12.0 | 12.0 | 83.0 | 26.0 | 0.75 |
| 177 1200-1.0RA | 17796 | 12.0 | 12.0 | 83.0 | 26.0 | 1.0 |
| 177 1200-1.5RA | 17797 | 12.0 | 12.0 | 83.0 | 26.0 | 1.5 |
| 177 1200-2.0RA | 17798 | 12.0 | 12.0 | 83.0 | 26.0 | 2.0 |
| 177 1200-2.5RA | 18074 | 12.0 | 12.0 | 83.0 | 26.0 | 2.5 |
| 177 1200-3.0RA | 96506 | 12.0 | 12.0 | 83.0 | 26.0 | 3.0 |
| 177 1200-4.0RA | 18076 | 12.0 | 12.0 | 83.0 | 26.0 | 4.0 |
| 177 1400-0.75RA | 17947 | 14.0 | 14.0 | 83.0 | 26.0 | 0.75 |
| 177 1600-0.50RA | 18078 | 16.0 | 16.0 | 92.0 | 32.0 | 0.5 |
| 177 1600-1.0RA | 17951 | 16.0 | 16.0 | 92.0 | 32.0 | 1.0 |
| 177 1600-1.5RA | 17799 | 16.0 | 16.0 | 92.0 | 32.0 | 1.5 |
| 177 1600-2.0RA | 17673 | 16.0 | 16.0 | 92.0 | 32.0 | 2.0 |
| 177 1600-2.5RA | 18080 | 16.0 | 16.0 | 92.0 | 32.0 | 2.5 |
| 177 1600-3.0RA | 17674 | 16.0 | 16.0 | 92.0 | 32.0 | 3.0 |
| 177 1600-4.0RA | 18082 | 16.0 | 16.0 | 92.0 | 32.0 | 4.0 |
| 177 1800-1.0RA | 17953 | 18.0 | 18.0 | 92.0 | 32.0 | 1.0 |
| 177 2000-1.0RA | 17956 | 20.0 | 20.0 | 104.0 | 38.0 | 1.0 |
| 177 2000-1.5RA | 18091 | 20.0 | 20.0 | 104.0 | 38.0 | 1.5 |
| 177 2000-2.0RA | 18084 | 20.0 | 20.0 | 104.0 | 38.0 | 2.0 |
| 177 2000-3.0RA | 18086 | 20.0 | 20.0 | 104.0 | 38.0 | 3.0 |
| 177 2000-4.0RA | 18088 | 20.0 | 20.0 | 104.0 | 38.0 | 4.0 |
| 177 2000-5.0RA | 18090 | 20.0 | 20.0 | 104.0 | 38.0 | 5.0 |
| 177 2000-6.0RA | 18092 | 20.0 | 20.0 | 104.0 | 38.0 | 6.0 |
| 177 2500-1.0RA | 17958 | 25.0 | 25.0 | 104.0 | 38.0 | 1.0 |

P65

# TuffCut® XR Series 177RW



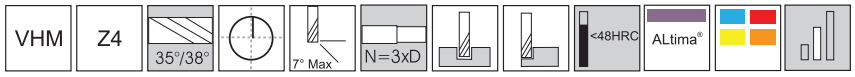


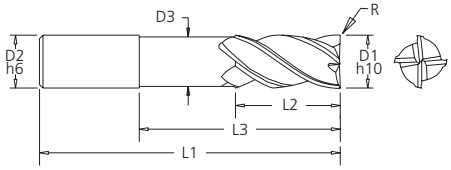

| Tool No. | EDP | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|---|
| 177 1200-0.50RAW | 14992 | 12.0 | 12.0 | 83.0 | 26.0 | 0.5 |
| 177 2000-1.0RAW | 75134 | 20.0 | 20.0 | 104.0 | 38.0 | 1.0 |

P65

# TuffCut® XR Series 177S






| Tool No. | EDP | D1 | D2 | D3 | L1 | L2 | L3 | Shank |
|---|---|---|---|---|---|---|---|---|
| 177S 0300A | 18218 | 3.0 | 6.0 | 2.9 | 50.0 | 5.0 | 11.0 | DIN 6535 HA |
| 177S 0400A | 18220 | 4.0 | 6.0 | 3.9 | 50.0 | 6.0 | 14.0 | DIN 6535 HA |
| 177S 0500A | 18222 | 5.0 | 6.0 | 4.9 | 57.0 | 8.0 | 17.0 | DIN 6535 HA |
| 177S 0600A | 18224 | 6.0 | 6.0 | 5.8 | 57.0 | 9.0 | 20.0 | DIN 6535 HA |
| 177S 0800A | 18226 | 8.0 | 8.0 | 7.6 | 63.0 | 12.0 | 26.0 | DIN 6535 HA |
| 177S 1000A | 18228 | 10.0 | 10.0 | 9.6 | 72.0 | 15.0 | 32.0 | DIN 6535 HA |
| 177S 1200A | 18230 | 12.0 | 12.0 | 11.4 | 83.0 | 18.0 | 38.0 | DIN 6535 HA |
| 177S 1600A | 18232 | 16.0 | 16.0 | 15.2 | 98.0 | 24.0 | 50.0 | DIN 6535 HA |
| 177S 2000A | 18234 | 20.0 | 20.0 | 19.2 | 112.0 | 30.0 | 62.0 | DIN 6535 HA |

HA DIN 6535

P65

| Tool No. | EDP | D1 | D2 | D3 | L1 | L2 | L3 | Shank |
|---|---|---|---|---|---|---|---|---|
| 177S 0300AW | 18254 | 3.0 | 6.0 | 2.9 | 50.0 | 5.0 | 11.0 | DIN 6535 HB |
| 177S 0400AW | 18256 | 4.0 | 6.0 | 3.9 | 50.0 | 6.0 | 14.0 | DIN 6535 HB |
| 177S 0500AW | 18258 | 5.0 | 6.0 | 4.9 | 57.0 | 8.0 | 17.0 | DIN 6535 HB |
| 177S 0600AW | 18260 | 6.0 | 6.0 | 5.8 | 57.0 | 9.0 | 20.0 | DIN 6535 HB |
| 177S 0800AW | 18262 | 8.0 | 8.0 | 7.6 | 63.0 | 12.0 | 26.0 | DIN 6535 HB |
| 177S 1000AW | 18264 | 10.0 | 10.0 | 9.6 | 72.0 | 15.0 | 32.0 | DIN 6535 HB |
| 177S 1200AW | 18266 | 12.0 | 12.0 | 11.4 | 83.0 | 18.0 | 38.0 | DIN 6535 HB |
| 177S 1600AW | 18268 | 16.0 | 16.0 | 15.2 | 98.0 | 24.0 | 50.0 | DIN 6535 HB |
| 177S 2000AW | 18270 | 20.0 | 20.0 | 19.2 | 112.0 | 30.0 | 62.0 | DIN 6535 HB |

HB DIN 6535

P65

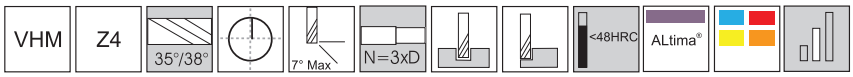
| Tool No. | EDP | D1 | D2 | D3 | L1 | L2 | L3 | R | Shank |
|---|---|---|---|---|---|---|---|---|---|
| 177S 03-0.2RA | 18200 | 3.0 | 6.0 | 2.9 | 50.0 | 5.0 | 11.0 | 0.2 | DIN 6535 HA |
| 177S 04-0.2RA | 18202 | 4.0 | 6.0 | 3.9 | 50.0 | 6.0 | 14.0 | 0.2 | DIN 6535 HA |
| 177S 05-0.2RA | 18204 | 5.0 | 6.0 | 4.9 | 57.0 | 8.0 | 17.0 | 0.2 | DIN 6535 HA |
| 177S 06-0.3RA | 18206 | 6.0 | 6.0 | 5.8 | 57.0 | 9.0 | 20.0 | 0.3 | DIN 6535 HA |
| 177S 08-0.5RA | 18208 | 8.0 | 8.0 | 7.6 | 63.0 | 12.0 | 26.0 | 0.5 | DIN 6535 HA |
| 177S 10-0.5RA | 18210 | 10.0 | 10.0 | 9.6 | 72.0 | 15.0 | 32.0 | 0.5 | DIN 6535 HA |
| 177S 12-0.5RA | 18212 | 12.0 | 12.0 | 11.4 | 83.0 | 18.0 | 38.0 | 0.5 | DIN 6535 HA |
| 177S 16-1.0RA | 18214 | 16.0 | 16.0 | 15.2 | 98.0 | 24.0 | 50.0 | 1.0 | DIN 6535 HA |
| 177S 20-1.0RA | 18216 | 20.0 | 20.0 | 19.2 | 112.0 | 30.0 | 62.0 | 1.0 | DIN 6535 HA |

HA DIN 6535

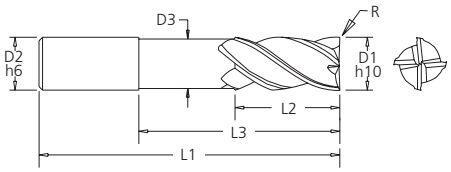
Corner Radius

P65

# TuffCut® XR Series 177S





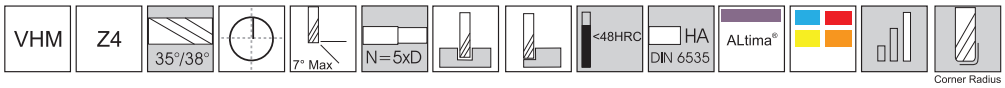

| Tool No. | EDP | D1 | D2 | D3 | L1 | L2 | L3 | R | Shank |
|---|---|---|---|---|---|---|---|---|---|
| 177S 03-0.2RAW | 18236 | 3.0 | 6.0 | 2.9 | 50.0 | 5.0 | 11.0 | 0.2 | DIN 6535 HB |
| 177S 04-0.2RAW | 18238 | 4.0 | 6.0 | 3.9 | 50.0 | 6.0 | 14.0 | 0.2 | DIN 6535 HB |
| 177S 05-0.2RAW | 18240 | 5.0 | 6.0 | 4.9 | 57.0 | 8.0 | 17.0 | 0.2 | DIN 6535 HB |
| 177S 06-0.3RAW | 18242 | 6.0 | 6.0 | 5.8 | 57.0 | 9.0 | 20.0 | 0.3 | DIN 6535 HB |
| 177S 08-0.5RAW | 18244 | 8.0 | 8.0 | 7.6 | 63.0 | 12.0 | 26.0 | 0.5 | DIN 6535 HB |
| 177S 10-0.5RAW | 18246 | 10.0 | 10.0 | 9.6 | 72.0 | 15.0 | 32.0 | 0.5 | DIN 6535 HB |
| 177S 12-0.5RAW | 18248 | 12.0 | 12.0 | 11.4 | 83.0 | 18.0 | 38.0 | 0.5 | DIN 6535 HB |
| 177S 16-1.0RAW | 18250 | 16.0 | 16.0 | 15.2 | 98.0 | 24.0 | 50.0 | 1.0 | DIN 6535 HB |
| 177S 20-1.0RAW | 18252 | 20.0 | 20.0 | 19.2 | 112.0 | 30.0 | 62.0 | 1.0 | DIN 6535 HB |

HB DIN 6535

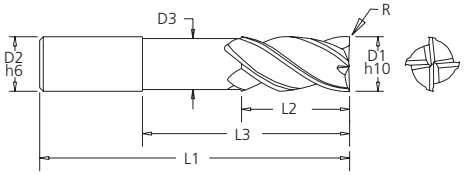
Corner Radius

P65

# TuffCut® XR Series 177LR N5



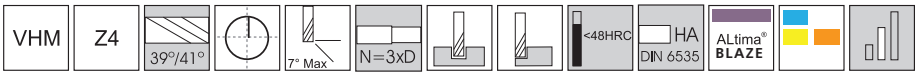


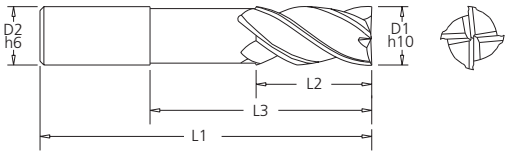

| Tool No. | EDP | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|---|
| 177L 06N5-0.25RA | 18186 | 6.0 | 6.0 | 5.8 | 101.0 | 12.0 | 30.0 | 0.25 |
| 177L 06N5-0.5RA | 18183 | 6.0 | 6.0 | 5.8 | 101.0 | 12.0 | 30.0 | 0.5 |
| 177L 06N5-1.0RA | 18184 | 6.0 | 6.0 | 5.8 | 101.0 | 12.0 | 30.0 | 1.0 |
| 177L 08N5-0.5RA | 18187 | 8.0 | 8.0 | 7.6 | 101.0 | 16.0 | 40.0 | 0.5 |
| 177L 08N5-1.0RA | 18194 | 8.0 | 8.0 | 7.6 | 101.0 | 16.0 | 40.0 | 1.0 |
| 177L 08N5-2.0RA | 18195 | 8.0 | 8.0 | 7.6 | 101.0 | 16.0 | 40.0 | 2.0 |
| 177L 08N5-3.0RA | 18196 | 8.0 | 8.0 | 7.6 | 101.0 | 16.0 | 40.0 | 3.0 |
| 177L 10N5-0.5RA | 18188 | 10.0 | 10.0 | 9.6 | 127.0 | 20.0 | 50.0 | 0.5 |
| 177L 10N5-1.0RA | 18197 | 10.0 | 10.0 | 9.6 | 127.0 | 20.0 | 50.0 | 1.0 |
| 177L 10N5-2.0RA | 18198 | 10.0 | 10.0 | 9.6 | 127.0 | 20.0 | 50.0 | 2.0 |
| 177L 10N5-3.0RA | 18199 | 10.0 | 10.0 | 9.6 | 127.0 | 20.0 | 50.0 | 3.0 |
| 177L 12N5-0.5RA | 18189 | 12.0 | 12.0 | 11.4 | 152.0 | 24.0 | 60.0 | 0.5 |
| 177L 12N5-1.0RA | 18176 | 12.0 | 12.0 | 11.4 | 152.0 | 24.0 | 60.0 | 1.0 |
| 177L 12N5-2.0RA | 18177 | 12.0 | 12.0 | 11.4 | 152.0 | 24.0 | 60.0 | 2.0 |
| 177L 12N5-3.0RA | 18190 | 12.0 | 12.0 | 11.4 | 152.0 | 24.0 | 60.0 | 3.0 |
| 177L 12N5-4.0RA | 18178 | 12.0 | 12.0 | 11.4 | 152.0 | 24.0 | 60.0 | 4.0 |
| 177L 16N5-0.5RA | 18181 | 16.0 | 16.0 | 15.2 | 152.0 | 32.0 | 80.0 | 0.5 |
| 177L 16N5-1.0RA | 18191 | 16.0 | 16.0 | 15.2 | 152.0 | 32.0 | 80.0 | 1.0 |
| 177L 16N5-2.0RA | 18179 | 16.0 | 16.0 | 15.2 | 152.0 | 32.0 | 80.0 | 2.0 |
| 177L 16N5-3.0RA | 18180 | 16.0 | 16.0 | 15.2 | 152.0 | 32.0 | 80.0 | 3.0 |
| 177L 20N5-0.5RA | 18182 | 20.0 | 20.0 | 19.2 | 152.0 | 40.0 | 100.0 | 0.5 |
| 177L 20N5-1.0RA | 18192 | 20.0 | 20.0 | 19.2 | 152.0 | 40.0 | 100.0 | 1.0 |
| 177L 20N5-3.0RA | 18193 | 20.0 | 20.0 | 19.2 | 152.0 | 40.0 | 100.0 | 3.0 |

P65

# TuffCut® XT Series 277N



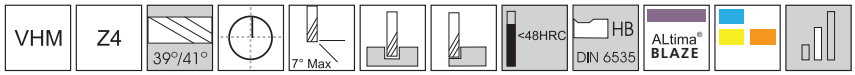


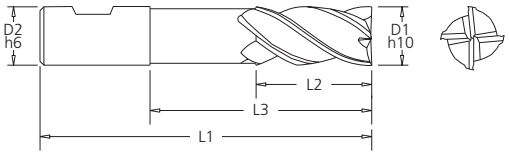

| Tool No. | D1 | D2 | L1 | L2 | L3 |
|---|---|---|---|---|---|
| 277 03N3B | 3.0 | 6.0 | 64.0 | 8.0 | 11.0 |
| 277 04N3B | 4.0 | 6.0 | 64.0 | 11.0 | 14.0 |
| 277 05N3B | 5.0 | 6.0 | 64.0 | 13.0 | 17.0 |
| 277 06N3B | 6.0 | 6.0 | 64.0 | 13.0 | 20.0 |
| 277 08N3B | 8.0 | 8.0 | 64.0 | 19.0 | 26.0 |
| 277 10N3B | 10.0 | 10.0 | 73.0 | 22.0 | 32.0 |
| 277 12N3B | 12.0 | 12.0 | 84.0 | 26.0 | 38.0 |
| 277 16N3B | 16.0 | 16.0 | 100.0 | 32.0 | 50.0 |
| 277 20N3B | 20.0 | 20.0 | 112.0 | 40.0 | 62.0 |

P69

# TuffCut® XT Series 277N-W



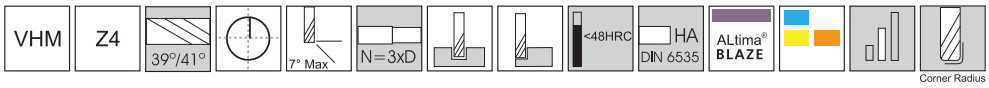


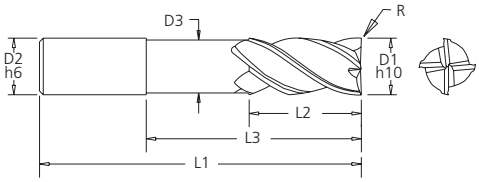

| Tool No. | D1 | D2 | L1 | L2 | L3 |
|---|---|---|---|---|---|
| 277 08N3BW | 8.0 | 8.0 | 64.0 | 19.0 | 26.0 |
| 277 10N3BW | 10.0 | 10.0 | 73.0 | 22.0 | 32.0 |
| 277 12N3BW | 12.0 | 12.0 | 84.0 | 26.0 | 38.0 |
| 277 16N3BW | 16.0 | 16.0 | 100.0 | 32.0 | 50.0 |

P69

# TuffCut® XT Series 277NR



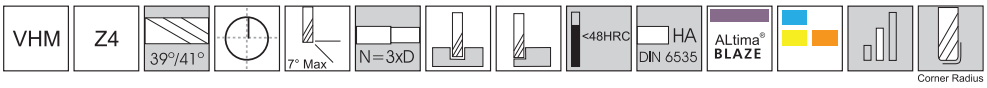


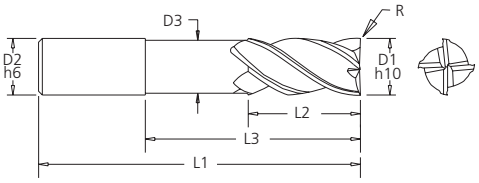

| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 277 03N3-0.25RB | 3.0 | 6.0 | 2.9 | 64.0 | 8.0 | 11.0 | 0.25 |
| 277 03N3-0.3RB | 3.0 | 6.0 | 2.9 | 64.0 | 8.0 | 11.0 | 0.3 |
| 277 03N3-0.5RB | 3.0 | 6.0 | 2.9 | 64.0 | 8.0 | 11.0 | 0.5 |
| 277 04N3-0.25RB | 4.0 | 6.0 | 3.9 | 64.0 | 11.0 | 14.0 | 0.25 |
| 277 04N3-0.3RB | 4.0 | 6.0 | 3.9 | 64.0 | 11.0 | 14.0 | 0.3 |
| 277 04N3-0.5RB | 4.0 | 6.0 | 3.9 | 64.0 | 11.0 | 14.0 | 0.5 |
| 277 04N3-1.0RB | 4.0 | 6.0 | 3.9 | 64.0 | 11.0 | 14.0 | 1.0 |
| 277 05N3-0.25RB | 5.0 | 6.0 | 4.9 | 64.0 | 13.0 | 17.0 | 0.25 |
| 277 05N3-0.3RB | 5.0 | 6.0 | 4.9 | 64.0 | 13.0 | 17.0 | 0.3 |
| 277 05N3-0.5RB | 5.0 | 6.0 | 4.9 | 64.0 | 13.0 | 17.0 | 0.5 |
| 277 05N3-1.0RB | 5.0 | 6.0 | 4.9 | 64.0 | 13.0 | 17.0 | 1.0 |
| 277 06N3-0.25RB | 6.0 | 6.0 | 5.9 | 64.0 | 13.0 | 20.0 | 0.25 |
| 277 06N3-0.3RB | 6.0 | 6.0 | 5.9 | 64.0 | 13.0 | 20.0 | 0.3 |
| 277 06N3-0.5RB | 6.0 | 6.0 | 5.9 | 64.0 | 13.0 | 20.0 | 0.5 |
| 277 06N3-1.0RB | 6.0 | 6.0 | 5.9 | 64.0 | 13.0 | 20.0 | 1.0 |
| 277 06N3-1.5RB | 6.0 | 6.0 | 5.9 | 64.0 | 13.0 | 20.0 | 1.5 |
| 277 06N3-2.0RB | 6.0 | 6.0 | 5.9 | 64.0 | 13.0 | 20.0 | 2.0 |
| 277 08N3-0.5RB | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 0.5 |
| 277 08N3-0.8RB | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 0.8 |
| 277 08N3-1.0RB | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 1.0 |
| 277 08N3-1.5RB | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 1.5 |
| 277 08N3-2.0RB | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 2.0 |
| 277 08N3-3.0RB | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 3.0 |
| 277 10N3-0.5RB | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 0.5 |
| 277 10N3-0.8RB | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 0.8 |
| 277 10N3-1.0RB | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 1.0 |
| 277 10N3-1.5RB | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 1.5 |
| 277 10N3-2.0RB | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 2.0 |
| 277 10N3-3.0RB | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 3.0 |
| 277 12N3-0.5RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 0.5 |
| 277 12N3-0.8RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 0.8 |
| 277 12N3-1.0RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 1.0 |
| 277 12N3-1.2RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 1.2 |
| 277 12N3-1.5RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 1.5 |
| 277 12N3-2.0RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 2.0 |
| 277 12N3-2.5RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 2.5 |
| 277 12N3-3.0RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 3.0 |
| 277 12N3-4.0RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 4.0 |
| 277 16N3-0.5RB | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 0.5 |
| 277 16N3-0.8RB | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 0.8 |
| 277 16N3-1.0RB | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 1.0 |
| 277 16N3-1.2RB | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 1.2 |
| 277 16N3-1.5RB | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 1.5 |
| 277 16N3-2.0RB | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 2.0 |
| 277 16N3-3.0RB | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 3.0 |

P69

# TuffCut® XT Series 277NR



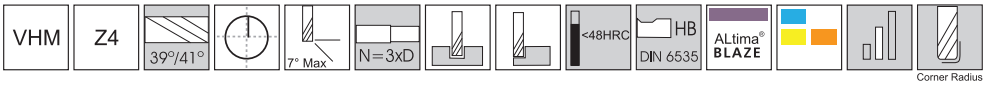


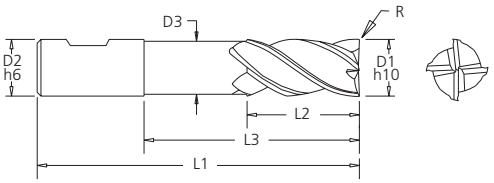

| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 277 16N3-4.0RB | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 4.0 |
| 277 20N3-0.8RB | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 0.8 |
| 277 20N3-1.0RB | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 1.0 |
| 277 20N3-1.5RB | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 1.5 |
| 277 20N3-2.0RB | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 2.0 |
| 277 20N3-3.0RB | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 3.0 |
| 277 20N3-4.0RB | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 4.0 |
| 277 20N3-5.0RB | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 5.0 |
| 277 20N3-6.0RB | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 6.0 |

P69

# TuffCut® XT Series 277NR-W



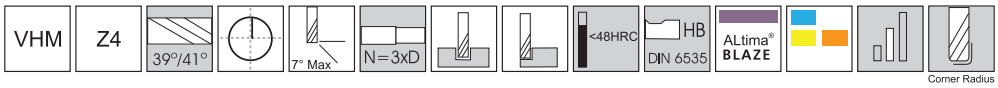


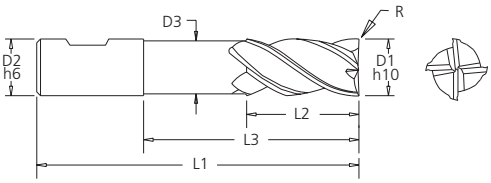

| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 277 08N3-0.5RBW | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 0.5 |
| 277 08N3-1.0RBW | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 1.0 |
| 277 08N3-1.5RBW | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 1.5 |
| 277 08N3-2.0RBW | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 2.0 |
| 277 08N3-3.0RBW | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 3.0 |
| 277 10N3-0.5RBW | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 0.5 |
| 277 10N3-1.0RBW | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 1.0 |
| 277 10N3-1.5RBW | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 1.5 |
| 277 10N3-2.0RBW | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 2.0 |
| 277 10N3-3.0RBW | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 3.0 |
| 277 12N3-0.5RBW | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 0.5 |
| 277 12N3-1.0RBW | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 1.0 |
| 277 12N3-1.5RBW | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 1.5 |
| 277 12N3-2.0RBW | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 2.0 |
| 277 12N3-2.5RBW | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 2.5 |
| 277 12N3-3.0RBW | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 3.0 |

P69

# TuffCut® XT Series 277NR-W



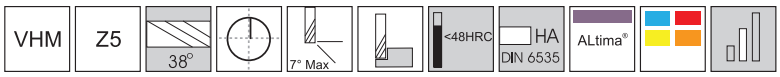


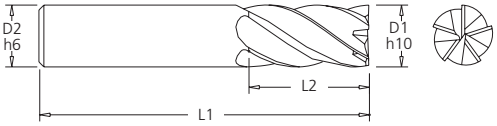

| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 277 12N3-4.0RBW | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 4.0 |
| 277 16N3-0.5RBW | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 0.5 |
| 277 16N3-1.0RBW | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 1.0 |
| 277 16N3-1.2RBW | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 1.2 |
| 277 16N3-1.5RBW | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 1.5 |
| 277 16N3-2.0RBW | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 2.0 |
| 277 16N3-3.0RBW | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 3.0 |
| 277 16N3-4.0RBW | 16.0 | 16.0 | 15.2 | 100.0 | 32.0 | 50.0 | 4.0 |
| 277 20N3-1.0RBW | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 1.0 |
| 277 20N3-1.5RBW | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 1.5 |
| 277 20N3-2.0RBW | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 2.0 |
| 277 20N3-3.0RBW | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 3.0 |
| 277 20N3-4.0RBW | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 4.0 |
| 277 20N3-5.0RBW | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 5.0 |
| 277 20N3-6.0RBW | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 6.0 |

P69

# TuffCut® XR Series 178



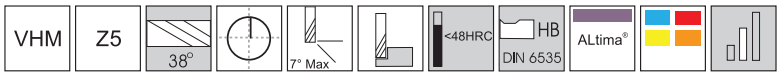


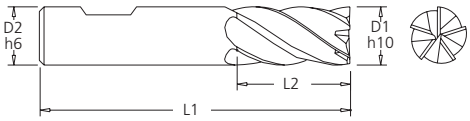

| Tool No. | EDP | D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|
| 178 0300A | 17959 | 3.0 | 6.0 | 57.0 | 8.0 |
| 178 0400A | 17961 | 4.0 | 6.0 | 57.0 | 11.0 |
| 178 0500A | 17963 | 5.0 | 6.0 | 57.0 | 13.0 |
| 178 0600A | 17965 | 6.0 | 6.0 | 57.0 | 13.0 |
| 178 0800A | 17968 | 8.0 | 8.0 | 63.0 | 19.0 |
| 178 1000A | 17971 | 10.0 | 10.0 | 72.0 | 22.0 |
| 178 1200A | 17974 | 12.0 | 12.0 | 83.0 | 26.0 |
| 178 1400A | 17977 | 14.0 | 14.0 | 83.0 | 26.0 |
| 178 1600A | 17981 | 16.0 | 16.0 | 92.0 | 32.0 |
| 178 1800A | 17983 | 18.0 | 18.0 | 92.0 | 32.0 |
| 178 2000A | 17986 | 20.0 | 20.0 | 104.0 | 38.0 |
| 178 2500A | 17988 | 25.0 | 25.0 | 104.0 | 38.0 |

P65

# TuffCut® XR Series 178-W



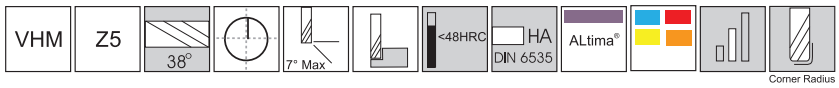


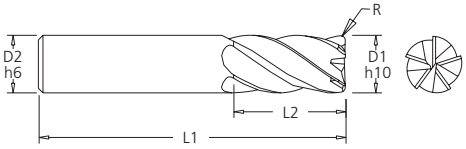

| Tool No. | EDP | D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|
| 178 0600AW | 17294 | 6.0 | 6.0 | 57.0 | 13.0 |
| 178 0800AW | 14119 | 8.0 | 8.0 | 63.0 | 19.0 |
| 178 1000AW | 75137 | 10.0 | 10.0 | 72.0 | 22.0 |
| 178 1200AW | 19534 | 12.0 | 12.0 | 83.0 | 26.0 |
| 178 1400AW | 75139 | 14.0 | 14.0 | 83.0 | 26.0 |
| 178 1600AW | 75141 | 16.0 | 16.0 | 92.0 | 32.0 |
| 178 2000AW | 19535 | 20.0 | 20.0 | 104.0 | 38.0 |

P65

# TuffCut® XR Series 178R



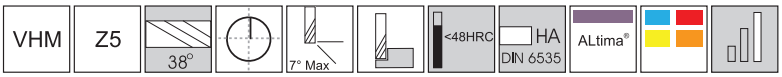


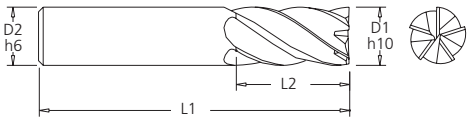

| Tool No. | EDP | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|---|
| 178 0600-0.50RA | 17966 | 6.0 | 6.0 | 57.0 | 13.0 | 0.5 |
| 178 0800-0.50RA | 17969 | 8.0 | 8.0 | 63.0 | 19.0 | 0.5 |
| 178 1000-0.50RA | 17972 | 10.0 | 10.0 | 72.0 | 22.0 | 0.5 |
| 178 1200-0.75RA | 17975 | 12.0 | 12.0 | 83.0 | 26.0 | 0.75 |
| 178 1400-0.75RA | 17978 | 14.0 | 14.0 | 83.0 | 26.0 | 0.75 |
| 178 1600-1.0RA | 17982 | 16.0 | 16.0 | 92.0 | 32.0 | 1.0 |
| 178 1800-1.0RA | 17984 | 18.0 | 18.0 | 92.0 | 32.0 | 1.0 |
| 178 2000-1.0RA | 17987 | 20.0 | 20.0 | 104.0 | 38.0 | 1.0 |
| 178 2500-1.0RA | 17989 | 25.0 | 25.0 | 104.0 | 38.0 | 1.0 |

P65

# TuffCut® XR Series 178-1



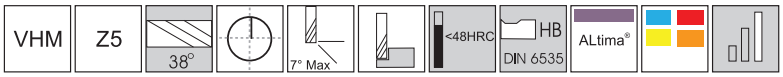


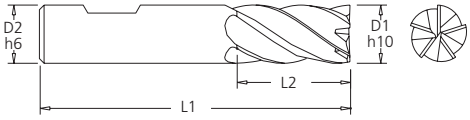

| Tool No. | EDP | D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|
| 178 0300-1A | 17998 | 3.0 | 3.0 | 75.0 | 25.0 |
| 178 0400-1A | 17999 | 4.0 | 4.0 | 75.0 | 25.0 |
| 178 0500-1A | 18026 | 5.0 | 5.0 | 75.0 | 25.0 |
| 178 0600-1A | 18027 | 6.0 | 6.0 | 75.0 | 25.0 |
| 178 0800-1A | 18028 | 8.0 | 8.0 | 75.0 | 30.0 |
| 178 1000-1A | 18029 | 10.0 | 10.0 | 100.0 | 45.0 |
| 178 1200-1A | 18030 | 12.0 | 12.0 | 150.0 | 75.0 |
| 178 1600-1A | 18031 | 16.0 | 16.0 | 150.0 | 75.0 |
| 178 2000-1A | 18032 | 20.0 | 20.0 | 150.0 | 75.0 |

P65

# TuffCut® XR Series 178-1W



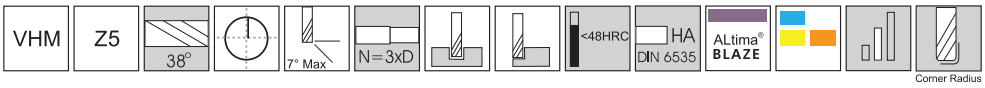


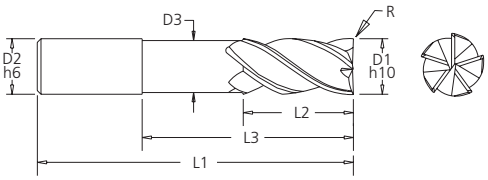

| Tool No. | EDP | D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|
| 178 0600-1AW | 17316 | 6.0 | 6.0 | 75.0 | 25.0 |
| 178 0800-1AW | 17317 | 8.0 | 8.0 | 75.0 | 30.0 |
| 178 1000-1AW | 16065 | 10.0 | 10.0 | 100.0 | 45.0 |
| 178 1200-1AW | 19536 | 12.0 | 12.0 | 150.0 | 75.0 |
| 178 1600-1AW | 19537 | 16.0 | 16.0 | 150.0 | 75.0 |
| 178 2000-1AW | 15828 | 20.0 | 20.0 | 150.0 | 75.0 |

P65

# TuffCut® XT Series 278R N3



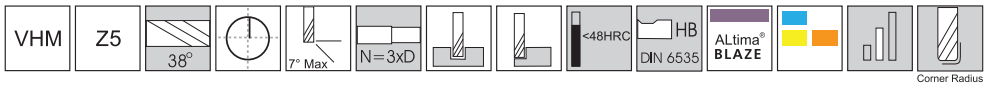


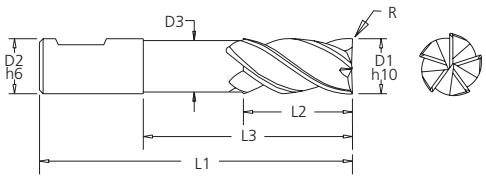

| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 278 0300N3-0.25RB | 3.0 | 6.0 | 2.9 | 57.0 | 8.0 | 10.0 | 0.25 |
| 278 0300N3-0.5RB | 3.0 | 6.0 | 2.9 | 57.0 | 8.0 | 10.0 | 0.5 |
| 278 0400N3-0.25RB | 4.0 | 6.0 | 3.9 | 57.0 | 11.0 | 13.0 | 0.25 |
| 278 0400N3-0.5RB | 4.0 | 6.0 | 3.9 | 57.0 | 11.0 | 13.0 | 0.5 |
| 278 0500N3-0.25RB | 5.0 | 6.0 | 4.9 | 57.0 | 13.0 | 16.0 | 0.25 |
| 278 0500N3-0.5RB | 5.0 | 6.0 | 4.9 | 57.0 | 13.0 | 16.0 | 0.5 |
| 278 0600N3-0.25RB | 6.0 | 6.0 | 5.9 | 57.0 | 13.0 | 19.0 | 0.25 |
| 278 0600N3-0.5RB | 6.0 | 6.0 | 5.9 | 57.0 | 13.0 | 19.0 | 0.5 |
| 278 0600N3-1.0RB | 6.0 | 6.0 | 5.9 | 57.0 | 13.0 | 19.0 | 1.0 |
| 278 0800N3-0.25RB | 8.0 | 8.0 | 7.8 | 63.0 | 19.0 | 25.0 | 0.25 |
| 278 0800N3-0.5RB | 8.0 | 8.0 | 7.8 | 63.0 | 19.0 | 25.0 | 0.5 |
| 278 0800N3-1.0RB | 8.0 | 8.0 | 7.8 | 63.0 | 19.0 | 25.0 | 1.0 |
| 278 0800N3-1.5RB | 8.0 | 8.0 | 7.8 | 63.0 | 19.0 | 25.0 | 1.5 |
| 278 0800N3-2.0RB | 8.0 | 8.0 | 7.8 | 63.0 | 19.0 | 25.0 | 2.0 |
| 278 1000N3-0.5RB | 10.0 | 10.0 | 9.8 | 72.0 | 22.0 | 31.0 | 0.5 |
| 278 1000N3-1.0RB | 10.0 | 10.0 | 9.8 | 72.0 | 22.0 | 31.0 | 1.0 |
| 278 1000N3-2.0RB | 10.0 | 10.0 | 9.8 | 72.0 | 22.0 | 31.0 | 2.0 |
| 278 1200N3-0.5RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 0.5 |
| 278 1200N3-1.0RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 1.0 |
| 278 1200N3-1.5RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 1.5 |
| 278 1200N3-2.0RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 2.0 |
| 278 1200N3-2.5RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 2.5 |
| 278 1200N3-3.0RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 3.0 |
| 278 1200N3-4.0RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 4.0 |
| 278 1600N3-0.5RB | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 0.5 |
| 278 1600N3-1.0RB | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 1.0 |
| 278 1600N3-1.5RB | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 1.5 |
| 278 1600N3-2.5RB | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 2.5 |
| 278 1600N3-3.0RB | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 3.0 |
| 278 1600N3-4.0RB | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 4.0 |
| 278 2000N3-1.0RB | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 1.0 |
| 278 2000N3-2.0RB | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 2.0 |
| 278 2000N3-3.0RB | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 3.0 |
| 278 2000N3-4.0RB | 20.0 | 20.0 | 19.2 | 112.0 | 40.0 | 62.0 | 4.0 |
| 278 2500N3-1.0RB | 25.0 | 25.0 | 24.6 | 127.0 | 40.0 | 77.0 | 1.0 |
| 278 2500N3-3.0RB | 25.0 | 25.0 | 24.6 | 127.0 | 40.0 | 77.0 | 3.0 |
| 278 2500N3-4.0RB | 25.0 | 25.0 | 24.6 | 127.0 | 40.0 | 77.0 | 4.0 |

P69

# TuffCut® XT Series 278R N3-W



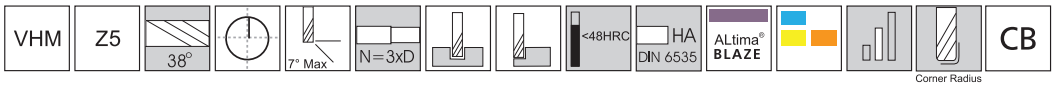



| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 278 1200N3-0.5RBW | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 0.5 |
| 278 1200N3-1.0RBW | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 1.0 |
| 278 1600N3-0.5RBW | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 0.5 |
| 278 1600N3-1.0RBW | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 1.0 |
| 278 1600N3-1.5RBW | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 1.5 |
| 278 1600N3-3.0RBW | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 3.0 |
| 278 1600N3-4.0RBW | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 4.0 |

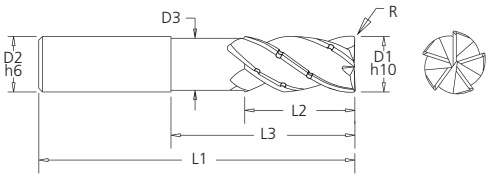
P69

# TuffCut® XT Series 278CBR N3





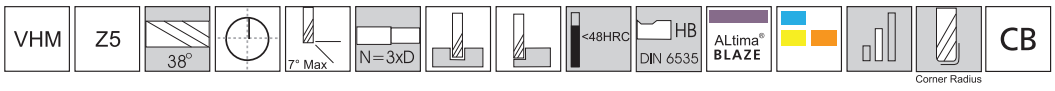





| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 278CB 10N3-1.0RB | 10.0 | 10.0 | 9.8 | 72.0 | 22.0 | 31.0 | 1.0 |
| 278CB 12N3-1.0RB | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 1.0 |
| 278CB 16N3-1.0RB | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 1.0 |

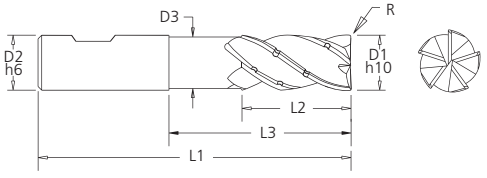
P69

# TuffCut® XT Series 278CBR N3-W





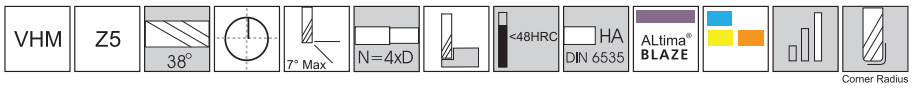




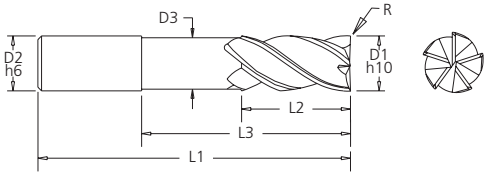

| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 278CB 10N3-1.0RBW | 10.0 | 10.0 | 9.8 | 72.0 | 22.0 | 31.0 | 1.0 |
| 278CB 12N3-1.0RBW | 12.0 | 12.0 | 11.4 | 84.0 | 26.0 | 38.0 | 1.0 |
| 278CB 16N3-1.0RBW | 16.0 | 16.0 | 15.2 | 100.0 | 35.0 | 50.0 | 1.0 |

P69

# TuffCut® XT Series 278R N4





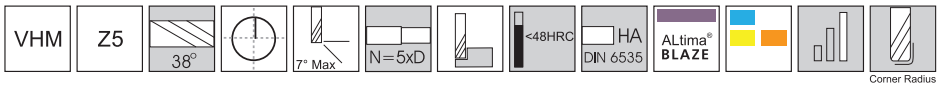




| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 278 1200N4-0.5RB | 12.0 | 12.0 | 11.4 | 100.0 | 18.0 | 50.0 | 0.5 |
| 278 1200N4-1.0RB | 12.0 | 12.0 | 11.4 | 100.0 | 18.0 | 50.0 | 1.0 |
| 278 1200N4-1.5RB | 12.0 | 12.0 | 11.4 | 100.0 | 18.0 | 50.0 | 1.5 |
| 278 1200N4-2.0RB | 12.0 | 12.0 | 11.4 | 100.0 | 18.0 | 50.0 | 2.0 |
| 278 1200N4-3.0RB | 12.0 | 12.0 | 11.4 | 100.0 | 18.0 | 50.0 | 3.0 |
| 278 1200N4-4.0RB | 12.0 | 12.0 | 11.4 | 100.0 | 18.0 | 50.0 | 4.0 |
| 278 1600N4-1.0RB | 16.0 | 16.0 | 15.2 | 120.0 | 35.0 | 65.0 | 1.0 |
| 278 1600N4-1.0RBW* | 16.0 | 16.0 | 15.2 | 120.0 | 35.0 | 65.0 | 1.0 |
| 278 1600N4-3.0RB | 16.0 | 16.0 | 15.2 | 120.0 | 35.0 | 65.0 | 3.0 |
| 278 2000N4-1.0RB | 20.0 | 20.0 | 19.2 | 133.0 | 40.0 | 82.0 | 1.0 |
| 278 2000N4-3.0RB | 20.0 | 20.0 | 19.2 | 133.0 | 40.0 | 82.0 | 3.0 |
| 278 2500N4-1.0RB | 25.0 | 25.0 | 24.6 | 152.0 | 40.0 | 102.0 | 1.0 |
| 278 2500N4-3.0RB | 25.0 | 25.0 | 24.6 | 152.0 | 40.0 | 102.0 | 3.0 |

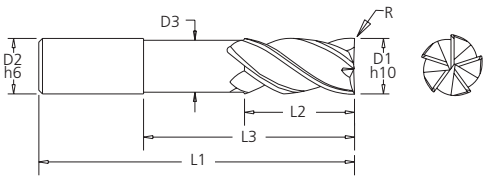
* Indicates weldon

P69

# TuffCut® XT Series 278R N5



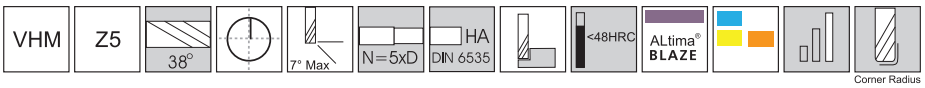


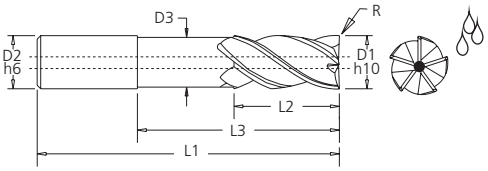

| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 278 1600N5-1.0RB | 16.0 | 16.0 | 15.2 | 133.0 | 35.0 | 82.0 | 1.0 |
| 278 1600N5-3.0RB | 16.0 | 16.0 | 15.2 | 133.0 | 35.0 | 82.0 | 3.0 |
| 278 2000N5-1.0RB | 20.0 | 20.0 | 19.2 | 152.0 | 40.0 | 102.0 | 1.0 |
| 278 2000N5-3.0RB | 20.0 | 20.0 | 19.2 | 152.0 | 40.0 | 102.0 | 3.0 |
| 278 2500N5-1.0RB | 25.0 | 25.0 | 24.6 | 180.0 | 40.0 | 125.0 | 1.0 |
| 278 2500N5-3.0RB | 25.0 | 25.0 | 24.6 | 180.0 | 40.0 | 125.0 | 3.0 |

P69

# TuffCut® XT Series 278R N5CT With Central Coolant



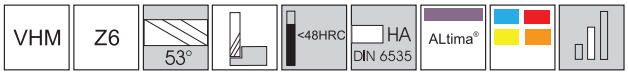


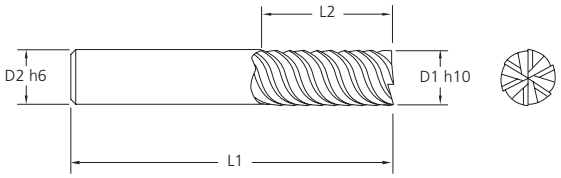

| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 278 1200N5-0.5RBCT | 12.0 | 12.0 | 11.4 | 110.0 | 18.0 | 62.0 | 0.5 |
| 278 1200N5-1.0RBCT | 12.0 | 12.0 | 11.4 | 110.0 | 18.0 | 62.0 | 1.0 |
| 278 1200N5-1.5RBCT | 12.0 | 12.0 | 11.4 | 110.0 | 18.0 | 62.0 | 1.5 |
| 278 1200N5-2.0RBCT | 12.0 | 12.0 | 11.4 | 110.0 | 18.0 | 62.0 | 2.0 |
| 278 1200N5-3.0RBCT | 12.0 | 12.0 | 11.4 | 110.0 | 18.0 | 62.0 | 3.0 |
| 278 1200N5-4.0RBCT | 12.0 | 12.0 | 11.4 | 110.0 | 18.0 | 62.0 | 4.0 |

P69

# TuffCut® XR Series 113A



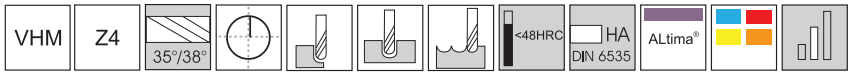


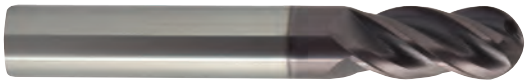



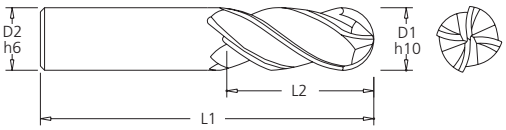

| Tool No. | EDP | D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|
| 113 0300A | 11384 | 3.0 | 3.0 | 38.0 | 12.0 |
| 113 0400A | 11385 | 4.0 | 4.0 | 51.0 | 14.0 |
| 113 0500A | 11386 | 5.0 | 5.0 | 51.0 | 20.0 |
| 113 0600A | 11387 | 6.0 | 6.0 | 64.0 | 20.0 |
| 113 0800A | 11388 | 8.0 | 8.0 | 64.0 | 20.0 |
| 113 1000A | 11389 | 10.0 | 10.0 | 70.0 | 25.0 |
| 113 1200A | 11390 | 12.0 | 12.0 | 76.0 | 25.0 |
| 113 1600A | 11391 | 16.0 | 16.0 | 89.0 | 30.0 |
| 113 2000A | 11392 | 20.0 | 20.0 | 102.0 | 38.0 |

P63

# TuffCut® XR Series 179



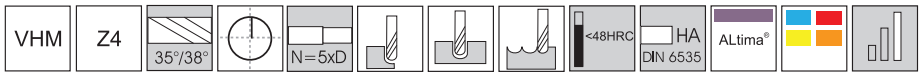





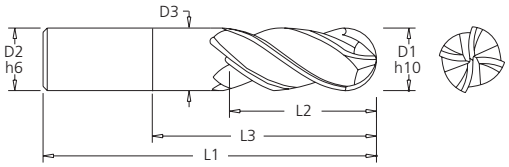

| Tool No. | EDP | D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|
| 179 0150A | 18272 | 1.5 | 3.0 | 38.0 | 3.0 |
| 179 0200A | 18274 | 2.0 | 3.0 | 38.0 | 4.0 |
| 179 0250A | 18276 | 2.5 | 3.0 | 38.0 | 5.0 |
| 179 0300A | 18018 | 3.0 | 6.0 | 57.0 | 8.0 |
| 179 0303A | 18278 | 3.0 | 3.0 | 38.0 | 6.0 |
| 179 0350A | 18280 | 3.5 | 6.0 | 57.0 | 7.0 |
| 179 0400A | 18019 | 4.0 | 6.0 | 57.0 | 11.0 |
| 179 0450A | 18282 | 4.5 | 6.0 | 57.0 | 9.0 |
| 179 0500A | 18020 | 5.0 | 6.0 | 57.0 | 13.0 |
| 179 0600A | 18021 | 6.0 | 6.0 | 57.0 | 13.0 |
| 179 0800A | 18022 | 8.0 | 8.0 | 63.0 | 19.0 |
| 179 1000A | 18023 | 10.0 | 10.0 | 72.0 | 22.0 |
| 179 1200A | 18024 | 12.0 | 12.0 | 83.0 | 26.0 |
| 179 1600A | 18059 | 16.0 | 16.0 | 92.0 | 32.0 |

P65

# TuffCut® XR Series 179L N5



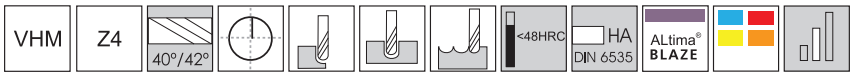


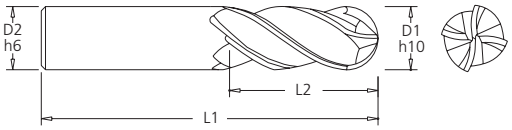

| Tool No. | EDP | D1 | D2 | D3 | L1 | L2 | L3 |
|---|---|---|---|---|---|---|---|
| 179L 03N5A | 18290 | 3.0 | 6.0 | 2.9 | 75.0 | 4.5 | 17.0 |
| 179L 04N5A | 18292 | 4.0 | 6.0 | 3.9 | 75.0 | 6.0 | 22.0 |
| 179L 05N5A | 18294 | 5.0 | 6.0 | 4.9 | 75.0 | 7.5 | 27.0 |
| 179L 06N5A | 18296 | 6.0 | 6.0 | 5.8 | 101.0 | 9.0 | 32.0 |
| 179L 08N5A | 18298 | 8.0 | 8.0 | 7.6 | 101.0 | 12.0 | 42.0 |
| 179L 10N5A | 18302 | 10.0 | 10.0 | 9.6 | 127.0 | 15.0 | 52.0 |
| 179L 12N5A | 18304 | 12.0 | 12.0 | 11.4 | 152.0 | 18.0 | 62.0 |
| 179L 16N5A | 18306 | 16.0 | 16.0 | 15.2 | 152.0 | 24.0 | 82.0 |

P65

# TuffCut® XT Series 279



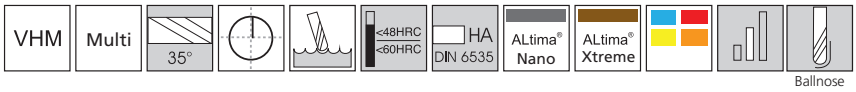


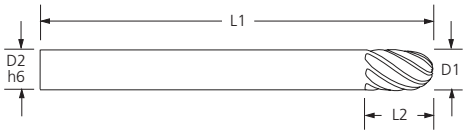

| Tool Number | D1 | D2 | L1 | L2 |
|---|---|---|---|---|
| 279 0300B | 3.0 | 6.0 | 57.0 | 8.0 |
| 279 0400B | 4.0 | 6.0 | 57.0 | 11.0 |
| 279 0500B | 5.0 | 6.0 | 57.0 | 13.0 |
| 279 0600B | 6.0 | 6.0 | 57.0 | 13.0 |
| 279 0800B | 8.0 | 8.0 | 63.0 | 19.0 |
| 279 1000B | 10.0 | 10.0 | 72.0 | 22.0 |
| 279 1200B | 12.0 | 12.0 | 83.0 | 26.0 |
| 279 1600B | 16.0 | 16.0 | 92.0 | 32.0 |

P69

# TuffCut® XT Series MFB





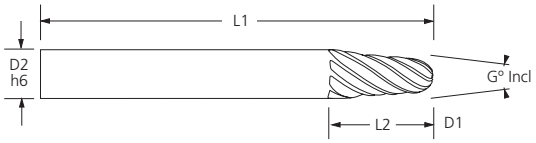




## MFPB Series - Multi Flute Parallel Ballnose

| Tool No. | | R | D1 | D2 | L1 | L2 | L3 | G° | Flutes |
|---|---|---|---|---|---|---|---|---|---|
| ALtima® Xtreme Coating | ALtima® Nano Coating | | | | | | | | |
| MFPB 0601AX | MFPB 0601AN | R3 | 6.0 | 6.0 | 100.0 | 9.0 | - | - | 6 |
| MFPB 0801AX | MFPB 0801AN | R4 | 8.0 | 8.0 | 100.0 | 12.0 | - | - | 8 |
| MFPB 1001AX | MFPB 1001AN | R5 | 10.0 | 10.0 | 108.0 | 15.0 | - | - | 8 |
| MFPB 1201AX | MFPB 1201AN | R6 | 12.0 | 12.0 | 108.0 | 18.0 | - | - | 8 |
| MFPB 1601AX | MFPB 1601AN | R8 | 16.0 | 16.0 | 108.0 | 24.0 | - | - | 8 |
| MFPB 2001AX | MFPB 2001AN | R10 | 20.0 | 20.0 | 150.0 | 30.0 | - | - | 10 |

P75






## MFTB Series - Multi Flute Tapered Ballnose

| Tool No. | | R | D1 | D2 | L1 | L2 | L3 | G° | Flutes |
|---|---|---|---|---|---|---|---|---|---|
| ALtima® Xtreme Coating | ALtima® Nano Coating | | | | | | | | |
| MFTB 0402AX | MFTB 0402AN | R2 | - | 6.0 | 100.0 | 24.0 | - | 5° | 6 |
| MFTB 0502AX | MFTB 0502AN | R2.5 | - | 6.0 | 100.0 | 13.0 | - | 5° | 6 |
| MFTB 0602AX | MFTB 0602AN | R3 | - | 8.0 | 100.0 | 25.0 | - | 5° | 6 |
| MFTB 0802AX | MFTB 0802AN | R4 | - | 10.0 | 100.0 | 26.0 | - | 5° | 8 |
| MFTB 1002AX | MFTB 1002AN | R5 | - | 12.0 | 108.0 | 27.0 | - | 5° | 8 |
| MFTB 1202AX | MFTB 1202AN | R6 | - | 16.0 | 108.0 | 51.0 | - | 5° | 8 |
| MFTB 1602AX | MFTB 1602AN | R8 | - | 20.0 | 108.0 | 53.0 | - | 5° | 8 |

P75






## MFNB Series - Multi Flute Necked Ballnose

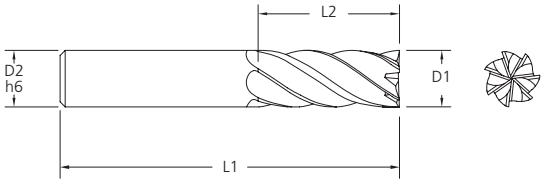
| Tool No. | | R | D1 | D2 | L1 | L2 | L3 | G° | Flutes |
|---|---|---|---|---|---|---|---|---|---|
| ALtima® Xtreme Coating | ALtima® Nano Coating | | | | | | | | |
| MFNB 0403AX | MFNB 0403AN | R2 | 4.0 | 6.0 | 100.0 | 6.0 | 8.0 | - | 6 |
| MFNB 0503AX | MFNB 0503AN | R2.5 | 5.0 | 6.0 | 100.0 | 7.5 | 10.0 | - | 6 |
| MFNB 0603AX | MFNB 0603AN | R3 | 6.0 | 8.0 | 100.0 | 9.0 | 12.0 | - | 6 |
| MFNB 0803AX | MFNB 0803AN | R4 | 8.0 | 10.0 | 100.0 | 12.0 | 16.0 | - | 8 |
| MFNB 1003AX | MFNB 1003AN | R5 | 10.0 | 12.0 | 108.0 | 15.0 | 23.0 | - | 8 |
| MFNB 1203AX | MFNB 1203AN | R6 | 12.0 | 16.0 | 108.0 | 18.0 | 24.0 | - | 8 |
| MFNB 1603AX | MFNB 1603AN | R8 | 16.0 | 20.0 | 108.0 | 24.0 | 32.0 | - | 8 |

P75

# TuffCut® XR7 Series 180





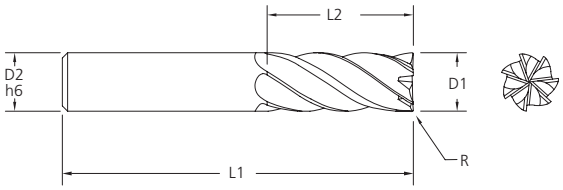

| Tool Number | EDP | D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|
| 180 0600B | 18936 | 6.0 | 6.0 | 57.0 | 13.0 |
| 180 0800B | 18944 | 8.0 | 8.0 | 63.0 | 19.0 |
| 180 1000B | 18940 | 10.0 | 10.0 | 72.0 | 22.0 |

P67

# TuffCut® XR7 Series 180R






| Tool Number | EDP | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|---|
| 180 0600-0.5RB | 18938 | 6.0 | 6.0 | 57.0 | 13.0 | 0.5 |
| 180 0800-0.5RB | 18946 | 8.0 | 8.0 | 63.0 | 19.0 | 0.5 |
| 180 1000-0.5RB | 18942 | 10.0 | 10.0 | 72.0 | 22.0 | 0.5 |
| 180 1200-0.5RB | 18501 | 12.0 | 12.0 | 84.0 | 32.0 | 0.5 |
| 180 1200-1.0RB | 18503 | 12.0 | 12.0 | 84.0 | 32.0 | 1.0 |
| 180 1200-2.0RB | 18505 | 12.0 | 12.0 | 84.0 | 32.0 | 2.0 |
| 180 1200-3.0RB | 18507 | 12.0 | 12.0 | 84.0 | 32.0 | 3.0 |
| 180 1200-4.0RB | 18508 | 12.0 | 12.0 | 84.0 | 32.0 | 4.0 |
| 180 1600-0.5RB | 18509 | 16.0 | 16.0 | 92.0 | 42.0 | 0.5 |
| 180 1600-1.0RB | 18510 | 16.0 | 16.0 | 92.0 | 42.0 | 1.0 |
| 180 1600-2.0RB | 18511 | 16.0 | 16.0 | 92.0 | 42.0 | 2.0 |
| 180 1600-3.0RB | 18513 | 16.0 | 16.0 | 92.0 | 42.0 | 3.0 |
| 180 1600-4.0RB | 18527 | 16.0 | 16.0 | 92.0 | 42.0 | 4.0 |
| 180 2000-0.5RB | 18528 | 20.0 | 20.0 | 102.0 | 52.0 | 0.5 |
| 180 2000-1.0RB | 18529 | 20.0 | 20.0 | 102.0 | 52.0 | 1.0 |
| 180 2000-2.0RB | 18530 | 20.0 | 20.0 | 102.0 | 52.0 | 2.0 |
| 180 2000-3.0RB | 18531 | 20.0 | 20.0 | 102.0 | 52.0 | 3.0 |
| 180 2000-4.0RB | 18533 | 20.0 | 20.0 | 102.0 | 52.0 | 4.0 |

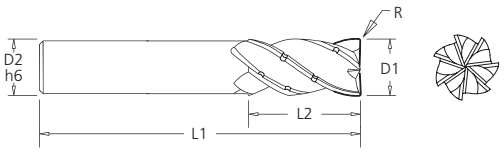
P67

# TuffCut® XR7 Series 180CBR










| Tool Number | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| 180CB 1000-1.0RB | 10.0 | 10.0 | 72.0 | 22.0 | 1.0 |
| 180CB 1200-1.0RB | 12.0 | 12.0 | 84.0 | 32.0 | 1.0 |
| 180CB 1600-1.0RB | 16.0 | 16.0 | 92.0 | 42.0 | 1.0 |

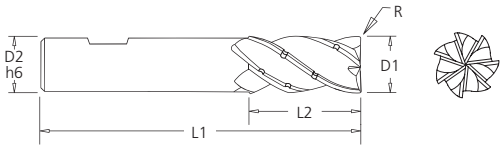
P67

# TuffCut® XR7 Series 180CBR-W





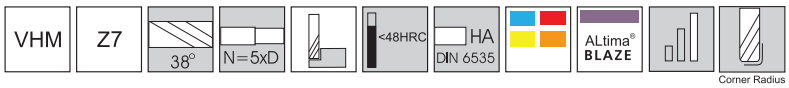




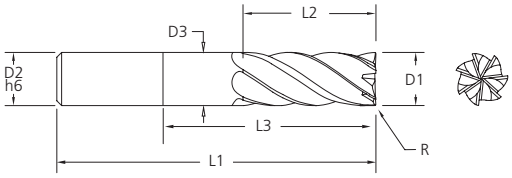

| Tool Number | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| 180CB 1000-1.0RBW | 10.0 | 10.0 | 72.0 | 22.0 | 1.0 |
| 180CB 1200-1.0RBW | 12.0 | 12.0 | 84.0 | 32.0 | 1.0 |
| 180CB 1600-1.0RBW | 16.0 | 16.0 | 92.0 | 42.0 | 1.0 |

P67

# TuffCut® XR7 Series 180R N5





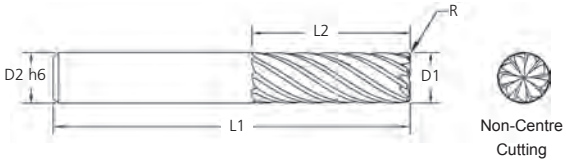

| Tool No. | EDP | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|---|
| 180 1200N5-1.0RB | 18500 | 12.0 | 12.0 | 11.4 | 120.0 | 30.0 | 60.0 | 1.0 |
| 180 1200N5-2.0RB | 18502 | 12.0 | 12.0 | 11.4 | 120.0 | 30.0 | 60.0 | 2.0 |
| 180 1200N5-3.0RB | 18504 | 12.0 | 12.0 | 11.4 | 120.0 | 30.0 | 60.0 | 3.0 |
| 180 1200N5-4.0RB | 18506 | 12.0 | 12.0 | 11.4 | 120.0 | 30.0 | 60.0 | 4.0 |
| 180 1600N5-1.0RB | 18548 | 16.0 | 16.0 | 15.2 | 150.0 | 40.0 | 80.0 | 1.0 |
| 180 1600N5-2.0RB | 18550 | 16.0 | 16.0 | 15.2 | 150.0 | 40.0 | 80.0 | 2.0 |
| 180 1600N5-3.0RB | 18552 | 16.0 | 16.0 | 15.2 | 150.0 | 40.0 | 80.0 | 3.0 |
| 180 1600N5-4.0RB | 18554 | 16.0 | 16.0 | 15.2 | 150.0 | 40.0 | 80.0 | 4.0 |
| 180 2000N5-1.0RB | 18590 | 20.0 | 20.0 | 19.2 | 150.0 | 50.0 | 100.0 | 1.0 |
| 180 2000N5-2.0RB | 18592 | 20.0 | 20.0 | 19.2 | 150.0 | 50.0 | 100.0 | 2.0 |
| 180 2000N5-3.0RB | 18594 | 20.0 | 20.0 | 19.2 | 150.0 | 50.0 | 100.0 | 3.0 |
| 180 2000N5-4.0RB | 18596 | 20.0 | 20.0 | 19.2 | 150.0 | 50.0 | 100.0 | 4.0 |

P67

# TuffCut® XT9 Series 380

VHM | Z9 | 37° | HA DIN 6535 | <60HRC | ALtima® Xtreme | Corner Radius






new items

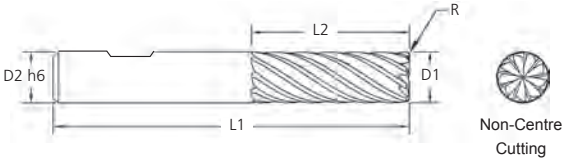
| Tool Number | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| 380M0800-0.5RAX | 8.0 | 8.0 | 63.0 | 22.0 | 0.5 |
| 380M0800-0.8RAX | 8.0 | 8.0 | 63.0 | 22.0 | 0.8 |
| 380M0800-1.0RAX | 8.0 | 8.0 | 63.0 | 22.0 | 1.0 |
| 380M0800-2.0RAX | 8.0 | 8.0 | 63.0 | 22.0 | 2.0 |
| 380M1000-0.5RAX | 10.0 | 10.0 | 72.0 | 27.0 | 0.5 |
| 380M1000-1.0RAX | 10.0 | 10.0 | 72.0 | 27.0 | 1.0 |
| 380M1000-2.0RAX | 10.0 | 10.0 | 72.0 | 27.0 | 2.0 |
| 380M1200-0.5RAX | 12.0 | 12.0 | 81.0 | 32.0 | 0.5 |
| 380M1200-1.0RAX | 12.0 | 12.0 | 81.0 | 32.0 | 1.0 |
| 380M1200-2.0RAX | 12.0 | 12.0 | 81.0 | 32.0 | 2.0 |
| 380M1200-3.0RAX | 12.0 | 12.0 | 81.0 | 32.0 | 3.0 |
| 380M1600-0.5RAX | 16.0 | 16.0 | 92.0 | 42.0 | 0.5 |
| 380M1600-1.0RAX | 16.0 | 16.0 | 92.0 | 42.0 | 1.0 |
| 380M1600-2.0RAX | 16.0 | 16.0 | 92.0 | 42.0 | 2.0 |
| 380M1600-3.0RAX | 16.0 | 16.0 | 92.0 | 42.0 | 3.0 |
| 380M1600-4.0RAX | 16.0 | 16.0 | 92.0 | 42.0 | 4.0 |
| 380M2000-0.5RAX | 20.0 | 20.0 | 104.0 | 52.0 | 0.5 |
| 380M2000-1.0RAX | 20.0 | 20.0 | 104.0 | 52.0 | 1.0 |

P68

# TuffCut® XT9 Series 380-W

VHM | Z9 | 37° | HB DIN 6535 | <60HRC | ALtima® Xtreme | Corner Radius






new items

| Tool Number | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| 380M1000-0.5RAXW | 10.0 | 10.0 | 72.0 | 27.0 | 0.5 |
| 380M1000-1.0RAXW | 10.0 | 10.0 | 72.0 | 27.0 | 1.0 |
| 380M1200-0.5RAXW | 12.0 | 12.0 | 81.0 | 32.0 | 0.5 |
| 380M1200-1.0RAXW | 12.0 | 12.0 | 81.0 | 32.0 | 1.0 |
| 380M1600-0.5RAXW | 16.0 | 16.0 | 92.0 | 42.0 | 0.5 |
| 380M1600-1.0RAXW | 16.0 | 16.0 | 92.0 | 42.0 | 1.0 |
| 380M2000-0.5RAXW | 20.0 | 20.0 | 104.0 | 52.0 | 0.5 |
| 380M2000-1.0RAXW | 20.0 | 20.0 | 104.0 | 52.0 | 1.0 |

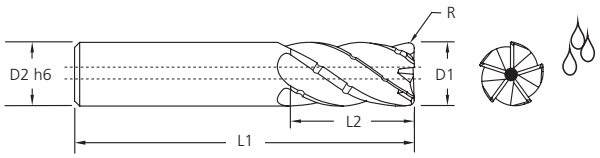
P68

# TuffCut® XT Series V5LCB - CT With Central Coolant







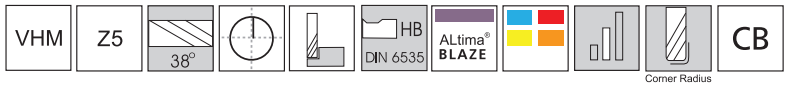



## Cylindrical Shank (HA)

| Tool Number | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| V5LCB 0603-0.5RB-CT | 6.0 | 6.0 | 64.0 | 19.0 | 0.5 |
| V5LCB 0803-0.5RB-CT | 8.0 | 8.0 | 70.0 | 25.0 | 0.5 |
| V5LCB 1003-0.5RB-CT | 10.0 | 10.0 | 80.0 | 31.0 | 0.5 |
| V5LCB 1203-0.5RB-CT | 12.0 | 12.0 | 84.0 | 37.0 | 0.5 |
| V5LCB 1603-0.5RB-CT | 16.0 | 16.0 | 110.0 | 49.0 | 0.5 |

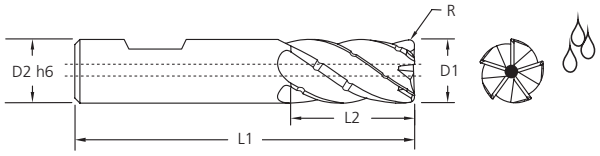
P70

# TuffCut® XT Series V5LCB - CT With Central Coolant










## Weldon Shank (HB)

| Tool Number | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| V5LCB 0803-0.5RBW-CT | 8.0 | 8.0 | 70.0 | 25.0 | 0.5 |
| V5LCB 1003-0.5RBW-CT | 10.0 | 10.0 | 80.0 | 31.0 | 0.5 |
| V5LCB 1203-0.5RBW-CT | 12.0 | 12.0 | 84.0 | 37.0 | 0.5 |
| V5LCB 1603-0.5RBW-CT | 16.0 | 16.0 | 110.0 | 49.0 | 0.5 |

P70

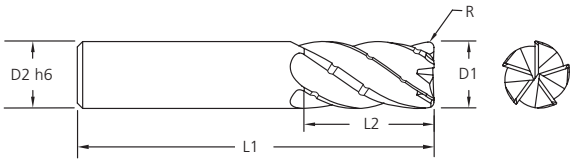
# TuffCut® XT Series V5LCB






4 x D Cutting Length

Close up of chipbreaker grind

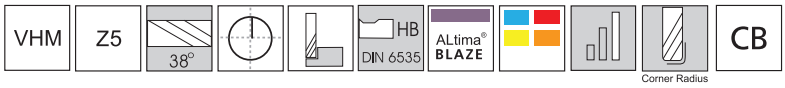



## Cylindrical Shank (HA)

| Tool Number | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| V5LCB 0604-0.5RB | 6.0 | 6.0 | 75.0 | 24.0 | 0.5 |
| V5LCB 0804-0.5RB | 8.0 | 8.0 | 75.0 | 32.0 | 0.5 |
| V5LCB 1004-0.5RB | 10.0 | 10.0 | 90.0 | 40.0 | 0.5 |
| V5LCB 1204-0.5RB | 12.0 | 12.0 | 100.0 | 48.0 | 0.5 |
| V5LCB 1604-0.5RB | 16.0 | 16.0 | 120.0 | 64.0 | 0.5 |

P70

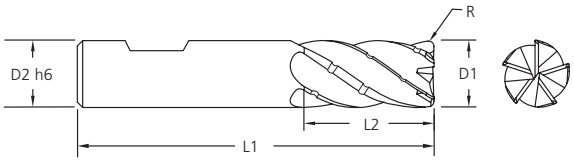
# TuffCut® XT Series V5LCB






4 x D Cutting Length

Close up of chipbreaker grind




## Weldon Shank (HB)

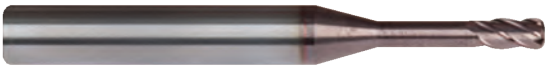
| Tool Number | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|
| V5LCB 0804-0.5RBW | 8.0 | 8.0 | 75.0 | 32.0 | 0.5 |
| V5LCB 1004-0.5RBW | 10.0 | 10.0 | 90.0 | 40.0 | 0.5 |
| V5LCB 1204-0.5RBW | 12.0 | 12.0 | 100.0 | 48.0 | 0.5 |
| V5LCB 1604-0.5RBW | 16.0 | 16.0 | 120.0 | 64.0 | 0.5 |

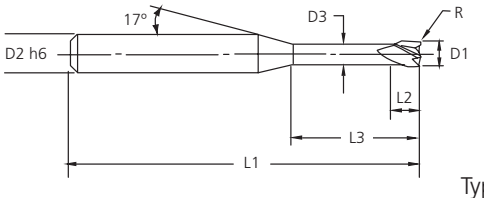
P70

# TuffCut® Series 158 Corner Radius - High Feed Roughing



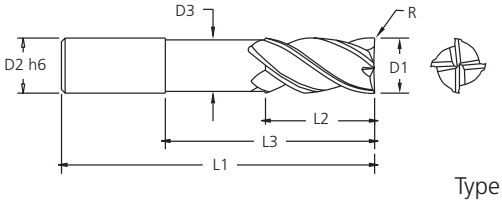

| Diameter | Diameter Tolerance | CR Tolerance | Shank Ø Tolerance |
|---|---|---|---|
| Ø2.0 - Ø16 | +0 / - 0.02 | -0.02 / +0.02 | h6 |






Type 1






Type 2

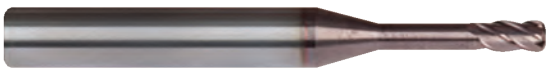
| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R | Type |
|---|---|---|---|---|---|---|---|---|
| 158 02N08-0.5RA | 2.0 | 6.0 | 1.9 | 63.0 | 3.0 | 8.0 | 0.5 | 1 |
| 158 03N10-0.8RA | 3.0 | 6.0 | 2.9 | 63.0 | 5.0 | 10.0 | 0.8 | 1 |
| 158 04N12-1.0RA | 4.0 | 6.0 | 3.9 | 63.0 | 6.0 | 12.0 | 1.0 | 1 |
| 158 06N20-1.5RA | 6.0 | 6.0 | 5.8 | 75.0 | 9.0 | 20.0 | 1.5 | 2 |
| 158 06N30-1.5RA | 6.0 | 6.0 | 5.8 | 100.0 | 9.0 | 30.0 | 1.5 | 2 |
| 158 08N30-2.0RA | 8.0 | 8.0 | 7.6 | 75.0 | 12.0 | 30.0 | 2.0 | 2 |
| 158 08N40-2.0RA | 8.0 | 8.0 | 7.6 | 100.0 | 12.0 | 40.0 | 2.0 | 2 |
| 158 08N50-2.0RA | 8.0 | 8.0 | 7.6 | 120.0 | 12.0 | 50.0 | 2.0 | 2 |
| 158 10N30-2.0RA | 10.0 | 10.0 | 9.6 | 75.0 | 15.0 | 30.0 | 2.0 | 2 |
| 158 10N50-2.0RA | 10.0 | 10.0 | 9.6 | 100.0 | 15.0 | 50.0 | 2.0 | 2 |
| 158 10N60-2.0RA | 10.0 | 10.0 | 9.6 | 130.0 | 15.0 | 60.0 | 2.0 | 2 |
| 158 12N40-2.0RA | 12.0 | 12.0 | 11.4 | 100.0 | 18.0 | 40.0 | 2.0 | 2 |
| 158 12N60-2.0RA | 12.0 | 12.0 | 11.4 | 140.0 | 18.0 | 60.0 | 2.0 | 2 |
| 158 16N50-3.0RA | 16.0 | 16.0 | 15.2 | 100.0 | 24.0 | 50.0 | 3.0 | 2 |
| 158 16N70-3.0RA | 16.0 | 16.0 | 15.2 | 150.0 | 24.0 | 70.0 | 3.0 | 2 |

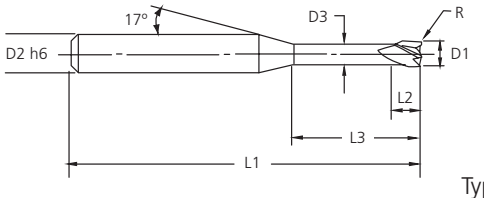
P72

# TuffCut® Series 158 Corner Radius



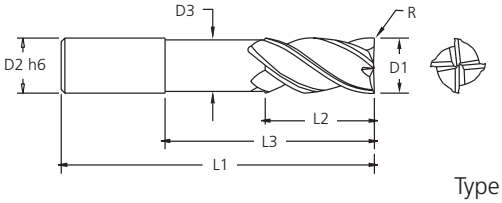

| Diameter | Diameter Tolerance | CR Tolerance | Shank Ø Tolerance |
|---|---|---|---|
| Ø2.0 - Ø16 | +0 / - 0.02 | -0.02 / +0.02 | h6 |






Type 1





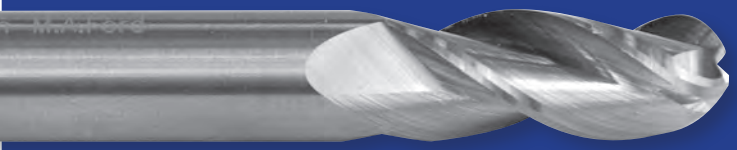

Type 2

| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R | Type |
|---|---|---|---|---|---|---|---|---|
| 158 02N06-0.1RA | 2.0 | 6.0 | 1.9 | 63.0 | 3.0 | 6.0 | 0.1 | 1 |
| 158 02N08-0.1RA | 2.0 | 6.0 | 1.9 | 63.0 | 3.0 | 8.0 | 0.1 | 1 |
| 158 02N12-0.1RA | 2.0 | 6.0 | 1.9 | 63.0 | 3.0 | 12.0 | 0.1 | 1 |
| 158 02N16-0.1RA | 2.0 | 6.0 | 1.9 | 63.0 | 3.0 | 16.0 | 0.1 | 1 |
| 158 02N20-0.1RA | 2.0 | 6.0 | 1.9 | 75.0 | 3.0 | 20.0 | 0.1 | 1 |
| 158 02N06-0.2RA | 2.0 | 6.0 | 1.9 | 63.0 | 3.0 | 6.0 | 0.2 | 1 |
| 158 02N08-0.2RA | 2.0 | 6.0 | 1.9 | 63.0 | 3.0 | 8.0 | 0.2 | 1 |
| 158 02N12-0.2RA | 2.0 | 6.0 | 1.9 | 63.0 | 3.0 | 12.0 | 0.2 | 1 |
| 158 02N16-0.2RA | 2.0 | 6.0 | 1.9 | 63.0 | 3.0 | 16.0 | 0.2 | 1 |
| 158 02N20-0.2RA | 2.0 | 6.0 | 1.9 | 75.0 | 3.0 | 20.0 | 0.2 | 1 |
| 158 03N10-0.2RA | 3.0 | 6.0 | 2.9 | 63.0 | 5.0 | 10.0 | 0.2 | 1 |
| 158 03N12-0.2RA | 3.0 | 6.0 | 2.9 | 63.0 | 5.0 | 12.0 | 0.2 | 1 |
| 158 03N16-0.2RA | 3.0 | 6.0 | 2.9 | 63.0 | 5.0 | 16.0 | 0.2 | 1 |
| 158 03N20-0.2RA | 3.0 | 6.0 | 2.9 | 75.0 | 5.0 | 20.0 | 0.2 | 1 |
| 158 03N25-0.2RA | 3.0 | 6.0 | 2.9 | 75.0 | 5.0 | 25.0 | 0.2 | 1 |
| 158 03N30-0.2RA | 3.0 | 6.0 | 2.9 | 75.0 | 5.0 | 30.0 | 0.2 | 1 |
| 158 03N10-0.5RA | 3.0 | 6.0 | 2.9 | 63.0 | 5.0 | 10.0 | 0.5 | 1 |
| 158 03N12-0.5RA | 3.0 | 6.0 | 2.9 | 63.0 | 5.0 | 12.0 | 0.5 | 1 |
| 158 03N16-0.5RA | 3.0 | 6.0 | 2.9 | 63.0 | 5.0 | 16.0 | 0.5 | 1 |
| 158 03N20-0.5RA | 3.0 | 6.0 | 2.9 | 75.0 | 5.0 | 20.0 | 0.5 | 1 |
| 158 03N25-0.5RA | 3.0 | 6.0 | 2.9 | 75.0 | 5.0 | 25.0 | 0.5 | 1 |
| 158 03N30-0.5RA | 3.0 | 6.0 | 2.9 | 75.0 | 5.0 | 30.0 | 0.5 | 1 |

# TuffCut® Series 158 Corner Radius

| Tool No. | D1 | D2 | D3 | L1 | L2 | L3 | R | Type |
|---|---|---|---|---|---|---|---|---|
| 158 04N10-0.2RA | 4.0 | 6.0 | 3.9 | 63.0 | 6.0 | 10.0 | 0.2 | 1 |
| 158 04N12-0.2RA | 4.0 | 6.0 | 3.9 | 63.0 | 6.0 | 12.0 | 0.2 | 1 |
| 158 04N16-0.2RA | 4.0 | 6.0 | 3.9 | 63.0 | 6.0 | 16.0 | 0.2 | 1 |
| 158 04N20-0.2RA | 4.0 | 6.0 | 3.9 | 75.0 | 6.0 | 20.0 | 0.2 | 1 |
| 158 04N25-0.2RA | 4.0 | 6.0 | 3.9 | 75.0 | 6.0 | 25.0 | 0.2 | 1 |
| 158 04N30-0.2RA | 4.0 | 6.0 | 3.9 | 75.0 | 6.0 | 30.0 | 0.2 | 1 |
| 158 04N10-0.5RA | 4.0 | 6.0 | 3.9 | 63.0 | 6.0 | 10.0 | 0.5 | 1 |
| 158 04N12-0.5RA | 4.0 | 6.0 | 3.9 | 63.0 | 6.0 | 12.0 | 0.5 | 1 |
| 158 04N16-0.5RA | 4.0 | 6.0 | 3.9 | 63.0 | 6.0 | 16.0 | 0.5 | 1 |
| 158 04N20-0.5RA | 4.0 | 6.0 | 3.9 | 75.0 | 6.0 | 20.0 | 0.5 | 1 |
| 158 04N25-0.5RA | 4.0 | 6.0 | 3.9 | 75.0 | 6.0 | 25.0 | 0.5 | 1 |
| 158 04N30-0.5RA | 4.0 | 6.0 | 3.9 | 75.0 | 6.0 | 30.0 | 0.5 | 1 |
| 158 06N20-0.3RA | 6.0 | 6.0 | 5.8 | 75.0 | 9.0 | 20.0 | 0.3 | 2 |
| 158 06N20-0.5RA | 6.0 | 6.0 | 5.8 | 75.0 | 9.0 | 20.0 | 0.5 | 2 |
| 158 06N20-1.0RA | 6.0 | 6.0 | 5.8 | 75.0 | 9.0 | 20.0 | 1.0 | 2 |
| 158 06N30-0.3RA | 6.0 | 6.0 | 5.8 | 100.0 | 9.0 | 30.0 | 0.3 | 2 |
| 158 06N30-0.5RA | 6.0 | 6.0 | 5.8 | 100.0 | 9.0 | 30.0 | 0.5 | 2 |
| 158 06N30-1.0RA | 6.0 | 6.0 | 5.8 | 100.0 | 9.0 | 30.0 | 1.0 | 2 |
| 158 08N30-0.3RA | 8.0 | 8.0 | 7.6 | 75.0 | 12.0 | 30.0 | 0.3 | 2 |
| 158 08N30-0.5RA | 8.0 | 8.0 | 7.6 | 75.0 | 12.0 | 30.0 | 0.5 | 2 |
| 158 08N30-1.0RA | 8.0 | 8.0 | 7.6 | 75.0 | 12.0 | 30.0 | 1.0 | 2 |
| 158 08N40-0.3RA | 8.0 | 8.0 | 7.6 | 100.0 | 12.0 | 40.0 | 0.3 | 2 |
| 158 08N40-0.5RA | 8.0 | 8.0 | 7.6 | 100.0 | 12.0 | 40.0 | 0.5 | 2 |
| 158 08N40-1.0RA | 8.0 | 8.0 | 7.6 | 100.0 | 12.0 | 40.0 | 1.0 | 2 |
| 158 08N50-0.3RA | 8.0 | 8.0 | 7.6 | 120.0 | 12.0 | 50.0 | 0.3 | 2 |
| 158 08N50-0.5RA | 8.0 | 8.0 | 7.6 | 120.0 | 12.0 | 50.0 | 0.5 | 2 |
| 158 08N50-1.0RA | 8.0 | 8.0 | 7.6 | 120.0 | 12.0 | 50.0 | 1.0 | 2 |
| 158 10N30-0.3RA | 10.0 | 10.0 | 9.6 | 75.0 | 15.0 | 30.0 | 0.3 | 2 |
| 158 10N30-0.5RA | 10.0 | 10.0 | 9.6 | 75.0 | 15.0 | 30.0 | 0.5 | 2 |
| 158 10N30-1.0RA | 10.0 | 10.0 | 9.6 | 75.0 | 15.0 | 30.0 | 1.0 | 2 |
| 158 10N50-0.3RA | 10.0 | 10.0 | 9.6 | 100.0 | 15.0 | 50.0 | 0.3 | 2 |
| 158 10N50-0.5RA | 10.0 | 10.0 | 9.6 | 100.0 | 15.0 | 50.0 | 0.5 | 2 |
| 158 10N50-1.0RA | 10.0 | 10.0 | 9.6 | 100.0 | 15.0 | 50.0 | 1.0 | 2 |
| 158 10N60-0.3RA | 10.0 | 10.0 | 9.6 | 130.0 | 15.0 | 60.0 | 0.3 | 2 |
| 158 10N60-0.5RA | 10.0 | 10.0 | 9.6 | 130.0 | 15.0 | 60.0 | 0.5 | 2 |
| 158 10N60-1.0RA | 10.0 | 10.0 | 9.6 | 130.0 | 15.0 | 60.0 | 1.0 | 2 |
| 158 12N40-0.3RA | 12.0 | 12.0 | 11.4 | 100.0 | 18.0 | 40.0 | 0.3 | 2 |
| 158 12N40-1.0RA | 12.0 | 12.0 | 11.4 | 100.0 | 18.0 | 40.0 | 1.0 | 2 |
| 158 12N60-0.3RA | 12.0 | 12.0 | 11.4 | 140.0 | 18.0 | 60.0 | 0.3 | 2 |
| 158 12N60-1.0RA | 12.0 | 12.0 | 11.4 | 140.0 | 18.0 | 60.0 | 1.0 | 2 |
| 158 16N50-0.3RA | 16.0 | 16.0 | 15.2 | 100.0 | 24.0 | 50.0 | 0.3 | 2 |
| 158 16N50-1.0RA | 16.0 | 16.0 | 15.2 | 100.0 | 24.0 | 50.0 | 1.0 | 2 |
| 158 16N70-0.3RA | 16.0 | 16.0 | 15.2 | 150.0 | 24.0 | 70.0 | 0.3 | 2 |
| 158 16N70-1.0RA | 16.0 | 16.0 | 15.2 | 150.0 | 24.0 | 70.0 | 1.0 | 2 |

P72



APG
ADVANCED PRODUCT GROUP

# TuffCut® X-AL

## Carbide End Mills

Fraises carbure en bout | Hartmetall-Schaftfräser
Frese in Metallo Duro Integrale
Frezy palcowe pełnowęglikowe



Designed to deliver exceptional metal removal rates and chip evacuation on aluminium, aluminium alloys and non-ferrous materials, the TuffCut® X-AL range has become the preferred tool choice for many precision manufacturers in a diverse range of industry sectors.

FR

"Conçue pour atteindre des niveaux exceptionnels de débit et d'évacuation copeaux dans l'aluminium, les alliages en aluminium et les métaux non-ferreux, la gamme TuffCut® X-AL est devenue l'outil de référence pour beaucoup de mécanique de précision dans divers secteurs de l'industrie."

DE

Auf außergewöhnliche Metallabtragsleistung und Spanabfuhr bei Aluminium, Aluminiumlegierungen und eisenfreiem Material ausgelegt, das TuffCut® X-AL-Sortiment ist für viele Hersteller technischer Präzisionsteile in verschiedensten Branchen zur ersten Wahl unter den Werkzeugen geworden.

IT

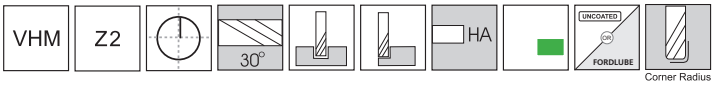
La famiglia TuffCut® X-AL, progettata per offrire eccezionale capacità di asportazione ed evacuazione truciolo su alluminio, leghe di alluminio e materiali non ferrosi, è diventata la scelta ideale per molti produttori di pezzi di precisione in diversi settori industriali.

PL

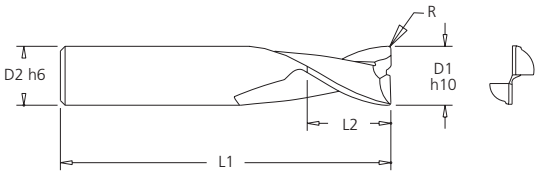
Zaprojektowany tak, aby zapewnić wyjątkową szybkość usuwania materiału i odprowadzania wiórów w aluminium, stopach aluminium i materiałach nieżelaznych. Typoszereg TuffCut® X-AL stał się preferowanym wyborem narzędzi dla wielu precyzyjnych producentów w różnych gałęziach przemysłu.


| | Page |
|---|---|
| **TuffCut® X-AL** Series 135 | 46 |
| **TuffCut® X-AL** Series 135 N | 47 |
| **TuffCut® X-AL** Series 135 N3 | 48 - 49 |
| **TuffCut® X-AL** Series 135 N5 | 50 - 51 |
| **TuffCut® X-AL** Series 135B N3, 135B N5 | 52 |
| **TuffCut® X-AL** Series 137V N3, 137V N3 AL | 53 - 54 |
| **TuffCut® X-AL** Series 137V N4, 137V N4 AL | 55 - 56 |
| **TuffCut® X-AL** Series 137V N5, 137V N5 AL | 57 - 58 |
| **TuffCut® X-AL** Series 138B, 138B N5 | 59 |
| **TuffCut® X-AL** Series 137VR N3, 137VR N5 | 60 |
| **TuffCut® X-AL** Series 137VF Finishing | 61 - 62 |
| **Technical Information** | 77 - 79 |

# TuffCut® X-AL Series 135






| Tool Number | EDP | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|---|
| 135 0300 | 13523 | 3.0 | 3.0 | 38.0 | 3.5 | 0.2 |
| 135 0400 | 13533 | 4.0 | 4.0 | 51.0 | 4.8 | 0.2 |
| 135 0500 | 13502 | 5.0 | 5.0 | 51.0 | 6.0 | 0.25 |
| 135 0600 | 13504 | 6.0 | 6.0 | 64.0 | 7.0 | 0.3 |
| 135 0800 | 13508 | 8.0 | 8.0 | 64.0 | 9.5 | 0.35 |
| 135 1000 | 13515 | 10.0 | 10.0 | 70.0 | 12.0 | 0.5 |
| 135 1200 | 13525 | 12.0 | 12.0 | 76.0 | 14.0 | 0.5 |
| 135 1400 | 13552 | 14.0 | 14.0 | 89.0 | 16.0 | 0.5 |
| 135 1600 | 13535 | 16.0 | 16.0 | 89.0 | 18.0 | 0.75 |
| 135 1800 | 13563 | 18.0 | 18.0 | 102.0 | 20.0 | 0.75 |
| 135 2000 | 13545 | 20.0 | 20.0 | 102.0 | 22.0 | 0.75 |
| 135 2500 | 13555 | 25.0 | 25.0 | 102.0 | 25.0 | 0.75 |

P77

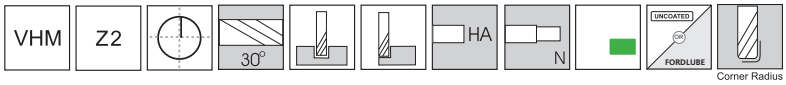
| Tool Number | EDP | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|---|
| 135 1001 | 13516 | 10.0 | 10.0 | 76.0 | 12.0 | 0.5 |
| 135 1201 | 13526 | 12.0 | 12.0 | 102.0 | 14.0 | 0.5 |
| 135 1401 | 13554 | 14.0 | 14.0 | 102.0 | 16.0 | 0.5 |
| 135 1601 | 13536 | 16.0 | 16.0 | 117.0 | 18.0 | 0.75 |
| 135 1801 | 13568 | 18.0 | 18.0 | 127.0 | 20.0 | 0.75 |
| 135 2001 | 13546 | 20.0 | 20.0 | 127.0 | 22.0 | 0.75 |
| 135 2501 | 13556 | 25.0 | 25.0 | 127.0 | 25.0 | 0.75 |

P77

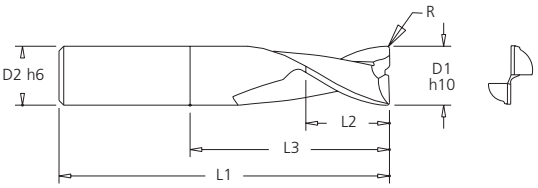
| Tool Number | EDP | D1 | D2 | L1 | L2 | R |
|---|---|---|---|---|---|---|
| 135 1002 | 13517 | 10.0 | 10.0 | 89.0 | 12.0 | 0.5 |
| 135 1202 | 13527 | 12.0 | 12.0 | 127.0 | 14.0 | 0.5 |
| 135 1402 | 13573 | 14.0 | 14.0 | 127.0 | 16.0 | 0.5 |
| 135 1602 | 13537 | 16.0 | 16.0 | 133.0 | 18.0 | 0.75 |
| 135 1802 | 13574 | 18.0 | 18.0 | 152.0 | 20.0 | 0.75 |
| 135 2002 | 13547 | 20.0 | 20.0 | 152.0 | 22.0 | 0.75 |
| 135 2502 | 13557 | 25.0 | 25.0 | 152.0 | 25.0 | 0.75 |

P77

# TuffCut® X-AL Series 135N






| Tool Number | EDP | D1 | D2 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 135 0300N | 13524 | 3.0 | 3.0 | 38.0 | 3.5 | 11.0 | 0.2 |
| 135 0400N | 13534 | 4.0 | 4.0 | 51.0 | 4.8 | 22.0 | 0.2 |
| 135 0500N | 13503 | 5.0 | 5.0 | 51.0 | 6.0 | 22.0 | 0.25 |
| 135 0600N | 13505 | 6.0 | 6.0 | 64.0 | 7.0 | 26.0 | 0.3 |
| 135 0800N | 13509 | 8.0 | 8.0 | 64.0 | 9.5 | 26.0 | 0.35 |
| 135 1000N | 13565 | 10.0 | 10.0 | 70.0 | 12.0 | 28.0 | 0.5 |
| 135 1200N | 13575 | 12.0 | 12.0 | 76.0 | 14.0 | 28.0 | 0.5 |
| 135 1400N | 13553 | 14.0 | 14.0 | 89.0 | 16.0 | 42.0 | 0.5 |
| 135 1600N | 13585 | 16.0 | 16.0 | 89.0 | 18.0 | 39.0 | 0.75 |
| 135 1800N | 13564 | 18.0 | 18.0 | 102.0 | 20.0 | 52.0 | 0.75 |
| 135 2000N | 13594 | 20.0 | 20.0 | 102.0 | 22.0 | 50.0 | 0.75 |
| 135 2500N | 13597 | 25.0 | 25.0 | 102.0 | 25.0 | 36.0 | 0.75 |

P77

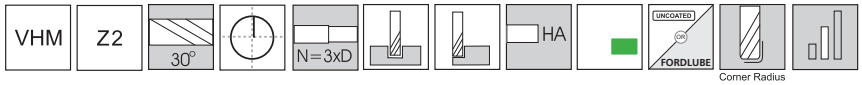
| Tool Number | EDP | D1 | D2 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 135 1001N | 13566 | 10.0 | 10.0 | 76.0 | 12.0 | 34.0 | 0.5 |
| 135 1201N | 13576 | 12.0 | 12.0 | 102.0 | 14.0 | 54.0 | 0.5 |
| 135 1401N | 13558 | 14.0 | 14.0 | 102.0 | 16.0 | 55.0 | 0.5 |
| 135 1601N | 13586 | 16.0 | 16.0 | 117.0 | 18.0 | 83.0 | 0.75 |
| 135 1801N | 13569 | 18.0 | 18.0 | 127.0 | 20.0 | 77.0 | 0.75 |
| 135 2001N | 13595 | 20.0 | 20.0 | 127.0 | 22.0 | 75.0 | 0.75 |
| 135 2501N | 13598 | 25.0 | 25.0 | 127.0 | 25.0 | 61.0 | 0.75 |

P77

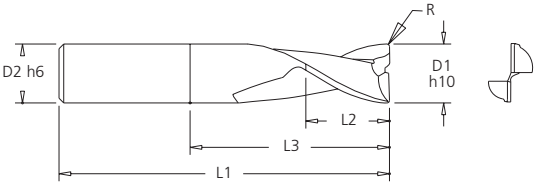
| Tool Number | EDP | D1 | D2 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 135 1002N | 13567 | 10.0 | 10.0 | 89.0 | 12.0 | 47.0 | 0.5 |
| 135 1202N | 13577 | 12.0 | 12.0 | 127.0 | 14.0 | 79.0 | 0.5 |
| 135 1402N | 13559 | 14.0 | 14.0 | 127.0 | 16.0 | 80.0 | 0.5 |
| 135 1602N | 13587 | 16.0 | 16.0 | 133.0 | 18.0 | 99.0 | 0.75 |
| 135 1802N | 13578 | 18.0 | 18.0 | 152.0 | 20.0 | 102.0 | 0.75 |
| 135 2002N | 13596 | 20.0 | 20.0 | 152.0 | 22.0 | 100.0 | 0.75 |
| 135 2502N | 13599 | 25.0 | 25.0 | 152.0 | 25.0 | 86.0 | 0.75 |

P77

# TuffCut® X-AL Series 135 N3



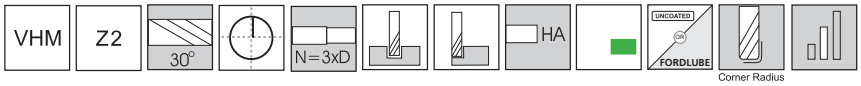


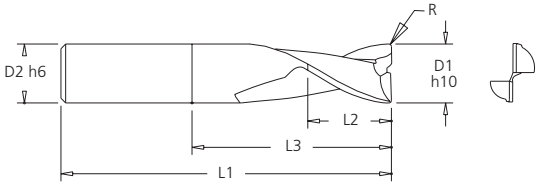

| Tool Number | EDP | D1 | D2 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 135 03N3 | 96620 | 3.0 | 3.0 | 38.0 | 3.5 | 11.0 | - |
| 135 03N3-0.5R | 96621 | 3.0 | 3.0 | 38.0 | 3.5 | 11.0 | 0.5 |
| 135 03N3-1.0R | 96622 | 3.0 | 3.0 | 38.0 | 3.5 | 11.0 | 1.0 |
| 135 04N3 | 96626 | 4.0 | 4.0 | 51.0 | 4.8 | 14.0 | - |
| 135 04N3-0.5R | 96627 | 4.0 | 4.0 | 51.0 | 4.8 | 14.0 | 0.5 |
| 135 04N3-1.0R | 96628 | 4.0 | 4.0 | 51.0 | 4.8 | 14.0 | 1.0 |
| 135 05N3 | 96632 | 5.0 | 6.0 | 64.0 | 6.0 | 17.0 | - |
| 135 05N3-0.5R | 96633 | 5.0 | 6.0 | 64.0 | 6.0 | 17.0 | 0.5 |
| 135 05N3-1.0R | 96634 | 5.0 | 6.0 | 64.0 | 6.0 | 17.0 | 1.0 |
| 135 06N3 | 96638 | 6.0 | 6.0 | 64.0 | 7.0 | 20.0 | - |
| 135 06N3-0.5R | 96639 | 6.0 | 6.0 | 64.0 | 7.0 | 20.0 | 0.5 |
| 135 06N3-1.0R | 96640 | 6.0 | 6.0 | 64.0 | 7.0 | 20.0 | 1.0 |
| 135 06N3-1.5R | 96641 | 6.0 | 6.0 | 64.0 | 7.0 | 20.0 | 1.5 |
| 135 06N3-2.0R | 96642 | 6.0 | 6.0 | 64.0 | 7.0 | 20.0 | 2.0 |
| 135 08N3 | 96648 | 8.0 | 8.0 | 64.0 | 9.5 | 26.0 | - |
| 135 08N3-0.5R | 96649 | 8.0 | 8.0 | 64.0 | 9.5 | 26.0 | 0.5 |
| 135 08N3-1.0R | 96650 | 8.0 | 8.0 | 64.0 | 9.5 | 26.0 | 1.0 |
| 135 08N3-1.5R | 96651 | 8.0 | 8.0 | 64.0 | 9.5 | 26.0 | 1.5 |
| 135 08N3-2.0R | 96652 | 8.0 | 8.0 | 64.0 | 9.5 | 26.0 | 2.0 |
| 135 08N3-3.0R | 96653 | 8.0 | 8.0 | 64.0 | 9.5 | 26.0 | 3.0 |
| 135 10N3 | 96660 | 10.0 | 10.0 | 76.0 | 12.0 | 34.0 | - |
| 135 1001N | 13566 | 10.0 | 10.0 | 76.0 | 12.0 | 34.0 | 0.5 |
| 135 10N3-1.0R | 96662 | 10.0 | 10.0 | 76.0 | 12.0 | 34.0 | 1.0 |
| 135 10N3-1.5R | 96663 | 10.0 | 10.0 | 76.0 | 12.0 | 34.0 | 1.5 |
| 135 10N3-2.0R | 96664 | 10.0 | 10.0 | 76.0 | 12.0 | 34.0 | 2.0 |
| 135 10N3-3.0R | 96665 | 10.0 | 10.0 | 76.0 | 12.0 | 34.0 | 3.0 |
| 135 12N3 | 96671 | 12.0 | 12.0 | 76.0 | 14.0 | 38.0 | - |

P77

# TuffCut® X-AL Series 135 N3



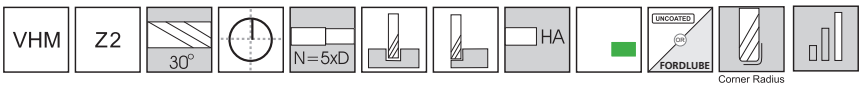


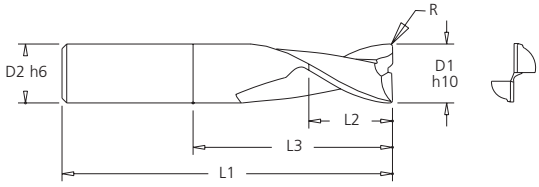

| Tool Number | EDP | D1 | D2 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 135 12N3-0.5R | 96672 | 12.0 | 12.0 | 76.0 | 14.0 | 38.0 | 0.5 |
| 135 12N3-1.0R | 96673 | 12.0 | 12.0 | 76.0 | 14.0 | 38.0 | 1.0 |
| 135 12N3-1.5R | 96674 | 12.0 | 12.0 | 76.0 | 14.0 | 38.0 | 1.5 |
| 135 12N3-2.0R | 96675 | 12.0 | 12.0 | 76.0 | 14.0 | 38.0 | 2.0 |
| 135 12N3-3.0R | 96676 | 12.0 | 12.0 | 76.0 | 14.0 | 38.0 | 3.0 |
| 135 12N3-4.0R | 96677 | 12.0 | 12.0 | 76.0 | 14.0 | 38.0 | 4.0 |
| 135 16N3 | 96684 | 16.0 | 16.0 | 117.0 | 18.0 | 53.0 | - |
| 135 16N3-0.5R | 96685 | 16.0 | 16.0 | 117.0 | 18.0 | 53.0 | 0.5 |
| 135 16N3-1.0R | 96686 | 16.0 | 16.0 | 117.0 | 18.0 | 53.0 | 1.0 |
| 135 16N3-1.5R | 96687 | 16.0 | 16.0 | 117.0 | 18.0 | 53.0 | 1.5 |
| 135 16N3-2.0R | 96688 | 16.0 | 16.0 | 117.0 | 18.0 | 53.0 | 2.0 |
| 135 16N3-3.0R | 96689 | 16.0 | 16.0 | 117.0 | 18.0 | 53.0 | 3.0 |
| 135 16N3-4.0R | 96690 | 16.0 | 16.0 | 117.0 | 18.0 | 53.0 | 4.0 |
| 135 20N3-0.5R | 96697 | 20.0 | 20.0 | 127.0 | 22.0 | 65.0 | 0.5 |
| 135 20N3-1.0R | 96698 | 20.0 | 20.0 | 127.0 | 22.0 | 65.0 | 1.0 |
| 135 20N3-1.5R | 96699 | 20.0 | 20.0 | 127.0 | 22.0 | 65.0 | 1.5 |
| 135 20N3-2.0R | 96700 | 20.0 | 20.0 | 127.0 | 22.0 | 65.0 | 2.0 |
| 135 20N3-3.0R | 96701 | 20.0 | 20.0 | 127.0 | 22.0 | 65.0 | 3.0 |
| 135 20N3-4.0R | 96702 | 20.0 | 20.0 | 127.0 | 22.0 | 65.0 | 4.0 |
| 135 20N3-5.0R | 96722 | 20.0 | 20.0 | 127.0 | 22.0 | 65.0 | 5.0 |
| 135 25N3-0.5R | 96709 | 25.0 | 25.0 | 127.0 | 25.0 | 80.0 | 0.5 |
| 135 25N3-1.0R | 96710 | 25.0 | 25.0 | 127.0 | 25.0 | 80.0 | 1.0 |
| 135 25N3-1.5R | 96711 | 25.0 | 25.0 | 127.0 | 25.0 | 80.0 | 1.5 |
| 135 25N3-2.0R | 96712 | 25.0 | 25.0 | 127.0 | 25.0 | 80.0 | 2.0 |
| 135 25N3-3.0R | 96713 | 25.0 | 25.0 | 127.0 | 25.0 | 80.0 | 3.0 |
| 135 25N3-4.0R | 96714 | 25.0 | 25.0 | 127.0 | 25.0 | 80.0 | 4.0 |

P77

# TuffCut® X-AL Series 135 N5



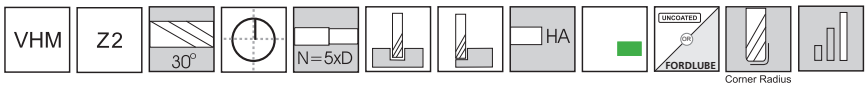


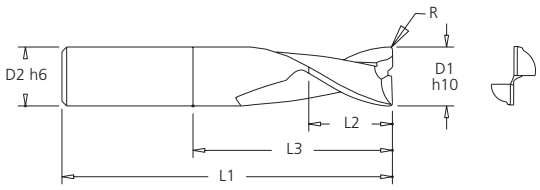

| Tool Number | EDP | D1 | D2 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 135 03N5 | 96623 | 3.0 | 3.0 | 38.0 | 3.5 | 16.0 | - |
| 135 03N5-0.5R | 96624 | 3.0 | 3.0 | 38.0 | 3.5 | 16.0 | 0.5 |
| 135 03N5-1.0R | 96625 | 3.0 | 3.0 | 38.0 | 3.5 | 16.0 | 1.0 |
| 135 04N5 | 96629 | 4.0 | 4.0 | 51.0 | 4.8 | 22.0 | - |
| 135 04N5-0.5R | 96630 | 4.0 | 4.0 | 51.0 | 4.8 | 22.0 | 0.5 |
| 135 04N5-1.0R | 96631 | 4.0 | 4.0 | 51.0 | 4.8 | 22.0 | 1.0 |
| 135 05N5 | 96635 | 5.0 | 6.0 | 64.0 | 6.0 | 27.0 | - |
| 135 05N5-0.5R | 96636 | 5.0 | 6.0 | 64.0 | 6.0 | 27.0 | 0.5 |
| 135 05N5-1.0R | 96637 | 5.0 | 6.0 | 64.0 | 6.0 | 27.0 | 1.0 |
| 135 06N5 | 96643 | 6.0 | 6.0 | 64.0 | 7.0 | 32.0 | - |
| 135 06N5-0.5R | 96644 | 6.0 | 6.0 | 64.0 | 7.0 | 32.0 | 0.5 |
| 135 06N5-1.0R | 96645 | 6.0 | 6.0 | 64.0 | 7.0 | 32.0 | 1.0 |
| 135 06N5-1.5R | 96646 | 6.0 | 6.0 | 64.0 | 7.0 | 32.0 | 1.5 |
| 135 06N5-2.0R | 96647 | 6.0 | 6.0 | 64.0 | 7.0 | 32.0 | 2.0 |
| 135 08N5 | 96654 | 8.0 | 8.0 | 75.0 | 9.5 | 42.0 | - |
| 135 08N5-0.5R | 96655 | 8.0 | 8.0 | 75.0 | 9.5 | 42.0 | 0.5 |
| 135 08N5-1.0R | 96656 | 8.0 | 8.0 | 75.0 | 9.5 | 42.0 | 1.0 |
| 135 08N5-1.5R | 96657 | 8.0 | 8.0 | 75.0 | 9.5 | 42.0 | 1.5 |
| 135 08N5-2.0R | 96658 | 8.0 | 8.0 | 75.0 | 9.5 | 42.0 | 2.0 |
| 135 08N5-3.0R | 96659 | 8.0 | 8.0 | 75.0 | 9.5 | 42.0 | 3.0 |
| 135 10N5-0.5R | 96666 | 10.0 | 10.0 | 89.0 | 12.0 | 52.0 | 0.5 |
| 135 10N5-1.0R | 96667 | 10.0 | 10.0 | 89.0 | 12.0 | 52.0 | 1.0 |
| 135 10N5-1.5R | 96668 | 10.0 | 10.0 | 89.0 | 12.0 | 52.0 | 1.5 |
| 135 10N5-2.0R | 96669 | 10.0 | 10.0 | 89.0 | 12.0 | 52.0 | 2.0 |
| 135 10N5-3.0R | 96670 | 10.0 | 10.0 | 89.0 | 12.0 | 52.0 | 3.0 |
| 135 12N5-0.5R | 96678 | 12.0 | 12.0 | 110.0 | 14.0 | 62.0 | 0.5 |

P77

# TuffCut® X-AL Series 135 N5





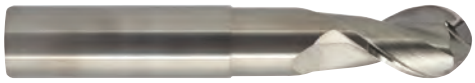



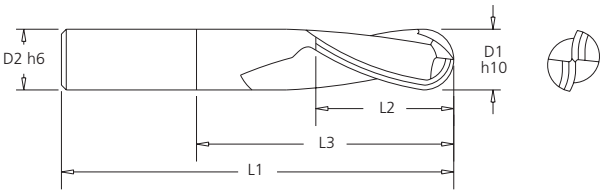

| Tool Number | EDP | D1 | D2 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|
| 135 12N5-1.0R | 96679 | 12.0 | 12.0 | 110.0 | 14.0 | 62.0 | 1.0 |
| 135 12N5-1.5R | 96680 | 12.0 | 12.0 | 110.0 | 14.0 | 62.0 | 1.5 |
| 135 12N5-2.0R | 96681 | 12.0 | 12.0 | 110.0 | 14.0 | 62.0 | 2.0 |
| 135 12N5-3.0R | 96682 | 12.0 | 12.0 | 110.0 | 14.0 | 62.0 | 3.0 |
| 135 12N5-4.0R | 96683 | 12.0 | 12.0 | 110.0 | 14.0 | 62.0 | 4.0 |
| 135 12N5-5.0R | 96723 | 12.0 | 12.0 | 110.0 | 14.0 | 62.0 | 5.0 |
| 135 16N5-0.5R | 96691 | 16.0 | 16.0 | 127.0 | 18.0 | 85.0 | 0.5 |
| 135 16N5-1.0R | 96692 | 16.0 | 16.0 | 127.0 | 18.0 | 85.0 | 1.0 |
| 135 16N5-1.5R | 96693 | 16.0 | 16.0 | 127.0 | 18.0 | 85.0 | 1.5 |
| 135 16N5-2.0R | 96694 | 16.0 | 16.0 | 127.0 | 18.0 | 85.0 | 2.0 |
| 135 16N5-3.0R | 96695 | 16.0 | 16.0 | 127.0 | 18.0 | 85.0 | 3.0 |
| 135 16N5-4.0R | 96696 | 16.0 | 16.0 | 127.0 | 18.0 | 85.0 | 4.0 |
| 135 20N5-0.5R | 96703 | 20.0 | 20.0 | 152.0 | 22.0 | 105.0 | 0.5 |
| 135 20N5-1.0R | 96704 | 20.0 | 20.0 | 152.0 | 22.0 | 105.0 | 1.0 |
| 135 20N5-1.5R | 96705 | 20.0 | 20.0 | 152.0 | 22.0 | 105.0 | 1.5 |
| 135 20N5-2.0R | 96706 | 20.0 | 20.0 | 152.0 | 22.0 | 105.0 | 2.0 |
| 135 20N5-3.0R | 96707 | 20.0 | 20.0 | 152.0 | 22.0 | 105.0 | 3.0 |
| 135 20N5-4.0R | 96708 | 20.0 | 20.0 | 152.0 | 22.0 | 105.0 | 4.0 |
| 135 20N5-5.0R | 96724 | 20.0 | 20.0 | 152.0 | 22.0 | 105.0 | 5.0 |
| 135 25N5-0.5R | 96715 | 25.0 | 25.0 | 180.0 | 25.0 | 130.0 | 0.5 |
| 135 25N5-1.0R | 96716 | 25.0 | 25.0 | 180.0 | 25.0 | 130.0 | 1.0 |
| 135 25N5-1.5R | 96717 | 25.0 | 25.0 | 180.0 | 25.0 | 130.0 | 1.5 |
| 135 25N5-2.0R | 96718 | 25.0 | 25.0 | 180.0 | 25.0 | 130.0 | 2.0 |
| 135 25N5-3.0R | 96719 | 25.0 | 25.0 | 180.0 | 25.0 | 130.0 | 3.0 |
| 135 25N5-4.0R | 96720 | 25.0 | 25.0 | 180.0 | 25.0 | 130.0 | 4.0 |

P77

# TuffCut® X-AL Series 135B N3



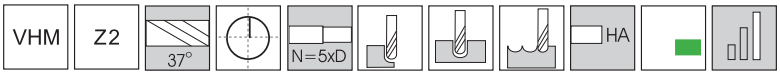





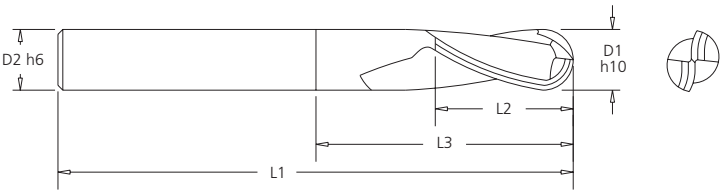

| Tool Number | EDP | D1 | D2 | L1 | L2 | L3 |
|---|---|---|---|---|---|---|
| 135B 0300N3 | 13236 | 3.0 | 3.0 | 38.0 | 5.0 | 11.0 |
| 135B 0400N3 | 13238 | 4.0 | 4.0 | 51.0 | 6.0 | 14.0 |
| 135B 0500N3 | 13240 | 5.0 | 5.0 | 64.0 | 7.0 | 17.0 |
| 135B 0600N3 | 13242 | 6.0 | 6.0 | 64.0 | 8.0 | 20.0 |
| 135B 0800N3 | 13244 | 8.0 | 8.0 | 64.0 | 10.0 | 26.0 |
| 135B 1000N3 | 13246 | 10.0 | 10.0 | 70.0 | 12.0 | 32.0 |
| 135B 1200N3 | 13248 | 12.0 | 12.0 | 76.0 | 16.0 | 38.0 |
| 135B 1600N3 | 13250 | 16.0 | 16.0 | 89.0 | 20.0 | 50.0 |

P78

# TuffCut® X-AL Series 135B N5



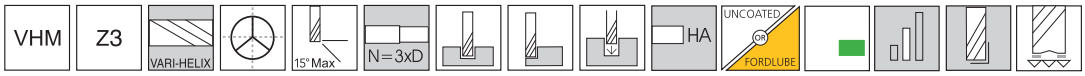


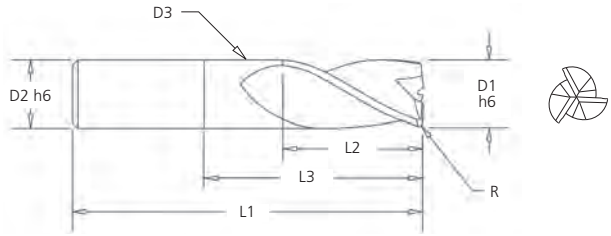

| Tool Number | EDP | D1 | D2 | L1 | L2 | L3 |
|---|---|---|---|---|---|---|
| 135B 0200N5 | 13252 | 2.0 | 6.0 | 75.0 | 4.0 | 12.0 |
| 135B 0300N5 | 13254 | 3.0 | 6.0 | 75.0 | 5.0 | 17.0 |
| 135B 0400N5 | 13256 | 4.0 | 6.0 | 75.0 | 6.0 | 22.0 |
| 135B 0500N5 | 13258 | 5.0 | 6.0 | 75.0 | 7.0 | 27.0 |
| 135B 0600N5 | 13260 | 6.0 | 6.0 | 110.0 | 8.0 | 32.0 |
| 135B 0800N5 | 13262 | 8.0 | 8.0 | 110.0 | 10.0 | 42.0 |
| 135B 1000N5 | 13264 | 10.0 | 10.0 | 110.0 | 12.0 | 52.0 |
| 135B 1200N5 | 13266 | 12.0 | 12.0 | 120.0 | 16.0 | 62.0 |
| 135B 1600N5 | 13268 | 16.0 | 16.0 | 130.0 | 20.0 | 82.0 |

P78

# TuffCut® X-AL Series 137V N3 & 137V N3 AL





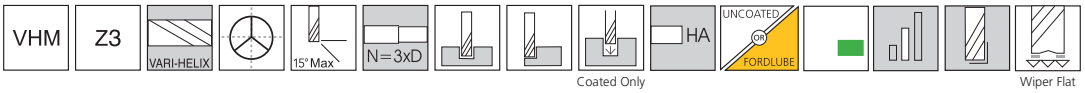

new items

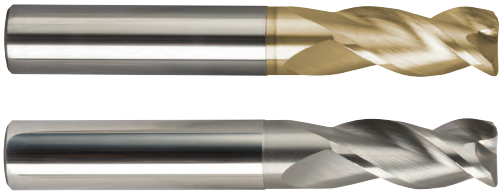
| Tool Number | | | | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|---|---|---|
| Uncoated | Stk | Fordlube Coating | Stk | | | | | | | |
| 137V 03N3 | ● | 137V 03N3AL | ● | 3.0 | 3.0 | 2.8 | 51.0 | 8.0 | 11.0 | - |
| 137V 03N3-0.2R | ● | 137V 03N3-0.2RAL | ● | 3.0 | 3.0 | 2.8 | 51.0 | 8.0 | 11.0 | 0.2 |
| 137V 03N3-0.5R | ● | 137V 03N3-0.5RAL | ● | 3.0 | 3.0 | 2.8 | 51.0 | 8.0 | 11.0 | 0.5 |
| 137V 03N3-1.0R | ● | 137V 03N3-1.0RAL | ● | 3.0 | 3.0 | 2.8 | 51.0 | 8.0 | 11.0 | 1.0 |
| 137V 04N3 | ● | 137V 04N3AL | ● | 4.0 | 4.0 | 3.8 | 51.0 | 11.0 | 14.0 | - |
| 137V 04N3-0.2R | ● | 137V 04N3-0.2RAL | ● | 4.0 | 4.0 | 3.8 | 51.0 | 11.0 | 14.0 | 0.2 |
| 137V 04N3-0.5R | ● | 137V 04N3-0.5RAL | ● | 4.0 | 4.0 | 3.8 | 51.0 | 11.0 | 14.0 | 0.5 |
| 137V 04N3-1.0R | ● | 137V 04N3-1.0RAL | ● | 4.0 | 4.0 | 3.8 | 51.0 | 11.0 | 14.0 | 1.0 |
| 137V 05N3 | ● | 137V 05N3AL | ● | 5.0 | 5.0 | 4.8 | 57.0 | 13.0 | 17.0 | - |
| 137V 05N3-0.2R | ● | 137V 05N3-0.2RAL | ● | 5.0 | 5.0 | 4.8 | 57.0 | 13.0 | 17.0 | 0.2 |
| 137V 05N3-0.5R | ● | 137V 05N3-0.5RAL | ● | 5.0 | 5.0 | 4.8 | 57.0 | 13.0 | 17.0 | 0.5 |
| 137V 05N3-1.0R | ● | 137V 05N3-1.0RAL | ● | 5.0 | 5.0 | 4.8 | 57.0 | 13.0 | 17.0 | 1.0 |
| 137V 06N3 | ● | 137V 06N3AL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 13.0 | 20.0 | - |
| 137V 06N3-0.2R | ● | 137V 06N3-0.2RAL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 13.0 | 20.0 | 0.2 |
| 137V 06N3-0.5R | ● | 137V 06N3-0.5RAL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 13.0 | 20.0 | 0.5 |
| 137V 06N3-1.0R | ● | 137V 06N3-1.0RAL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 13.0 | 20.0 | 1.0 |
| 137V 06N3-1.5R | ● | 137V 06N3-1.5RAL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 13.0 | 20.0 | 1.5 |
| 137V 06N3-2.0R | ● | 137V 06N3-2.0RAL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 13.0 | 20.0 | 2.0 |
| 137V 08N3 | ● | 137V 08N3AL | ● | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | - |
| 137V 08N3-0.2R | ● | 137V 08N3-0.2RAL | ● | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 0.2 |
| 137V 08N3-0.5R | ● | 137V 08N3-0.5RAL | ● | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 0.5 |
| 137V 08N3-1.0R | ● | 137V 08N3-1.0RAL | ● | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 1.0 |
| 137V 08N3-1.5R | ● | 137V 08N3-1.5RAL | ○ | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 1.5 |
| 137V 08N3-2.0R | ● | 137V 08N3-2.0RAL | ● | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 2.0 |
| 137V 08N3-3.0R | ● | 137V 08N3-3.0RAL | ● | 8.0 | 8.0 | 7.8 | 64.0 | 19.0 | 26.0 | 3.0 |
| 137V 10N3 | ● | 137V 10N3AL | ● | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | - |
| 137V 10N3-0.2R | ● | 137V 10N3-0.2RAL | ● | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 0.2 |
| 137V 10N3-0.3R | ○ | 137V 10N3-0.3RAL | ○ | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 0.3 |
| 137V 10N3-0.5R | ● | 137V 10N3-0.5RAL | ● | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 0.5 |
| 137V 10N3-1.0R | ● | 137V 10N3-1.0RAL | ● | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 1.0 |
| 137V 10N3-1.5R | ● | 137V 10N3-1.5RAL | ● | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 1.5 |
| 137V 10N3-2.0R | ● | 137V 10N3-2.0RAL | ● | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 2.0 |
| 137V 10N3-3.0R | ● | 137V 10N3-3.0RAL | ● | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 3.0 |
| 137V 10N3-4.0R | ● | 137V 10N3-4.0RAL | ○ | 10.0 | 10.0 | 9.8 | 73.0 | 22.0 | 32.0 | 4.0 |

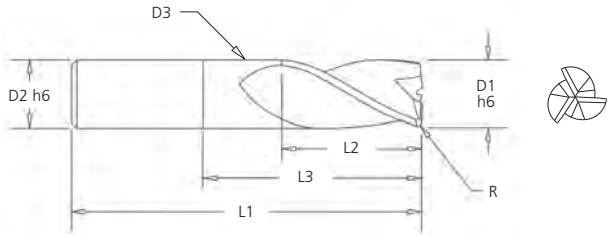
● Stock ○ Check Availability

P79

# TuffCut® X-AL Series 137V N3 & 137V N3 AL





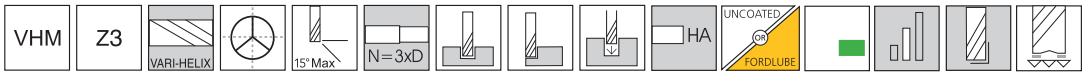

new items

| Tool Number | | | | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|---|---|---|
| Uncoated | Stk | Fordlube Coating | Stk | | | | | | | |
| 137V 12N3 | ● | 137V 12N3AL | ● | 12.0 | 12.0 | 11.8 | 84.0 | 26.0 | 38.0 | - |
| 137V 12N3-0.2R | ● | 137V 12N3-0.2RAL | ● | 12.0 | 12.0 | 11.8 | 84.0 | 26.0 | 38.0 | 0.2 |
| 137V 12N3-0.5R | ● | 137V 12N3-0.5RAL | ○ | 12.0 | 12.0 | 11.8 | 84.0 | 26.0 | 38.0 | 0.5 |
| 137V 12N3-1.0R | ● | 137V 12N3-1.0RAL | ● | 12.0 | 12.0 | 11.8 | 84.0 | 26.0 | 38.0 | 1.0 |
| 137V 12N3-1.5R | ● | 137V 12N3-1.5RAL | ○ | 12.0 | 12.0 | 11.8 | 84.0 | 26.0 | 38.0 | 1.5 |
| 137V 12N3-2.0R | ● | 137V 12N3-2.0RAL | ● | 12.0 | 12.0 | 11.8 | 84.0 | 26.0 | 38.0 | 2.0 |
| 137V 12N3-2.5R | ● | 137V 12N3-2.5RAL | ○ | 12.0 | 12.0 | 11.8 | 84.0 | 26.0 | 38.0 | 2.5 |
| 137V 12N3-3.0R | ● | 137V 12N3-3.0RAL | ● | 12.0 | 12.0 | 11.8 | 84.0 | 26.0 | 38.0 | 3.0 |
| 137V 12N3-4.0R | ● | 137V 12N3-4.0RAL | ● | 12.0 | 12.0 | 11.8 | 84.0 | 26.0 | 38.0 | 4.0 |
| 137V 16N3 | ● | 137V 16N3AL | ● | 16.0 | 16.0 | 15.8 | 93.0 | 32.0 | 50.0 | - |
| 137V 16N3-0.2R | ● | 137V 16N3-0.2RAL | ● | 16.0 | 16.0 | 15.8 | 93.0 | 32.0 | 50.0 | 0.2 |
| 137V 16N3-0.5R | ● | 137V 16N3-0.5RAL | ● | 16.0 | 16.0 | 15.8 | 93.0 | 32.0 | 50.0 | 0.5 |
| 137V 16N3-1.0R | ● | 137V 16N3-1.0RAL | ● | 16.0 | 16.0 | 15.8 | 93.0 | 32.0 | 50.0 | 1.0 |
| 137V 16N3-1.5R | ● | 137V 16N3-1.5RAL | ● | 16.0 | 16.0 | 15.8 | 93.0 | 32.0 | 50.0 | 1.5 |
| 137V 16N3-2.0R | ● | 137V 16N3-2.0RAL | ● | 16.0 | 16.0 | 15.8 | 93.0 | 32.0 | 50.0 | 2.0 |
| 137V 16N3-3.0R | ● | 137V 16N3-3.0RAL | ● | 16.0 | 16.0 | 15.8 | 93.0 | 32.0 | 50.0 | 3.0 |
| 137V 16N3-4.0R | ● | 137V 16N3-4.0RAL | ● | 16.0 | 16.0 | 15.8 | 93.0 | 32.0 | 50.0 | 4.0 |
| 137V 20N3 | ● | 137V 20N3AL | ● | 20.0 | 20.0 | 19.8 | 105.0 | 38.0 | 62.0 | - |
| 137V 20N3-0.2R | ● | 137V 20N3-0.2RAL | ● | 20.0 | 20.0 | 19.8 | 105.0 | 38.0 | 62.0 | 0.2 |
| 137V 20N3-0.5R | ● | 137V 20N3-0.5RAL | ● | 20.0 | 20.0 | 19.8 | 105.0 | 38.0 | 62.0 | 0.5 |
| 137V 20N3-1.0R | ● | 137V 20N3-1.0RAL | ● | 20.0 | 20.0 | 19.8 | 105.0 | 38.0 | 62.0 | 1.0 |
| 137V 20N3-1.5R | ● | 137V 20N3-1.5RAL | ○ | 20.0 | 20.0 | 19.8 | 105.0 | 38.0 | 62.0 | 1.5 |
| 137V 20N3-2.0R | ● | 137V 20N3-2.0RAL | ● | 20.0 | 20.0 | 19.8 | 105.0 | 38.0 | 62.0 | 2.0 |
| 137V 20N3-3.0R | ● | 137V 20N3-3.0RAL | ● | 20.0 | 20.0 | 19.8 | 105.0 | 38.0 | 62.0 | 3.0 |
| 137V 20N3-4.0R | ● | 137V 20N3-4.0RAL | ● | 20.0 | 20.0 | 19.8 | 105.0 | 38.0 | 62.0 | 4.0 |
| 137V 20N3-5.0R | ● | 137V 20N3-5.0RAL | ○ | 20.0 | 20.0 | 19.8 | 105.0 | 38.0 | 62.0 | 5.0 |
| 137V 20N3-6.0R | ● | 137V 20N3-6.0RAL | ○ | 20.0 | 20.0 | 19.8 | 105.0 | 38.0 | 62.0 | 6.0 |

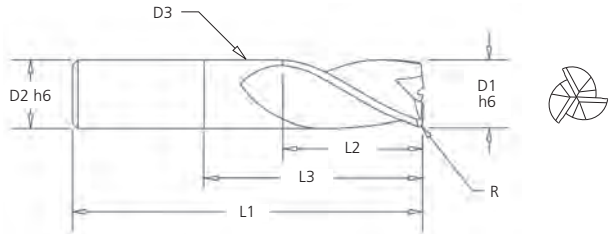
● Stock ○ Check Availability

P79

# TuffCut® X-AL Series 137V N4 & 137V N4 AL





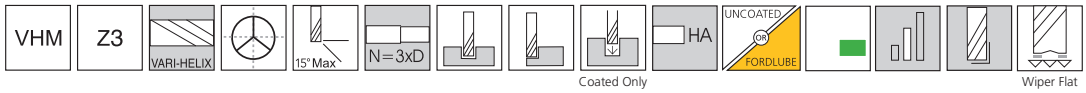

new items

| Tool Number | | | | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|---|---|---|
| Uncoated | Stk | Fordlube Coating | Stk | | | | | | | |
| 137V 03N4 | ● | 137V 03N4AL | ○ | 3.0 | 3.0 | 2.8 | 51.0 | 4.5 | 14.0 | - |
| 137V 03N4-0.2R | ● | 137V 03N4-0.2RAL | ● | 3.0 | 3.0 | 2.8 | 51.0 | 4.5 | 14.0 | 0.2 |
| 137V 03N4-0.5R | ● | 137V 03N4-0.5RAL | ● | 3.0 | 3.0 | 2.8 | 51.0 | 4.5 | 14.0 | 0.5 |
| 137V 03N4-1.0R | ● | 137V 03N4-1.0RAL | ○ | 3.0 | 3.0 | 2.8 | 51.0 | 4.5 | 14.0 | 1.0 |
| 137V 04N4 | ● | 137V 04N4AL | ● | 4.0 | 4.0 | 3.8 | 51.0 | 6.0 | 18.0 | - |
| 137V 04N4-0.2R | ● | 137V 04N4-0.2RAL | ● | 4.0 | 4.0 | 3.8 | 51.0 | 6.0 | 18.0 | 0.2 |
| 137V 04N4-0.5R | ● | 137V 04N4-0.5RAL | ● | 4.0 | 4.0 | 3.8 | 51.0 | 6.0 | 18.0 | 0.5 |
| 137V 04N4-1.0R | ● | 137V 04N4-1.0RAL | ● | 4.0 | 4.0 | 3.8 | 51.0 | 6.0 | 18.0 | 1.0 |
| 137V 05N4 | ● | 137V 05N4AL | ● | 5.0 | 5.0 | 4.8 | 57.0 | 7.5 | 22.0 | - |
| 137V 05N4-0.2R | ● | 137V 05N4-0.2RAL | ● | 5.0 | 5.0 | 4.8 | 57.0 | 7.5 | 22.0 | 0.2 |
| 137V 05N4-0.5R | ● | 137V 05N4-0.5RAL | ○ | 5.0 | 5.0 | 4.8 | 57.0 | 7.5 | 22.0 | 0.5 |
| 137V 05N4-1.0R | ● | 137V 05N4-1.0RAL | ● | 5.0 | 5.0 | 4.8 | 57.0 | 7.5 | 22.0 | 1.0 |
| 137V 06N4 | ● | 137V 06N4AL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 9.0 | 26.0 | - |
| 137V 06N4-0.2R | ● | 137V 06N4-0.2RAL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 9.0 | 26.0 | 0.2 |
| 137V 06N4-0.5R | ● | 137V 06N4-0.5RAL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 9.0 | 26.0 | 0.5 |
| 137V 06N4-1.0R | ● | 137V 06N4-1.0RAL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 9.0 | 26.0 | 1.0 |
| 137V 06N4-1.5R | ● | 137V 06N4-1.5RAL | ○ | 6.0 | 6.0 | 5.8 | 64.0 | 9.0 | 26.0 | 1.5 |
| 137V 06N4-2.0R | ● | 137V 06N4-2.0RAL | ○ | 6.0 | 6.0 | 5.8 | 64.0 | 9.0 | 26.0 | 2.0 |
| 137V 08N4 | ● | 137V 08N4AL | ● | 8.0 | 8.0 | 7.8 | 70.0 | 12.0 | 34.0 | - |
| 137V 08N4-0.2R | ● | 137V 08N4-0.2RAL | ● | 8.0 | 8.0 | 7.8 | 70.0 | 12.0 | 34.0 | 0.2 |
| 137V 08N4-0.5R | ● | 137V 08N4-0.5RAL | ○ | 8.0 | 8.0 | 7.8 | 70.0 | 12.0 | 34.0 | 0.5 |
| 137V 08N4-1.0R | ● | 137V 08N4-1.0RAL | ● | 8.0 | 8.0 | 7.8 | 70.0 | 12.0 | 34.0 | 1.0 |
| 137V 08N4-1.5R | ● | 137V 08N4-1.5RAL | ○ | 8.0 | 8.0 | 7.8 | 70.0 | 12.0 | 34.0 | 1.5 |
| 137V 08N4-2.0R | ● | 137V 08N4-2.0RAL | ● | 8.0 | 8.0 | 7.8 | 70.0 | 12.0 | 34.0 | 2.0 |
| 137V 08N4-3.0R | ● | 137V 08N4-3.0RAL | ● | 8.0 | 8.0 | 7.8 | 70.0 | 12.0 | 34.0 | 3.0 |
| 137V 10N4 | ● | 137V 10N4AL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 42.0 | - |
| 137V 10N4-0.2R | ● | 137V 10N4-0.2RAL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 42.0 | 0.2 |
| 137V 10N4-0.5R | ● | 137V 10N4-0.5RAL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 42.0 | 0.5 |
| 137V 10N4-1.0R | ● | 137V 10N4-1.0RAL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 42.0 | 1.0 |
| 137V 10N4-1.5R | ● | 137V 10N4-1.5RAL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 42.0 | 1.5 |
| 137V 10N4-2.0R | ● | 137V 10N4-2.0RAL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 42.0 | 2.0 |
| 137V 10N4-3.0R | ● | 137V 10N4-3.0RAL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 42.0 | 3.0 |
| 137V 10N4-4.0R | ● | 137V 10N4-4.0RAL | ○ | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 42.0 | 4.0 |

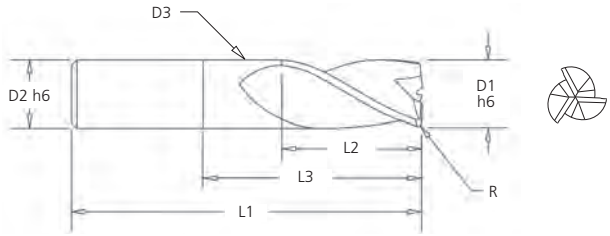
● Stock ○ Check Availability

P79

# TuffCut® X-AL Series 137V N4 & 137V N4 AL





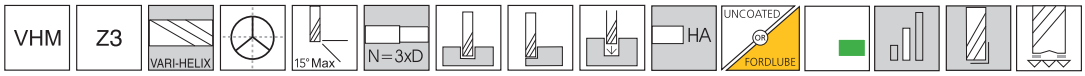

new items

| Tool Number | | | | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|---|---|---|
| Uncoated | Stk | Fordlube Coating | Stk | | | | | | | |
| 137V 12N4 | ● | 137V 12N4AL | ● | 12.0 | 12.0 | 11.8 | 100.0 | 18.0 | 50.0 | - |
| 137V 12N4-0.2R | ● | 137V 12N4-0.2RAL | ● | 12.0 | 12.0 | 11.8 | 100.0 | 18.0. | 50.0 | 0.2 |
| 137V 12N4-0.5R | ● | 137V 12N4-0.5RAL | ● | 12.0 | 12.0 | 11.8 | 100.0 | 18.0 | 50.0 | 0.5 |
| 137V 12N4-1.0R | ● | 137V 12N4-1.0RAL | ● | 12.0 | 12.0 | 11.8 | 100.0 | 18.0 | 50.0 | 1.0 |
| 137V 12N4-1.5R | ● | 137V 12N4-1.5RAL | ● | 12.0 | 12.0 | 11.8 | 100.0 | 18.0 | 50.0 | 1.5 |
| 137V 12N4-2.0R | ● | 137V 12N4-2.0RAL | ● | 12.0 | 12.0 | 11.8 | 100.0 | 18.0 | 50.0 | 2.0 |
| 137V 12N4-3.0R | ● | 137V 12N4-3.0RAL | ● | 12.0 | 12.0 | 11.8 | 100.0 | 18.0 | 50.0 | 3.0 |
| 137V 12N4-4.0R | ● | 137V 12N4-4.0RAL | ● | 12.0 | 12.0 | 11.8 | 100.0 | 18.0 | 50.0 | 4.0 |
| 137V 16N4 | ● | 137V 16N4AL | ● | 16.0 | 16.0 | 15.8 | 120.0 | 24.0 | 66.0 | - |
| 137V 16N4-0.2R | ● | 137V 16N4-0.2RAL | ● | 16.0 | 16.0 | 15.8 | 120.0 | 24.0 | 66.0 | 0.2 |
| 137V 16N4-0.5R | ● | 137V 16N4-0.5RAL | ● | 16.0 | 16.0 | 15.8 | 120.0 | 24.0 | 66.0 | 0.5 |
| 137V 16N4-1.0R | ● | 137V 16N4-1.0RAL | ● | 16.0 | 16.0 | 15.8 | 120.0 | 24.0 | 66.0 | 1.0 |
| 137V 16N4-1.5R | ● | 137V 16N4-1.5RAL | ○ | 16.0 | 16.0 | 15.8 | 120.0 | 24.0 | 66.0 | 1.5 |
| 137V 16N4-2.0R | ● | 137V 16N4-2.0RAL | ○ | 16.0 | 16.0 | 15.8 | 120.0 | 24.0 | 66.0 | 2.0 |
| 137V 16N4-3.0R | ● | 137V 16N4-3.0RAL | ○ | 16.0 | 16.0 | 15.8 | 120.0 | 24.0 | 66.0 | 3.0 |
| 137V 16N4-4.0R | ● | 137V 16N4-4.0RAL | ● | 16.0 | 16.0 | 15.8 | 120.0 | 24.0 | 66.0 | 4.0 |
| 137V 20N4 | ● | 137V 20N4AL | ● | 20.0 | 20.0 | 19.8 | 135.0 | 30.0 | 82.0 | - |
| 137V 20N4-0.2R | ● | 137V 20N4-0.2RAL | ○ | 20.0 | 20.0 | 19.8 | 135.0 | 30.0 | 82.0 | 0.2 |
| 137V 20N4-0.5R | ● | 137V 20N4-0.5RAL | ○ | 20.0 | 20.0 | 19.8 | 135.0 | 30.0 | 82.0 | 0.5 |
| 137V 20N4-1.0R | ● | 137V 20N4-1.0RAL | ● | 20.0 | 20.0 | 19.8 | 135.0 | 30.0 | 82.0 | 1.0 |
| 137V 20N4-1.5R | ● | 137V 20N4-1.5RAL | ○ | 20.0 | 20.0 | 19.8 | 135.0 | 30.0 | 82.0 | 1.5 |
| 137V 20N4-2.0R | ● | 137V 20N4-2.0RAL | ● | 20.0 | 20.0 | 19.8 | 135.0 | 30.0 | 82.0 | 2.0 |
| 137V 20N4-3.0R | ● | 137V 20N4-3.0RAL | ○ | 20.0 | 20.0 | 19.8 | 135.0 | 30.0 | 82.0 | 3.0 |
| 137V 20N4-4.0R | ● | 137V 20N4-4.0RAL | ○ | 20.0 | 20.0 | 19.8 | 135.0 | 30.0 | 82.0 | 4.0 |

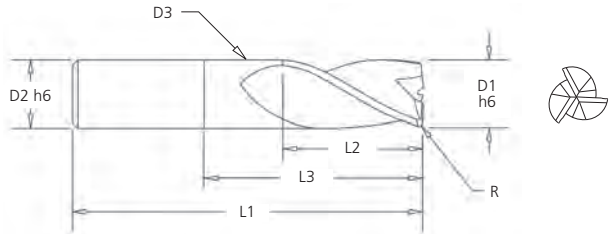
● Stock ○ Check Availability

P79

# TuffCut® X-AL Series 137V N5 & 137V N5 AL





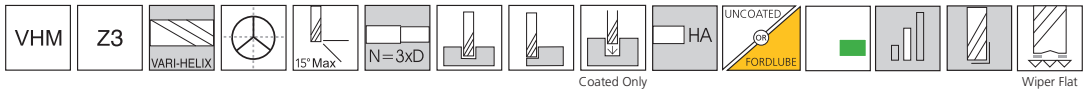

new items

| Tool Number | | | | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|---|---|---|
| Uncoated | Stk | Fordlube Coating | Stk | | | | | | | |
| 137V 03N5 | ● | 137V 03N5AL | ● | 3.0 | 3.0 | 2.8 | 51.0 | 4.5 | 17.0 | - |
| 137V 03N5-0.2R | ● | 137V 03N5-0.2RAL | ● | 3.0 | 3.0 | 2.8 | 51.0 | 4.5 | 17.0 | 0.2 |
| 137V 03N5-0.5R | ● | 137V 03N5-0.5RAL | ● | 3.0 | 3.0 | 2.8 | 51.0 | 4.5 | 17.0 | 0.5 |
| 137V 03N5-1.0R | ● | 137V 03N5-1.0RAL | ○ | 3.0 | 3.0 | 2.8 | 51.0 | 4.5 | 17.0 | 1.0 |
| 137V 04N5 | ● | 137V 04N5AL | ● | 4.0 | 4.0 | 3.8 | 51.0 | 6.0 | 22.0 | - |
| 137V 04N5-0.2R | ● | 137V 04N5-0.2RAL | ● | 4.0 | 4.0 | 3.8 | 51.0 | 6.0 | 22.0 | 0.2 |
| 137V 04N5-0.5R | ● | 137V 04N5-0.5RAL | ● | 4.0 | 4.0 | 3.8 | 51.0 | 6.0 | 22.0 | 0.5 |
| 137V 04N5-1.0R | ● | 137V 04N5-1.0RAL | ● | 4.0 | 4.0 | 3.8 | 51.0 | 6.0 | 22.0 | 1.0 |
| 137V 05N5 | ● | 137V 05N5AL | ● | 5.0 | 5.0 | 4.8 | 57.0 | 7.5 | 27.0 | - |
| 137V 05N5-0.2R | ● | 137V 05N5-0.2RAL | ● | 5.0 | 5.0 | 4.8 | 57.0 | 7.5 | 27.0 | 0.2 |
| 137V 05N5-0.5R | ● | 137V 05N5-0.5RAL | ● | 5.0 | 5.0 | 4.8 | 57.0 | 7.5 | 27.0 | 0.5 |
| 137V 05N5-1.0R | ● | 137V 05N5-1.0RAL | ● | 5.0 | 5.0 | 4.8 | 57.0 | 7.5 | 27.0 | 1.0 |
| 137V 06N5 | ● | 137V 06N5AL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 9.0 | 32.0 | - |
| 137V 06N5-0.2R | ● | 137V 06N5-0.2RAL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 9.0 | 32.0 | 0.2 |
| 137V 06N5-0.5R | ● | 137V 06N5-0.5RAL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 9.0 | 32.0 | 0.5 |
| 137V 06N5-1.0R | ● | 137V 06N5-1.0RAL | ○ | 6.0 | 6.0 | 5.8 | 64.0 | 9.0 | 32.0 | 1.0 |
| 137V 06N5-1.5R | ● | 137V 06N5-1.5RAL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 9.0 | 32.0 | 1.5 |
| 137V 06N5-2.0R | ● | 137V 06N5-2.0RAL | ● | 6.0 | 6.0 | 5.8 | 64.0 | 9.0 | 32.0 | 2.0 |
| 137V 08N5 | ● | 137V 08N5AL | ● | 8.0 | 8.0 | 7.8 | 75.0 | 12.0 | 42.0 | - |
| 137V 08N5-0.2R | ● | 137V 08N5-0.2RAL | ● | 8.0 | 8.0 | 7.8 | 75.0 | 12.0 | 42.0 | 0.2 |
| 137V 08N5-0.5R | ● | 137V 08N5-0.5RAL | ● | 8.0 | 8.0 | 7.8 | 75.0 | 12.0 | 42.0 | 0.5 |
| 137V 08N5-1.0R | ● | 137V 08N5-1.0RAL | ○ | 8.0 | 8.0 | 7.8 | 75.0 | 12.0 | 42.0 | 1.0 |
| 137V 08N5-1.5R | ● | 137V 08N5-1.5RAL | ○ | 8.0 | 8.0 | 7.8 | 75.0 | 12.0 | 42.0 | 1.5 |
| 137V 08N5-2.0R | ● | 137V 08N5-2.0RAL | ● | 8.0 | 8.0 | 7.8 | 75.0 | 12.0 | 42.0 | 2.0 |
| 137V 08N5-3.0R | ● | 137V 08N5-3.0RAL | ○ | 8.0 | 8.0 | 7.8 | 75.0 | 12.0 | 42.0 | 3.0 |
| 137V 10N5 | ● | 137V 10N5AL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 52.0 | - |
| 137V 10N5-0.2R | ● | 137V 10N5-0.2RAL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 52.0 | 0.2 |
| 137V 10N5-0.5R | ● | 137V 10N5-0.5RAL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 52.0 | 0.5 |
| 137V 10N5-1.0R | ● | 137V 10N5-1.0RAL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 52.0 | 1.0 |
| 137V 10N5-1.5R | ● | 137V 10N5-1.5RAL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 52.0 | 1.5 |
| 137V 10N5-2.0R | ● | 137V 10N5-2.0RAL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 52.0 | 2.0 |
| 137V 10N5-3.0R | ● | 137V 10N5-3.0RAL | ● | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 52.0 | 3.0 |
| 137V 10N5-4.0R | ● | 137V 10N5-4.0RAL | ○ | 10.0 | 10.0 | 9.8 | 90.0 | 15.0 | 52.0 | 4.0 |

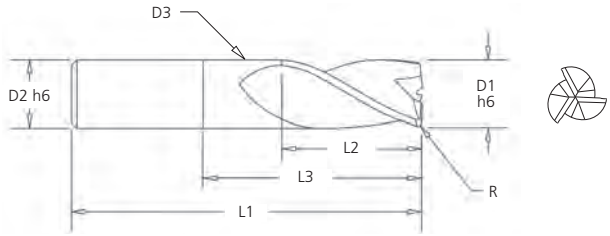
● Stock ○ Check Availability

P79

# TuffCut® X-AL Series 137V N5 & 137V N5 AL





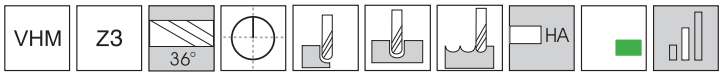

new items

| Tool Number | | | | D1 | D2 | D3 | L1 | L2 | L3 | R |
|---|---|---|---|---|---|---|---|---|---|---|
| Uncoated | Stk | Fordlube Coating | Stk | | | | | | | |
| 137V 12N5 | ● | 137V 12N5AL | ● | 12.0 | 12.0 | 11.8 | 110.0 | 18.0 | 62.0 | - |
| 137V 12N5-0.2R | ● | 137V 12N5-0.2RAL | ● | 12.0 | 12.0 | 11.8 | 110.0 | 18.0 | 62.0 | 0.2 |
| 137V 12N5-0.5R | ● | 137V 12N5-0.5RAL | ● | 12.0 | 12.0 | 11.8 | 110.0 | 18.0 | 62.0 | 0.5 |
| 137V 12N5-1.0R | ● | 137V 12N5-1.0RAL | ● | 12.0 | 12.0 | 11.8 | 110.0 | 18.0 | 62.0 | 1.0 |
| 137V 12N5-1.5R | ● | 137V 12N5-1.5RAL | ○ | 12.0 | 12.0 | 11.8 | 110.0 | 18.0 | 62.0 | 1.5 |
| 137V 12N5-2.0R | ● | 137V 12N5-2.0RAL | ● | 12.0 | 12.0 | 11.8 | 110.0 | 18.0 | 62.0 | 2.0 |
| 137V 12N5-3.0R | ● | 137V 12N5-3.0RAL | ● | 12.0 | 12.0 | 11.8 | 110.0 | 18.0 | 62.0 | 3.0 |
| 137V 12N5-4.0R | ● | 137V 12N5-4.0RAL | ● | 12.0 | 12.0 | 11.8 | 110.0 | 18.0 | 62.0 | 4.0 |
| 137V 16N5 | ● | 137V 16N5AL | ● | 16.0 | 16.0 | 15.8 | 130.0 | 24.0 | 82.0 | - |
| 137V 16N5-0.2R | ● | 137V 16N5-0.2RAL | ● | 16.0 | 16.0 | 15.8 | 130.0 | 24.0 | 82.0 | 0.2 |
| 137V 16N5-0.5R | ● | 137V 16N5-0.5RAL | ● | 16.0 | 16.0 | 15.8 | 130.0 | 24.0 | 82.0 | 0.5 |
| 137V 16N5-1.0R | ● | 137V 16N5-1.0RAL | ● | 16.0 | 16.0 | 15.8 | 130.0 | 24.0 | 82.0 | 1.0 |
| 137V 16N5-1.5R | ● | 137V 16N5-1.5RAL | ○ | 16.0 | 16.0 | 15.8 | 130.0 | 24.0 | 82.0 | 1.5 |
| 137V 16N5-2.0R | ● | 137V 16N5-2.0RAL | ● | 16.0 | 16.0 | 15.8 | 130.0 | 24.0 | 82.0 | 2.0 |
| 137V 16N5-3.0R | ● | 137V 16N5-3.0RAL | ● | 16.0 | 16.0 | 15.8 | 130.0 | 24.0 | 82.0 | 3.0 |
| 137V 16N5-4.0R | ● | 137V 16N5-4.0RAL | ● | 16.0 | 16.0 | 15.8 | 130.0 | 24.0 | 82.0 | 4.0 |
| 137V 20N5 | ● | 137V 20N5AL | ● | 20.0 | 20.0 | 19.8 | 150.0 | 30.0 | 102.0 | - |
| 137V 20N5-0.2R | ● | 137V 20N5-0.2RAL | ● | 20.0 | 20.0 | 19.8 | 150.0 | 30.0 | 102.0 | 0.2 |
| 137V 20N5-0.5R | ● | 137V 20N5-0.5RAL | ● | 20.0 | 20.0 | 19.8 | 150.0 | 30.0 | 102.0 | 0.5 |
| 137V 20N5-1.0R | ● | 137V 20N5-1.0RAL | ● | 20.0 | 20.0 | 19.8 | 150.0 | 30.0 | 102.0 | 1.0 |
| 137V 20N5-1.5R | ● | 137V 20N5-1.5RAL | ○ | 20.0 | 20.0 | 19.8 | 150.0 | 30.0 | 102.0 | 1.5 |
| 137V 20N5-2.0R | ● | 137V 20N5-2.0RAL | ○ | 20.0 | 20.0 | 19.8 | 150.0 | 30.0 | 102.0 | 2.0 |
| 137V 20N5-3.0R | ● | 137V 20N5-3.0RAL | ○ | 20.0 | 20.0 | 19.8 | 150.0 | 30.0 | 102.0 | 3.0 |
| 137V 20N5-4.0R | ● | 137V 20N5-4.0RAL | ○ | 20.0 | 20.0 | 19.8 | 150.0 | 30.0 | 102.0 | 4.0 |

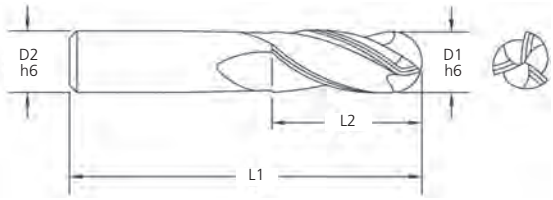
● Stock ○ Check Availability

P79

# TuffCut® X-AL Series 138B



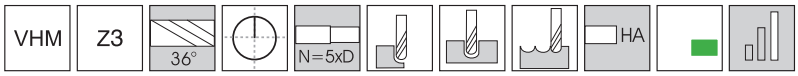


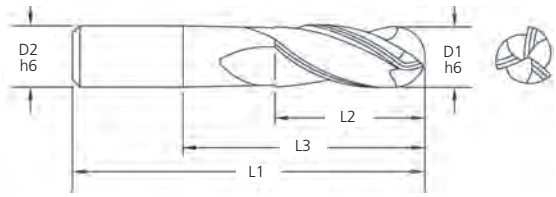

| Tool Number | EDP | D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|
| 138B 0300 | 13356 | 3.0 | 3.0 | 38.0 | 12.0 |
| 138B 0400 | 13358 | 4.0 | 4.0 | 51.0 | 15.0 |
| 138B 0500 | 13360 | 5.0 | 5.0 | 64.0 | 20.0 |
| 138B 0600 | 13362 | 6.0 | 6.0 | 64.0 | 20.0 |
| 138B 0800 | 13364 | 8.0 | 8.0 | 64.0 | 20.0 |
| 138B 1000 | 13366 | 10.0 | 10.0 | 70.0 | 25.0 |
| 138B 1200 | 13368 | 12.0 | 12.0 | 76.0 | 25.0 |
| 138B 1600 | 13370 | 16.0 | 16.0 | 89.0 | 35.0 |

P78

# TuffCut® X-AL Series 138B N5



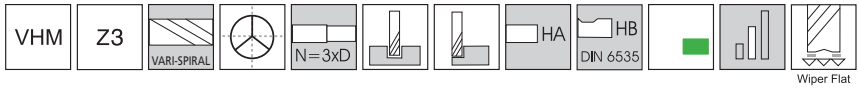


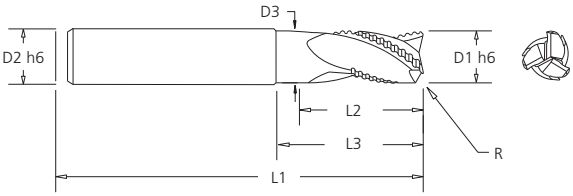

| Tool Number | EDP | D1 | D2 | L1 | L2 | L3 |
|---|---|---|---|---|---|---|
| 138B 0200N5 | 13372 | 2.0 | 6.0 | 75.0 | 4.0 | 12.0 |
| 138B 0300N5 | 13374 | 3.0 | 6.0 | 75.0 | 5.0 | 17.0 |
| 138B 0400N5 | 13376 | 4.0 | 6.0 | 75.0 | 6.0 | 22.0 |
| 138B 0500N5 | 13378 | 5.0 | 6.0 | 75.0 | 7.0 | 27.0 |
| 138B 0600N5 | 13380 | 6.0 | 6.0 | 110.0 | 8.0 | 32.0 |
| 138B 0800N5 | 13382 | 8.0 | 8.0 | 110.0 | 10.0 | 42.0 |
| 138B 1000N5 | 13384 | 10.0 | 10.0 | 110.0 | 12.0 | 52.0 |
| 138B 1200N5 | 13386 | 12.0 | 12.0 | 120.0 | 16.0 | 62.0 |
| 138B 1600N5 | 13388 | 16.0 | 16.0 | 130.0 | 20.0 | 82.0 |

P78

# TuffCut® X-AL Series 137VR N3



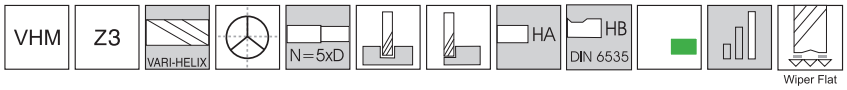


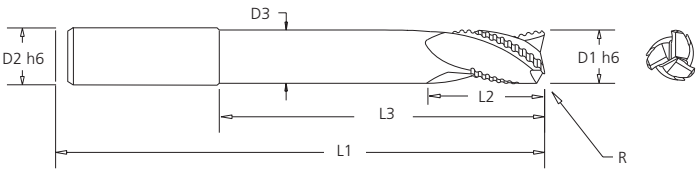

| Tool Number | D1 | D2 | D3 | L1 | L2 | L3 | R | Shank |
|---|---|---|---|---|---|---|---|---|
| 137VR 12N3-1.0R | 12.0 | 12.0 | 11.8 | 84.0 | 26.0 | 38.0 | 1.0 | HA |
| 137VR 12N3-1.0RW | 12.0 | 12.0 | 11.8 | 84.0 | 26.0 | 38.0 | 1.0 | HB |
| 137VR 16N3-1.0R | 16.0 | 16.0 | 15.8 | 93.0 | 32.0 | 50.0 | 1.0 | HA |
| 137VR 16N3-1.0RW | 16.0 | 16.0 | 15.8 | 100.0 | 32.0 | 50.0 | 1.0 | HB |
| 137VR 20N3-1.0R | 20.0 | 20.0 | 19.8 | 105.0 | 38.0 | 62.0 | 1.0 | HA |
| 137VR 20N3-1.0RW | 20.0 | 20.0 | 19.8 | 112.0 | 38.0 | 62.0 | 1.0 | HB |

P78

# TuffCut® X-AL Series 137VR N5



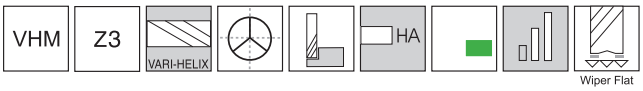



| Tool Number | EDP | D1 | D2 | D3 | L1 | L2 | L3 | R | Shank |
|---|---|---|---|---|---|---|---|---|---|
| 137VR 12N5-1.0R | 12.0 | 12.0 | 11.8 | 11.8 | 110.0 | 18.0 | 62.0 | 1.0 | HA |
| 137VR 12N5-1.0RW | 12.0 | 12.0 | 11.8 | 11.8 | 110.0 | 18.0 | 62.0 | 1.0 | HB |
| 137VR 16N5-1.0R | 16.0 | 16.0 | 15.8 | 15.8 | 130.0 | 24.0 | 82.0 | 1.0 | HA |
| 137VR 16N5-1.0RW | 16.0 | 16.0 | 15.8 | 15.8 | 130.0 | 24.0 | 82.0 | 1.0 | HB |
| 137VR 20N5-1.0R | 20.0 | 20.0 | 19.8 | 19.8 | 150.0 | 30.0 | 102.0 | 1.0 | HA |
| 137VR 20N5-1.0RW | 20.0 | 20.0 | 19.8 | 19.8 | 155.0 | 30.0 | 102.0 | 1.0 | HB |

P78

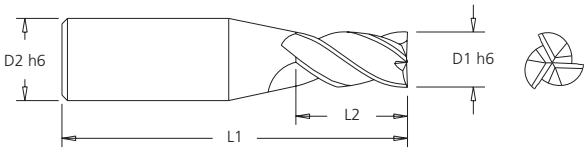
# TuffCut® X-AL Series 137VF Finishing



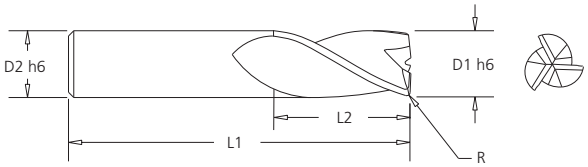



3 x D1 and 5 x D1 Flute Lengths

Type 1

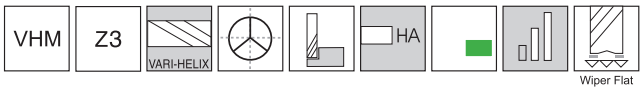



Type 2




| Tool Number | D1 | D2 | L1 | L2 | R | Type |
|---|---|---|---|---|---|---|
| 137VF 0303 | 3.0 | 6.0 | 75.0 | 11.0 | - | 1 |
| 137VF 0303-0.2R | 3.0 | 6.0 | 75.0 | 11.0 | 0.2 | 1 |
| 137VF 0305 | 3.0 | 6.0 | 75.0 | 17.0 | - | 1 |
| 137VF 0305-0.2R | 3.0 | 6.0 | 75.0 | 17.0 | 0.2 | 1 |
| 137VF 0403 | 4.0 | 6.0 | 75.0 | 14.0 | - | 1 |
| 137VF 0403-0.2R | 4.0 | 6.0 | 75.0 | 14.0 | 0.2 | 1 |
| 137VF 0403-0.5R | 4.0 | 6.0 | 75.0 | 14.0 | 0.5 | 1 |
| 137VF 0405 | 4.0 | 6.0 | 75.0 | 22.0 | - | 1 |
| 137VF 0405-0.2R | 4.0 | 6.0 | 75.0 | 22.0 | 0.2 | 1 |
| 137VF 0405-0.5R | 4.0 | 6.0 | 75.0 | 22.0 | 0.5 | 1 |
| 137VF 0503 | 5.0 | 6.0 | 75.0 | 17.0 | - | 1 |
| 137VF 0503-0.2R | 5.0 | 6.0 | 75.0 | 17.0 | 0.2 | 1 |
| 137VF 0503-0.5R | 5.0 | 6.0 | 75.0 | 17.0 | 0.5 | 1 |
| 137VF 0505 | 5.0 | 6.0 | 75.0 | 27.0 | - | 1 |
| 137VF 0505-0.2R | 5.0 | 6.0 | 75.0 | 27.0 | 0.2 | 1 |
| 137VF 0505-0.5R | 5.0 | 6.0 | 75.0 | 27.0 | 0.5 | 1 |
| 137VF 0603 | 6.0 | 6.0 | 75.0 | 20.0 | - | 2 |
| 137VF 0603-0.2R | 6.0 | 6.0 | 75.0 | 20.0 | 0.2 | 2 |
| 137VF 0603-0.5R | 6.0 | 6.0 | 75.0 | 20.0 | 0.5 | 2 |
| 137VF 0605 | 6.0 | 6.0 | 75.0 | 32.0 | - | 2 |
| 137VF 0605-0.2R | 6.0 | 6.0 | 75.0 | 32.0 | 0.2 | 2 |
| 137VF 0605-0.5R | 6.0 | 6.0 | 75.0 | 32.0 | 0.5 | 2 |
| 137VF 0605-1.0R | 6.0 | 6.0 | 75.0 | 32.0 | 1.0 | 2 |
| 137VF 0803 | 8.0 | 8.0 | 75.0 | 26.0 | - | 2 |
| 137VF 0803-0.2R | 8.0 | 8.0 | 75.0 | 26.0 | 0.2 | 2 |
| 137VF 0803-0.5R | 8.0 | 8.0 | 75.0 | 26.0 | 0.5 | 2 |
| 137VF 0803-1.0R | 8.0 | 8.0 | 75.0 | 26.0 | 1.0 | 2 |
| 137VF 0805 | 8.0 | 8.0 | 90.0 | 42.0 | - | 2 |
| 137VF 0805-0.2R | 8.0 | 8.0 | 90.0 | 42.0 | 0.2 | 2 |
| 137VF 0805-0.5R | 8.0 | 8.0 | 90.0 | 42.0 | 0.5 | 2 |
| 137VF 0805-1.0R | 8.0 | 8.0 | 90.0 | 42.0 | 1.0 | 2 |
| 137VF 1003 | 10.0 | 10.0 | 90.0 | 32.0 | - | 2 |
| 137VF 1003-0.2R | 10.0 | 10.0 | 90.0 | 32.0 | 0.2 | 2 |
| 137VF 1003-0.5R | 10.0 | 10.0 | 90.0 | 32.0 | 0.5 | 2 |
| 137VF 1003-1.0R | 10.0 | 10.0 | 90.0 | 32.0 | 1.0 | 2 |
| 137VF 1003-2.0R | 10.0 | 10.0 | 90.0 | 32.0 | 2.0 | 2 |
| 137VF 1005 | 10.0 | 10.0 | 100.0 | 52.0 | - | 2 |
| 137VF 1005-0.2R | 10.0 | 10.0 | 100.0 | 52.0 | 0.2 | 2 |
| 137VF 1005-0.5R | 10.0 | 10.0 | 100.0 | 52.0 | 0.5 | 2 |

# TuffCut® X-AL Series 137VF Finishing

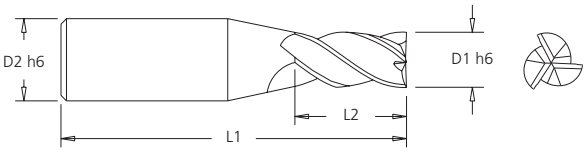




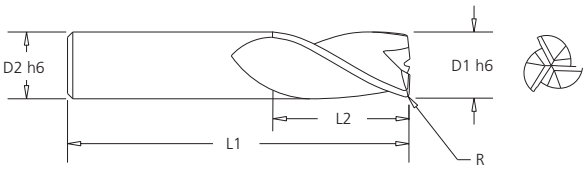



3 x D1 and 5 x D1 Flute Lengths

Type 1




Type 2




| Tool Number | D1 | D2 | L1 | L2 | R | Type |
|---|---|---|---|---|---|---|
| 137VF 1005-1.0R | 10.0 | 10.0 | 100.0 | 52.0 | 1.0 | 2 |
| 137VF 1005-2.0R | 10.0 | 10.0 | 100.0 | 52.0 | 2.0 | 2 |
| 137VF 1203 | 12.0 | 12.0 | 100.0 | 38.0 | - | 2 |
| 137VF 1203-0.2R | 12.0 | 12.0 | 100.0 | 38.0 | 0.2 | 2 |
| 137VF 1203-0.5R | 12.0 | 12.0 | 100.0 | 38.0 | 0.5 | 2 |
| 137VF 1203-1.0R | 12.0 | 12.0 | 100.0 | 38.0 | 1.0 | 2 |
| 137VF 1203-2.0R | 12.0 | 12.0 | 100.0 | 38.0 | 2.0 | 2 |
| 137VF 1205 | 12.0 | 12.0 | 120.0 | 62.0 | - | 2 |
| 137VF 1205-0.2R | 12.0 | 12.0 | 120.0 | 62.0 | 0.2 | 2 |
| 137VF 1205-0.5R | 12.0 | 12.0 | 120.0 | 62.0 | 0.5 | 2 |
| 137VF 1205-1.0R | 12.0 | 12.0 | 120.0 | 62.0 | 1.0 | 2 |
| 137VF 1205-2.0R | 12.0 | 12.0 | 120.0 | 62.0 | 2.0 | 2 |
| 137VF 1603 | 16.0 | 16.0 | 120.0 | 50.0 | - | 2 |
| 137VF 1603-0.2R | 16.0 | 16.0 | 120.0 | 50.0 | 0.2 | 2 |
| 137VF 1603-0.5R | 16.0 | 16.0 | 120.0 | 50.0 | 0.5 | 2 |
| 137VF 1603-1.0R | 16.0 | 16.0 | 120.0 | 50.0 | 1.0 | 2 |
| 137VF 1603-2.0R | 16.0 | 16.0 | 120.0 | 50.0 | 2.0 | 2 |
| 137VF 1605 | 16.0 | 16.0 | 150.0 | 82.0 | - | 2 |
| 137VF 1605-0.2R | 16.0 | 16.0 | 150.0 | 82.0 | 0.2 | 2 |
| 137VF 1605-0.5R | 16.0 | 16.0 | 150.0 | 82.0 | 0.5 | 2 |
| 137VF 1605-1.0R | 16.0 | 16.0 | 150.0 | 82.0 | 1.0 | 2 |
| 137VF 1605-2.0R | 16.0 | 16.0 | 150.0 | 82.0 | 2.0 | 2 |
| 137VF 2003 | 20.0 | 20.0 | 135.0 | 62.0 | - | 2 |
| 137VF 2003-0.2R | 20.0 | 20.0 | 135.0 | 62.0 | 0.2 | 2 |
| 137VF 2003-0.5R | 20.0 | 20.0 | 135.0 | 62.0 | 0.5 | 2 |
| 137VF 2003-1.0R | 20.0 | 20.0 | 135.0 | 62.0 | 1.0 | 2 |
| 137VF 2003-2.0R | 20.0 | 20.0 | 135.0 | 62.0 | 2.0 | 2 |
| 137VF 2005 | 20.0 | 20.0 | 164.0 | 102.0 | - | 2 |
| 137VF 2005-0.2R | 20.0 | 20.0 | 164.0 | 102.0 | 0.2 | 2 |
| 137VF 2005-0.5R | 20.0 | 20.0 | 164.0 | 102.0 | 0.5 | 2 |
| 137VF 2005-1.0R | 20.0 | 20.0 | 164.0 | 102.0 | 1.0 | 2 |
| 137VF 2005-2.0R | 20.0 | 20.0 | 164.0 | 102.0 | 2.0 | 2 |

P78

# TuffCut® XR Series 113A

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | | Material Type | Coolant | | | 0.05 x D, 2 x D | 0.1 x D, 2 x D |
|---|---|---|---|---|---|---|---|
| | | | Max | Air | MMS | Vc-M/Min | |
| Steels | P | Low Carbon | ● | ● | ● | 280 | 240 |
| | | Medium Carbon | ● | ● | ● | 200 | 185 |
| | | Alloy Steels | ● | ● | ● | 185 | 170 |
| | | Die/Tool Steels | ● | ● | ● | 160 | 135 |
| Stainless Steels | M | Free Machining | ● | X | ○ | 120 | 100 |
| | | Austenitic | ● | X | ○ | 95 | 90 |
| | | Difficult Stainless | ● | X | ○ | 75 | 65 |
| | | PH Stainless | ● | X | ○ | 95 | 90 |
| | | Cobalt Chrome Alloys | ● | X | ○ | 70 | 65 |
| | | Duplex (22%) | ● | X | ○ | 70 | 65 |
| | | Super Duplex (25%) | ● | X | ○ | 45 | 40 |
| Special Alloys | S | High Temp Alloys | ● | X | X | 35 | 30 |
| | | Inconel 625/718 | ● | X | X | 35 | 30 |
| | | Titanium Alloys | ● | X | X | 95 | 70 |
| Cast Irons | K | Gray Cast Iron | ● | ○ | ○ | 290 | 190 |
| | | Ductile Cast Iron | ● | ○ | ○ | 215 | 150 |
| | | Malleable Iron | ● | ○ | ○ | 120 | 110 |
| Hardened Steels | H | Hardened Steels 45 - 50 Rc | ● | ○ | ○ | 110 | 70 |
| | | Hardened Steels 50 - 55 Rc | ● | ○ | ○ | 90 | 60 |

● Preferred ○ Possible X Not Possible

| Workpiece Material Group | | Material Type | Tool Diameter | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1.5mm | 3mm | 5mm | 6mm | 8mm | 10mm | 12mm | 16mm | 20mm |
| | | | fz-mm/tooth | | | | | | | | |
| Steels | P | Low Carbon | 0.020 | 0.027 | 0.067 | 0.080 | 0.093 | 0.133 | 0.160 | 0.187 | 0.267 |
| | | Medium Carbon | | | | | | | | | |
| | | Alloy Steels | | | | | | | | | |
| | | Die/Tool Steels | | | | | | | | | |
| Stainless Steels | M | Free Machining | 0.020 | 0.027 | 0.067 | 0.080 | 0.093 | 0.133 | 0.160 | 0.187 | 0.267 |
| | | Austenitic | | | | | | | | | |
| | | Difficult Stainless | | | | | | | | | |
| | | PH Stainless | | | | | | | | | |
| | | Cobalt Chrome Alloys | 0.014 | 0.020 | 0.050 | 0.060 | 0.070 | 0.100 | 0.120 | 0.140 | 0.200 |
| | | Duplex (22%) | | | | | | | | | |
| | | Super Duplex (25%) | | | | | | | | | |
| Special Alloys | S | High Temp Alloys | 0.009 | 0.013 | 0.033 | 0.040 | 0.047 | 0.067 | 0.080 | 0.093 | 0.133 |
| | | Inconel | | | | | | | | | |
| | | Titanium Alloys | | | | | | | | | |
| Cast Irons | K | Gray Cast Iron | 0.019 | 0.027 | 0.067 | 0.080 | 0.093 | 0.133 | 0.160 | 0.187 | 0.267 |
| | | Ductile Cast Iron | | | | | | | | | |
| | | Malleable Iron | | | | | | | | | |
| Hardened Steels | H | Hardened Steels 45 - 50 Rc | 0.017 | 0.024 | 0.060 | 0.072 | 0.084 | 0.120 | 0.144 | 0.168 | 0.240 |
| | | Hardened Steels 50 - 55 Rc | 0.010 | 0.018 | 0.043 | 0.053 | 0.061 | 0.089 | 0.107 | 0.124 | 0.178 |

**Please Note- Peripheral Milling only.**

During profile milling less than 50% of the cutter diameter radial width, the actual chip thickness at the cutting edge is less than the programmed chipload. The accompanying table shows the increase in tooth load by given raidal percentage engagement. Multiply your feed per tooth by the factor before finalising your table feed.

| Radial Cut (Ae) | Chip thickness Compensation factor |
|---|---|
| 30% | 1.10 |
| 20% | 1.20 |
| 15% | 1.40 |
| 10% | 1.80 |
| 5% | 2.30 |
| 1% | 5.00 |

# TuffCut® Series 3MVS/3MVR

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

### Regular Length - 3MVR Series

| Workpiece Material Group | ISO | Coolant • Preferred o Possible x Not Possible | | | Application | Depth of Cut Per Application | | vc - m/min | End Mill Diameter (mm) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Max. | Air | MMS | | Axial (Ap) | Radial (Ae) | | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
| | | | | | | | | | fz - mm/tooth by Cutter Diameter | | | | | |
| Moderate Machining & PH Stainless Steels | M | • | X | o | Slotting | 0.5 x D | - | 75 | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 |
| | | | | | Profiling | 0.2-2.5 x D | 0.1 x D | 150 | 0.0033 | 0.0066 | 0.0099 | 0.0132 | 0.0165 | 0.0198 |
| High Temp Alloys | S | • | X | X | Slotting | 0.5 x D | - | 30 | 0.0010 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 |
| | | | | | Profiling | 0.2-2.5 x D | 0.05 x D | 45 | 0.0028 | 0.0056 | 0.0084 | 0.0112 | 0.0140 | 0.0168 |
| Titanium Alloys | S | • | X | X | Slotting | 0.5 x D | - | 75 | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 |
| | | | | | Profiling | 0.2-2.5 x D | 0.1 x D | 107 | 0.0020 | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0120 |

### Stub Length - 3MVS Series

| Workpiece Material Group | ISO | Coolant • Preferred o Possible x Not Possible | | | Application | Depth of Cut Per Application | | vc - m/min | End Mill Diameter (mm) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Max. | Air | MMS | | Axial (Ap) | Radial (Ae) | | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
| | | | | | | | | | fz - mm/tooth by Cutter Diameter | | | | | |
| Moderate Machining & PH Stainless Steels | M | • | X | o | Slotting | 0.5 x D | - | 75 | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 |
| | | | | | Profiling | 0.2-2.5 x D | 0.1 x D | 150 | 0.0033 | 0.0066 | 0.0099 | 0.0132 | 0.0165 | 0.0198 |
| High Temp Alloys | S | • | X | X | Slotting | 0.5 x D | - | 30 | 0.0010 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 |
| | | | | | Profiling | 0.2-2.5 x D | 0.05 x D | 45 | 0.0028 | 0.0056 | 0.0084 | 0.0112 | 0.0140 | 0.0168 |
| Titanium Alloys | S | • | X | X | Slotting | 0.5 x D | - | 75 | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 |
| | | | | | Profiling | 0.2-2.5 x D | 0.1 x D | 107 | 0.0020 | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0120 |

### 5 X D Necked Tools (3MVS Series - N5)

| Workpiece Material Group | ISO | Coolant • Preferred o Possible x Not Possible | | | Application | Depth of Cut Per Application | | vc - m/min | End Mill Diameter (mm) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Max. | Air | MMS | | Axial (Ap) | Radial (Ae) | | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
| | | | | | | | | | fz - mm/tooth by Cutter Diameter | | | | | |
| Moderate Machining & PH Stainless Steels | M | • | X | o | Slotting | 0.3 x D | - | 75 | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 |
| | | | | | Profiling | 0.1 x D | 0.08 x D | 150 | 0.0033 | 0.0066 | 0.0099 | 0.0132 | 0.0165 | 0.0198 |
| High Temp Alloys | S | • | X | X | Slotting | 0.3 x D | - | 30 | 0.0010 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 |
| | | | | | Profiling | 0.1 x D | 0.05 x D | 45 | 0.0028 | 0.0056 | 0.0084 | 0.0112 | 0.0140 | 0.0168 |
| Titanium Alloys | S | • | X | X | Slotting | 0.3 x D | - | 75 | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 |
| | | | | | Profiling | 0.1 x D | 0.08 x D | 107 | 0.0020 | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0120 |

### 8 X D Necked Tools (3MVS Series - N8)

| Workpiece Material Group | ISO | Coolant • Preferred o Possible x Not Possible | | | Application | Depth of Cut Per Application | | vc - m/min | End Mill Diameter (mm) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Max. | Air | MMS | | Axial (Ap) | Radial (Ae) | | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 |
| | | | | | | | | | fz - mm/tooth by Cutter Diameter | | | | | |
| Moderate Machining & PH Stainless Steels | M | • | X | o | Slotting | 0.2 x D | - | 75 | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 |
| | | | | | Profiling | 0.75 x D | 0.05 x D | 150 | 0.0033 | 0.0066 | 0.0099 | 0.0132 | 0.0165 | 0.0198 |
| High Temp Alloys | S | • | X | X | Slotting | 0.2 x D | - | 30 | 0.0010 | 0.0020 | 0.0030 | 0.0040 | 0.0050 | 0.0060 |
| | | | | | Profiling | 0.75 x D | 0.05 x D | 45 | 0.0028 | 0.0056 | 0.0084 | 0.0112 | 0.0140 | 0.0168 |
| Titanium Alloys | S | • | X | X | Slotting | 0.2 x D | - | 75 | 0.0012 | 0.0024 | 0.0036 | 0.0048 | 0.0060 | 0.0072 |
| | | | | | Profiling | 0.75 x D | 0.05 x D | 107 | 0.0020 | 0.0040 | 0.0060 | 0.0080 | 0.0100 | 0.0120 |

# TuffCut® XR Series 177, 178 & 179

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | | Material Type | Coolant | | | 1 x D / 0.5 x D | 1 x D / 1 x D | 0.05 x D / 2 x D | 0.1 x D / 2 x D | 0.2 x D / 2 x D | 0.3 x D / 1.5 x D | 0.5 x D / 1.5 x D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Max | Air | MMS | Vc-M/Min | | | | | | |
| Steels | P | Low Carbon | ● | ● | ● | 210 | 200 | 450 | 350 | 300 | 250 | 200 |
| | | Medium Carbon | ● | ● | ● | 180 | 170 | 270 | 250 | 230 | 200 | 170 |
| | | Alloy Steels | ● | ● | ● | 160 | 150 | 250 | 230 | 210 | 180 | 150 |
| | | Die/Tool Steels | ● | ● | ● | 130 | 120 | 225 | 200 | 170 | 130 | 120 |
| Stainless Steels | M | Free Machining | ● | X | ○ | 110 | 100 | 150 | 150 | 120 | 105 | 100 |
| | | Austenitic | ● | X | ○ | 100 | 90 | 130 | 120 | 110 | 100 | 90 |
| | | Difficult Stainless | ● | X | ○ | 70 | 60 | 100 | 90 | 80 | 70 | 60 |
| | | PH Stainless | ● | X | ○ | 100 | 90 | 130 | 120 | 110 | 100 | 90 |
| | | Cobalt Chrome Alloys | ● | X | ○ | 70 | 60 | 100 | 90 | 80 | 70 | 60 |
| | | Duplex (22%) | ● | X | ○ | 70 | 60 | 100 | 90 | 80 | 70 | 60 |
| | | Super Duplex (25%) | ● | X | ○ | 50 | 40 | 60 | 55 | 50 | 45 | 40 |
| Special Alloys | S | High Temp Alloys | ● | X | X | 30 | 25 | 50 | 40 | 35 | 30 | 25 |
| | | Titanium Alloys | ● | X | X | 70 | 60 | 120 | 120 | 90 | 75 | 60 |
| Cast Irons | K | Gray Cast Iron | ● | ○ | ○ | 180 | 160 | 360 | 360 | 240 | 190 | 160 |
| | | Ductile Cast Iron | ● | ○ | ○ | 170 | 150 | 270 | 270 | 190 | 170 | 150 |
| | | Malleable Iron | ● | ○ | ○ | 130 | 120 | 160 | 150 | 140 | 130 | 120 |
| Hardened Steels | H | Hardened Steels 45 - 50 Rc | ● | ○ | ○ | 50 | 45 | 135 | 135 | 90 | 50 | 45 |
| | | Hardened Steels 50 - 55 Rc | ● | ○ | ○ | 45 | 40 | 115 | 115 | 75 | 45 | 40 |

● Preferred ○ Possible X Not Possible

| Workpiece Material Group | | Material Type | Tool Diameter | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1.5mm | 3mm | 5mm | 6mm | 8mm | 10mm | 12mm | 16mm | 20mm | 25mm |
| | | | fz-mm/tooth | | | | | | | | | |
| Steels | P | Profiling-177-178-179 | 0.005 | 0.018 | 0.025 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 | 0.200 | 0.250 |
| | | Slotting-177/179 | 0.003 | 0.009 | 0.012 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 | 0.100 | 0.125 |
| Stainless Steels | M | Profiling-177-178-179 | 0.005 | 0.018 | 0.025 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 | 0.200 | 0.250 |
| | | Slotting-177/179 | 0.003 | 0.009 | 0.012 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 | 0.100 | 0.125 |
| Special Alloys | S | Profiling-177-178-179 | 0.003 | 0.009 | 0.013 | 0.032 | 0.038 | 0.044 | 0.064 | 0.076 | 0.089 | 0.127 |
| | | Slotting-177/179 | 0.0015 | 0.0045 | 0.007 | 0.016 | 0.019 | 0.022 | 0.032 | 0.038 | 0.045 | 0.065 |
| Titanium | | Profiling-177-178-179 | 0.005 | 0.018 | 0.025 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 | 0.200 | 0.250 |
| | | Slotting-177/179 | 0.003 | 0.009 | 0.013 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 | 0.100 | 0.125 |
| Cast Irons | K | Profiling-177-178-179 | 0.005 | 0.018 | 0.025 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 | 0.200 | 0.250 |
| | | Slotting-177/179 | 0.003 | 0.009 | 0.013 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 | 0.100 | 0.125 |
| Hardened Steels | H | Profiling-177-178-179<50HRC | 0.005 | 0.016 | 0.023 | 0.057 | 0.069 | 0.080 | 0.114 | 0.137 | 0.160 | 0.229 |
| | | Slotting-177/179 <50HRC | 0.003 | 0.008 | 0.013 | 0.028 | 0.035 | 0.040 | 0.065 | 0.070 | 0.080 | 0.115 |
| | | Profiling-177-178-179>55HRC | 0.003 | 0.010 | 0.015 | 0.041 | 0.051 | 0.058 | 0.084 | 0.102 | 0.119 | 0.170 |
| | | Slotting-177/179 >55HRC | 0.002 | 0.005 | 0.008 | 0.020 | 0.025 | 0.028 | 0.042 | 0.050 | 0.060 | 0.080 |

**Please Note- 178 series-5 flute to be used for Peripheral milling only.**

During profile milling less than 50% of the cutter diameter radial width, the actual chip thickness at the cutting edge is less than the programmed chipload. The accompanying table shows the increase in tooth load by given raidal percentage engagement. Multiply your feed per tooth by the factor before finalising your table feed.

| Radial Cut (Ae) | Chip thickness Compensation factor |
|---|---|
| 30% | 1.10 |
| 20% | 1.20 |
| 15% | 1.40 |
| 10% | 1.80 |
| 5% | 2.30 |
| 1% | 5.00 |

**For 177L tools please use the following conditions**

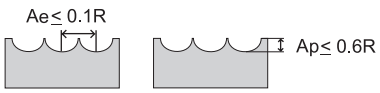
| | | |
|---|---|---|
| Ap | 1 x D1 | 0.25 x D1 |
| Ae | 0.1 x D1 | 1.0 x D1 |

**When using Long Series 178 - 1 Reduce speed by 20%**

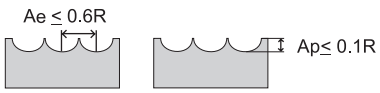
# TuffCut® XR & XT Series 179, 179L & 279

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| | | Semi Roughing / Roughing Steel (25-48 HRC) | | | | | Semi Finishing / Finishing Steel (25-48 HRC) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Diameter** | **R** | **RPM** | **f** | **fz** | **Ae Max.** | **Ap Max.** | **f** | **fz** | **Ae Max.** | **Ap Max.** |
| **mm** | **mm** | **trs** | **mm/min** | **mm/z** | **mm** | **mm** | **mm/min** | **mm/z** | **mm** | **mm** |
| 1.5 | R 0.75 | 35,000 | 1,950 - 3,300 | 0.0139 - 0.0235 | 0.075 | 0.450 | 1,950 - 3,300 | 0.0139 - 0.0235 | 0.450 | 0.075 |
| 2 | R 1.0 | 30,000 | 2,100 - 3,600 | 0.0175 - 0.0300 | 0.100 | 0.600 | 2,100 - 3,600 | 0.0175 - 0.0300 | 0.600 | 0.100 |
| 2.5 | R 1.25 | 28,000 | 2,100 - 3,600 | 0.0185 - 0.0320 | 0.125 | 0.750 | 2,100 - 3,600 | 0.0185 - 0.0320 | 0.750 | 0.125 |
| 3 | R 1.5 | 26,500 | 2,100 - 3,600 | 0.0198 - 0.0330 | 0.150 | 0.900 | 2,100 - 3,600 | 0.0198 - 0.0330 | 0.900 | 0.150 |
| 3.5 | R 1.75 | 24,000 | 2,250 - 3,900 | 0.0230 - 0.0400 | 0.175 | 1.000 | 2,250 - 3,900 | 0.0230 - 0.0400 | 1.000 | 0.175 |
| 4 | R 2.0 | 23,000 | 2,250 - 3,900 | 0.0240 - 0.0420 | 0.200 | 1.200 | 2,250 - 3,900 | 0.0240 - 0.0420 | 1.200 | 0.200 |
| 4.5 | R 2.25 | 22,000 | 2,250 - 3,900 | 0.0250 - 0.0440 | 0.220 | 1.350 | 2,250 - 3,900 | 0.0250 - 0.0440 | 1.350 | 0.220 |
| 5 | R 2.5 | 20,000 | 1,800 - 5,500 | 0.0225 - 0.0687 | 0.250 | 1.500 | 1,800 - 5,500 | 0.0225 - 0.0687 | 1.500 | 0.250 |
| 6 | R 3.0 | 20,000 | 1,800 - 5,500 | 0.0225 - 0.0687 | 0.300 | 1.800 | 1,800 - 5,500 | 0.0225 - 0.0687 | 1.800 | 0.300 |
| 8 | R 4.0 | 15,000 | 2,200 - 5,000 | 0.0366 - 0.0833 | 0.400 | 2.400 | 2,200 - 5,000 | 0.0366 - 0.0833 | 2.400 | 0.400 |
| 10 | R 5.0 | 12,000 | 2,300 - 4,600 | 0.0479 - 0.0958 | 0.500 | 3.000 | 2,300 - 4,600 | 0.0479 - 0.0958 | 3.000 | 0.500 |
| 12 | R 6.0 | 10,000 | 1,900 - 4,100 | 0.0475 - 0.1025 | 0.600 | 3.600 | 1,900 - 4,100 | 0.0475 - 0.1025 | 3.600 | 0.600 |
| 16 | R 8.0 | 7,500 | 1,600 - 3,200 | 0.0533 - 0.1066 | 0.800 | 4.800 | 1,600 - 3,200 | 0.0533 - 0.1066 | 4.800 | 0.800 |



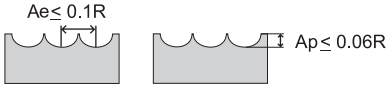

Cooling Requirements - High Pressure Air Blast




Cooling Requirements - High Pressure Air Blast.

| Titanium | | | | |
|---|---|---|---|---|
| **Diameter** | **R** | **RPM** | **f** | **fz** |
| **mm** | **mm** | **trs** | **mm/min** | **mm/z** |
| 1.5 | R 0.75 | 32,000 | 2,700 | 0.020 |
| 2.0 | R 1.0 | 24,000 | 2,400 | 0.025 |
| 2.5 | R 1.25 | 24,000 | 2,400 | 0.025 |
| 3.0 | R 1.5 | 16,000 | 1,950 | 0.030 |
| 3.5 | R 1.75 | 16,000 | 1,950 | 0.030 |
| 4.0 | R 2.0 | 12,000 | 1,950 | 0.040 |
| 4.5 | R 2.25 | 12,000 | 1,950 | 0.040 |
| 5.0 | R 2.5 | 10,000 | 1,650 | 0.040 |
| 6.0 | R 3.0 | 8,000 | 1,500 | 0.046 |
| 8.0 | R 4.0 | 6,000 | 1,650 | 0.068 |
| 10.0 | R 5.0 | 5,000 | 1,650 | 0.080 |
| 12.0 | R 6.0 | 4,000 | 1,500 | 0.093 |
| 16.0 | R 8.0 | 3,000 | 1,200 | 0.100 |

| High Temperature Alloys | | | | | | |
|---|---|---|---|---|---|---|
| **Diameter** | **R** | **RPM** | **f** | **fz** | **Ae Max.** | **Ap Max.** |
| **mm** | **mm** | **trs** | **mm/min** | **mm/z** | **mm** | **mm** |
| 1.5 | R 0.75 | 10,000 | 825 | 0.020 | 0.075 | 0.05 |
| 2.0 | R 1.0 | 7,300 | 750 | 0.025 | 0.100 | 0.06 |
| 2.5 | R 1.25 | 6,000 | 700 | 0.029 | 0.125 | 0.08 |
| 3.0 | R 1.5 | 5,000 | 630 | 0.030 | 0.150 | 0.09 |
| 3.5 | R 1.75 | 4,100 | 575 | 0.035 | 0.175 | 0.11 |
| 4.0 | R 2.0 | 3,600 | 555 | 0.040 | 0.200 | 0.12 |
| 4.5 | R 2.25 | 3,200 | 510 | 0.040 | 0.220 | 0.14 |
| 5.0 | R 2.5 | 3,000 | 510 | 0.040 | 0.250 | 0.15 |
| 6.0 | R 3.0 | 2,500 | 495 | 0.046 | 0.300 | 0.18 |
| 8.0 | R 4.0 | 1,900 | 510 | 0.068 | 0.400 | 0.24 |
| 10.0 | R 5.0 | 1,500 | 510 | 0.080 | 0.500 | 0.30 |
| 12.0 | R 6.0 | 1,200 | 450 | 0.093 | 0.600 | 0.36 |
| 16.0 | R 8.0 | 900 | 360 | 0.100 | 0.800 | 0.48 |




Cooling Requirements - Maximum coolant flow/pressure

# TuffCut® XR7 Series 180

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | | Material Type | Coolant | | | 0.05 x D / 2 x D | 0.1 x D / 2 x D | 0.2 x D / 2 x D |
|---|---|---|---|---|---|---|---|---|
| | | | Max | Air | MMS | Vc-M/Min | | |
| Steels | P | Low Carbon | ● | ● | ● | 480 | 385 | 330 |
| | | Medium Carbon | ● | ● | ● | 345 | 275 | 255 |
| | | Alloy Steels | ● | ● | ● | 315 | 255 | 230 |
| | | Die/Tool Steels | ● | ● | ● | 275 | 220 | 187 |
| Stainless Steels | M | Free Machining | ● | X | ○ | 205 | 165 | 130 |
| | | Austenitic | ● | X | ○ | 160 | 130 | 120 |
| | | Difficult Stainless | ● | X | ○ | 125 | 100 | 90 |
| | | PH Stainless | ● | X | ○ | 160 | 130 | 120 |
| | | Cobalt Chrome Alloys | ● | X | ○ | 125 | 100 | 90 |
| | | Duplex (22%) | ● | X | ○ | 125 | 100 | 90 |
| | | Super Duplex (25%) | ● | X | ○ | 75 | 60 | 55 |
| Special Alloys | S | High Temp Alloys | ● | X | X | 55 | 45 | 40 |
| | | Inconel | ● | X | X | 55 | 45 | 40 |
| | | Titanium Alloys | ● | X | X | 160 | 130 | 100 |
| Cast Irons | K | Gray Cast Iron | ● | ○ | ○ | 495 | 395 | 265 |
| | | Ductile Cast Iron | ● | ○ | ○ | 370 | 300 | 210 |
| | | Malleable Iron | ● | ○ | ○ | 205 | 165 | 155 |
| Hardened Steels | H | Hardened Steels 45 - 50 Rc | ● | ○ | ○ | 185 | 150 | 100 |
| | | Hardened Steels 50 - 55 Rc | I | ○ | ○ | 155 | 125 | 85 |

● Preferred ○ Possible X Not Possible

| Workpiece Material Group | | Material Type | Tool Diameter | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 6mm | 8mm | 10mm | 12mm | 16mm | 20mm |
| | | | fz-mm/tooth | | | | | |
| Steels | P | Low Carbon | 0.036 | 0.048 | 0.060 | 0.072 | 0.096 | 0.120 |
| | | Medium Carbon | 0.036 | 0.048 | 0.060 | 0.072 | 0.096 | 0.120 |
| | | Alloy Steels | 0.036 | 0.048 | 0.060 | 0.072 | 0.096 | 0.120 |
| | | Die/Tool Steels | 0.036 | 0.048 | 0.060 | 0.072 | 0.096 | 0.120 |
| Stainless Steels | M | Free Machining | 0.036 | 0.048 | 0.060 | 0.072 | 0.096 | 0.12 |
| | | Austenitic | 0.029 | 0.038 | 0.048 | 0.058 | 0.077 | 0.096 |
| | | Difficult Stainless | 0.024 | 0.032 | 0.040 | 0.048 | 0.064 | 0.080 |
| | | PH Stainless | 0.029 | 0.038 | 0.048 | 0.058 | 0.077 | 0.096 |
| | | Cobalt Chrome Alloys | 0.018 | 0.024 | 0.030 | 0.036 | 0.048 | 0.060 |
| | | Duplex (22%) | 0.018 | 0.024 | 0.030 | 0.036 | 0.048 | 0.060 |
| | | Super Duplex (25%) | 0.018 | 0.024 | 0.030 | 0.036 | 0.048 | 0.060 |
| Special Alloys | S | High Temp Alloys | 0.014 | 0.019 | 0.024 | 0.029 | 0.038 | 0.048 |
| | | Inconel | 0.014 | 0.019 | 0.024 | 0.029 | 0.038 | 0.048 |
| | | Titanium Alloys | 0.024 | 0.032 | 0.040 | 0.048 | 0.064 | 0.08 |
| Cast Irons | K | Gray Cast Iron | 0.032 | 0.043 | 0.054 | 0.065 | 0.086 | 0.108 |
| | | Ductile Cast Iron | 0.032 | 0.043 | 0.054 | 0.065 | 0.086 | 0.108 |
| | | Malleable Iron | 0.028 | 0.037 | 0.046 | 0.055 | 0.074 | 0.092 |
| Hardened Steels | H | Hardened Steels 45 - 50 Rc | 0.025 | 0.034 | 0.042 | 0.050 | 0.067 | 0.084 |
| | | Hardened Steels 50 - 55 Rc | 0.022 | 0.029 | 0.036 | 0.043 | 0.058 | 0.072 |

**Please Note - Peripheral Milling only.**

During profile milling less than 50% of the cutter diameter radial width, the actual chip thickness at the cutting edge is less than the programmed chipload. The accompanying table shows the increase in tooth load by given raidal percentage engagement. Multiply your feed per tooth by the factor before finalising your table feed.

| Radial Cut (Ae) | Chip thickness Compensation factor |
|---|---|
| 15% | 1.40 |
| 13% | 1.50 |
| 10% | 1.67 |
| 8% | 1.80 |
| 7% | 2.00 |
| 5% | 2.30 |

# TuffCut® XT9 Series 380

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | ISO | Hardness | Coolant ● Preferred o Possible x Not Possible | | | Profiling (ae) 5% | Profiling (ae) 10% | End Mill Diameter (mm) 8 | 10 | 12 | 16 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2.3 | 1.67 | ← Multiply fz by this Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing. | | | | |
| | | | Max. | Air | MMS | vc - m/min | | fz - mm/tooth | | | | |
| Low Carbon Steels 1018, 1020 | P | up to 28 Rc | ● | ● | ● | 450 | 350 | .080 | .100 | .110 | .150 | .254 |
| Medium Carbon Steels 1140, 1145 | P | 28 to 38 Rc | ● | ● | ● | 345 | 275 | .080 | .100 | .110 | .150 | .254 |
| Alloy Steels 4140, 4145 | P | 28 to 44 Rc | ● | ● | ● | 315 | 255 | .080 | .100 | .110 | .150 | .254 |
| Die / Tool Steels A2, D2, H13, P20 | P | 28 to 44 Rc | ● | ● | ● | 275 | 220 | .080 | .100 | .110 | .150 | .254 |
| Stainless Steel - Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430 | M | up to 28 Rc | ● | x | o | 205 | 165 | .030-.040 | .038-.050 | .050-.078 | .050-.083 | .060-.099 |
| Stainless Steel - Austenitic 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH | M | up to 28 Rc | ● | x | o | 160 | 130 | .030-.040 | .038-.050 | .050-.078 | .050-.083 | .060-.099 |
| Stainless Steel - Difficult to Machine 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321 | M | up to 28 Rc | ● | x | o | 125 | 100 | .030-.040 | .038-.050 | .050-.078 | .050-.083 | .060-.099 |
| Stainless Steel - Difficult to Machine 17-4 PH, PH13-8Mo, Nitronics | M | over 28 Rc | ● | x | o | 160 | 130 | .030-.040 | .038-.050 | .050-.078 | .050-.083 | .060-.099 |
| Cobalt Chrome Alloys | M | | ● | x | o | 125 | 100 | .040 | .050 | .078 | .083 | .099 |
| Duplex (22%) | M | | ● | x | o | 75 | 60 | .040 | .050 | .078 | .083 | .099 |
| Super Duplex (25%) | M | | ● | x | o | 75 | 60 | .040 | .050 | .078 | .083 | .099 |
| High Temp Alloys | S | up to 42 Rc | ● | x | x | 55 | 45 | .030-.040 | .038-.050 | .025-.040 | .025-.043 | .030-.050 |
| Inconel | S | | ● | x | x | 55 | 45 | .020-.030 | .025-.040 | .025-.040 | .025-.043 | .030-.050 |
| Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al | S | up to 42 Rc | ● | x | x | 115 | 105 | .020-.030 | .025-.040 | .050-.078 | .050-.083 | .030-.050 |
| Cast-Iron - Gray CG, ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40 | K | up to 240 HB | ● | o | o | 495 | 395 | .080 | .100 | .110 | .150 | .254 |
| Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450 | K | over 240 HB | ● | o | o | 205 | 165 | .065 | .080 | .110 | .150 | .254 |
| Hardened Steels | H | 40-50 Rc | ● | o | o | 185 | 150 | .050 | .060 | .101 | .116 | .152 |
| Hardened Steels | | 50-55 Rc | ● | o | o | 155 | 125 | .030 | .040 | .061 | .076 | .088 |
| Hardened Steels | | >55 Rc | ● | o | o | 100 | 95 | .020 | .025 | .045 | .055 | .063 |

**Safety Note**

Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should be fully guarded.

Spindle Maximum - Should the calculated spindle speed be more than your actual spindle maximum, use this formula: (Calculated Feed x Spindle Maximum)/Calculated Speed.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

# TuffCut® XT Series 279, 277 / R / NR / NR-W, 278 R / N3 / N4 / N5

Recommended cutting data Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | | Material Type | Coolant | | | 1 x D 0.5 x D | 1 x D 1 x D | 0.05 x D 2 x D | 0.1 x D 2 x D | 0.2 x D 2 x D | 0.3 x D 1.5 x D | 0.5 x D 1.5 x D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Max | Air | MMS | Vc-M/Min | | | | | | |
| Steels | P | Low Carbon | ● | ● | ● | 230 | 220 | 480 | 385 | 330 | 275 | 220 |
| | | Medium Carbon | ● | ● | ● | 200 | 185 | 345 | 275 | 255 | 220 | 185 |
| | | Alloy Steels | ● | ● | ● | 175 | 165 | 315 | 255 | 230 | 200 | 165 |
| | | Die/Tool Steels | ● | ● | ● | 145 | 130 | 275 | 220 | 187 | 145 | 130 |
| Stainless Steels | M | Free Machining | ● | X | ○ | 120 | 110 | 205 | 165 | 130 | 115 | 110 |
| | | Austenitic | ● | X | ○ | 110 | 100 | 160 | 130 | 120 | 110 | 100 |
| | | Difficult Stainless | ● | X | ○ | 75 | 65 | 125 | 100 | 90 | 75 | 65 |
| | | PH Stainless | ● | X | ○ | 110 | 100 | 160 | 130 | 120 | 110 | 100 |
| | | Cobalt Chrome Alloys | ● | X | ○ | 75 | 65 | 125 | 100 | 90 | 75 | 65 |
| | | Duplex (22%) | ● | X | ○ | 75 | 65 | 125 | 100 | 90 | 75 | 65 |
| | | Super Duplex (25%) | ● | X | ○ | 55 | 45 | 75 | 60 | 55 | 50 | 45 |
| Special Alloys | S | High Temp Alloys | ● | X | X | 35 | 28 | 55 | 45 | 40 | 35 | 28 |
| | | | ● | X | X | 35 | 28 | 55 | 45 | 40 | 35 | 28 |
| | | Titanium Alloys | ● | X | X | 75 | 66 | 160 | 130 | 100 | 85 | 65 |
| Cast Irons | K | Gray Cast Iron | ● | ○ | ○ | 200 | 175 | 495 | 395 | 265 | 210 | 175 |
| | | Ductile Cast Iron | ● | ○ | ○ | 185 | 165 | 370 | 300 | 210 | 185 | 165 |
| | | Malleable Iron | ● | ○ | ○ | 145 | 132 | 205 | 165 | 155 | 145 | 130 |
| Hardened Steels | H | Hardened Steels 35 - 45 Rc | ● | ○ | ○ | 60 | 50 | 185 | 150 | 100 | 55 | 50 |
| | | Hardened Steels 45 - 55 Rc | ● | ○ | ○ | 50 | 45 | 155 | 125 | 85 | 50 | 45 |

● Preferred ○ Possible X Not Possible

| Workpiece Material Group | | Material Type | Tool Diameter | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3mm | 5mm | 6mm | 8mm | 10mm | 12mm | 16mm | 20mm | 25mm |
| | | | fz-mm/tooth | | | | | | | | |
| Steels | P | Profiling | 0.030 | 0.050 | 0.06 | 0.080 | 0.100 | 0.120 | 0.160 | 0.200 | 0.250 |
| | | Slotting | 0.015 | 0.025 | 0.03 | 0.040 | 0.050 | 0.060 | 0.080 | 0.100 | 0.125 |
| Stainless Steels | M | Profiling | 0.030 | 0.050 | 0.06 | 0.080 | 0.100 | 0.120 | 0.160 | 0.200 | 0.250 |
| | | Slotting | 0.015 | 0.025 | 0.03 | 0.040 | 0.050 | 0.060 | 0.080 | 0.100 | 0.125 |
| Special Alloys | S | Profiling | 0.009 | 0.013 | 0.032 | 0.038 | 0.044 | 0.064 | 0.076 | 0.089 | 0.127 |
| | | Slotting | 0.005 | 0.007 | 0.016 | 0.019 | 0.022 | 0.032 | 0.038 | 0.045 | 0.065 |
| Titanium | | Profiling | 0.030 | 0.050 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 | 0.200 | 0.250 |
| | | Slotting | 0.015 | 0.025 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 | 0.100 | 0.125 |
| Cast Irons | K | Profiling | 0.030 | 0.050 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 | 0.200 | 0.250 |
| | | Slotting | 0.015 | 0.025 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 | 0.100 | 0.125 |
| Hardened Steels | H | Profiling 35 - 45 Rc | 0.016 | 0.023 | 0.057 | 0.069 | 0.080 | 0.114 | 0.137 | 0.160 | 0.229 |
| | | Slotting 35 - 45 Rc | 0.010 | 0.015 | 0.025 | 0.035 | 0.045 | 0.065 | 0.070 | 0.075 | 0.100 |
| | | Profiling 45 - 55 Rc | 0.010 | 0.015 | 0.041 | 0.051 | 0.058 | 0.084 | 0.102 | 0.119 | 0.170 |
| | | Slotting 45 - 55 Rc | 0.008 | 0.011 | 0.020 | 0.030 | 0.040 | 0.050 | 0.055 | 0.080 | 0.090 |

During profile milling less than 50% of the cutter diameter radial width, the actual chip thickness at the cutting edge is less than the programmed chipload. The accompanying table shows the increase in tooth load by given raidal percentage engagement. Multiply your feed per tooth by the factor before finalising your table feed.

| Radial Cut (Ae) | Chip thickness Compensation factor |
|---|---|
| 30% | 1.10 |
| 20% | 1.20 |
| 15% | 1.40 |
| 10% | 1.80 |
| 7% | 2.00 |
| 5% | 2.30 |
| 1% | 5.00 |

**Note:**

**For N4 tools reduce above data by 10%**
**For N5 tools reduce above data by 30%**

**For N4 & N5 tools profile machining only!**

# TuffCut® XT Series V5LCB

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| 3 x D Cutting Length | | | Ø 6.0 | Ø 8.0 | Ø 10.0 | Ø 12.0 | Ø 16.0 |
|---|---|---|---|---|---|---|---|
| | | | Maximum Axial Depth Of Cut (ap) | Maximum Axial Depth Of Cut (ap) | Maximum Axial Depth Of Cut (ap) | Maximum Axial Depth Of Cut (ap) | Maximum Axial Depth Of Cut (ap) |
| | | | ≤ 3 x ØD (18.0mm) | ≤ 3 x ØD (24.0mm) | ≤ 3 x ØD (30.0mm) | ≤ 3 x ØD (36.0mm) | ≤ 3 x ØD (48.0mm) |
| Material Group | Vc | | Maximum Radial Depth Of Cut (ae) | Maximum Radial Depth Of Cut (ae) | Maximum Radial Depth Of Cut (ae) | Maximum Radial Depth Of Cut (ae) | Maximum Radial Depth Of Cut (ae) |
| | | | 0.1 x $ØD_1$ (0.6mm) | 0.1 x $ØD_1$ (0.8mm) | 0.1 x $ØD_1$ (1.0mm) | 0.1 x $ØD_1$ (1.2mm) | 0.1 x $ØD_1$ (1.6mm) |
| Low Carbon, Free Machining Steels | 300 | RPM | 15,900 | 11,925 | 9,540 | 7,950 | 5,963 |
| | | Feed (Vf) | 5,724 | 5,724 | 5,724 | 5,724 | 5,724 |
| Alloy Steels, Tool Steels & Nitriding Steels | 200 | RPM | 10,600 | 7,950 | 6,360 | 5,300 | 3,975 |
| | | Feed (Vf) | 3,816 | 3,816 | 3,816 | 3,816 | 3,816 |
| Free Machining & Austenitic Stainless Steels ≤ 32 HRC | 150 | RPM | 7,950 | 5,963 | 4,770 | 3,975 | 2,981 |
| | | Feed (Vf) | 2,862 | 2,862 | 2,862 | 2,862 | 2,862 |
| Moderate Machining & PH Stainless Steels | 130 | RPM | 6,890 | 5,168 | 4,134 | 3,445 | 2,584 |
| | | Feed (Vf) | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 |
| Duplex & Super Duplex Stainless Steels | 80 | RPM | 4,240 | 3,180 | 2,544 | 2,120 | 1,590 |
| | | Feed (Vf) | 1,526 | 1,526 | 1,526 | 1,526 | 1,526 |
| Titanium Alloys | 80 | RPM | 4,240 | 3,180 | 2,544 | 2,120 | 1,590 |
| | | Feed (Vf) | 1,526 | 1,526 | 1,526 | 1,526 | 1,526 |

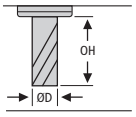
| 4 x D Cutting Length | | | Ø 6.0 | Ø 8.0 | Ø 10.0 | Ø 12.0 | Ø 16.0 |
|---|---|---|---|---|---|---|---|
| | | | Maximum Axial Depth Of Cut (ap) | Maximum Axial Depth Of Cut (ap) | Maximum Axial Depth Of Cut (ap) | Maximum Axial Depth Of Cut (ap) | Maximum Axial Depth Of Cut (ap) |
| | | | ≤ 4 x ØD (24.0mm) | ≤ 4 x ØD (32.0mm) | ≤ 4 x ØD (40.0mm) | ≤ 4 x ØD (48.0mm) | ≤ 4 x ØD (64.0mm) |
| Material Group | Vc | | Maximum Radial Depth Of Cut (ae) | Maximum Radial Depth Of Cut (ae) | Maximum Radial Depth Of Cut (ae) | Maximum Radial Depth Of Cut (ae) | Maximum Radial Depth Of Cut (ae) |
| | | | 0.05 x ØD (0.3mm) | 0.05 x ØD (0.4mm) | 0.05 x ØD (0.5mm) | 0.05 x ØD (0.6mm) | 0.05 x ØD (0.8mm) |
| Low Carbon, Free Machining Steels | 300 | RPM | 15,900 | 11,925 | 9,540 | 7,950 | 5,963 |
| | | Feed (Vf) | 5,724 | 5,724 | 5,724 | 5,724 | 5,724 |
| Alloy Steels, Tool Steels & Nitriding Steels | 200 | RPM | 10,600 | 7,950 | 6,360 | 5,300 | 3,975 |
| | | Feed (Vf) | 3,816 | 3,816 | 3,816 | 3,816 | 3,816 |
| Free Machining & Austenitic Stainless Steels ≤ 32 HRC | 150 | RPM | 7,950 | 5,963 | 4,770 | 3,975 | 2,981 |
| | | Feed (Vf) | 2,862 | 2,862 | 2,862 | 2,862 | 2,862 |
| Moderate Machining & PH Stainless Steels | 130 | RPM | 6,890 | 5,168 | 4,134 | 3,445 | 2,584 |
| | | Feed (Vf) | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 |
| Duplex & Super Duplex Stainless Steels | 80 | RPM | 4,240 | 3,180 | 2,544 | 2,120 | 1,590 |
| | | Feed (Vf) | 1,526 | 1,526 | 1,526 | 1,526 | 1,526 |
| Titanium Alloys | 80 | RPM | 4,240 | 3,180 | 2,544 | 2,120 | 1,590 |
| | | Feed (Vf) | 1,526 | 1,526 | 1,526 | 1,526 | 1,526 |

**Please note - the cutting data shown in the table above is advisory and should be considered as the maximum.**
**Adjustments should be made to the cutting data depending on the application, work piece rigidity, machine tool etc.**
**V5LCB should only be used in accurate tool holders with high gripping power. ER collet type tool holders are not recommended.**

# TuffCut® Series 158

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

## HSC Roughing




| Workpice Material Group | | Material Type | Coolant | | OH | Vc | Tool Diameter and Corner Radius | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2.0 x R0.5 | | | 3.0 x R0.8 | | | 4.0 x R1.0 | | |
| | | | Air | Emulsion | | | Ap | Ae | Fz | Ap | Ae | Fz | Ap | Ae | Fz |
| Steel | P | Alloy & Tool Steel Below 260HB | ● | ○ | 3D | 120 | 0.10 | 0.5 | 0.10 | 0.16 | 0.7 | 0.16 | 0.20 | 1.0 | 0.20 |
| | | | | | 4D | 110 | 0.09 | | 0.10 | 0.14 | | 0.16 | 0.18 | | 0.20 |
| | | | | | 5D | 100 | 0.09 | | 0.10 | 0.14 | | 0.16 | 0.17 | | 0.20 |
| | | | | | 6D | 95 | 0.07 | | 0.10 | 0.11 | | 0.16 | 0.14 | | 0.20 |
| | | | | | 8D | 85 | 0.06 | | 0.10 | 0.10 | | 0.16 | 0.12 | | 0.20 |
| | | | | | 10D | 70 | 0.05 | | 0.10 | 0.08 | | 0.16 | 0.10 | | 0.20 |
| | | Pre-hardened Tool Steel HRC30-40 | ● | ○ | 3D | 95 | 0.08 | 0.5 | 0.09 | 0.13 | 0.7 | 0.14 | 0.16 | 1.0 | 0.18 |
| | | | | | 4D | 85 | 0.07 | | 0.09 | 0.12 | | 0.14 | 0.14 | | 0.18 |
| | | | | | 5D | 80 | 0.07 | | 0.09 | 0.11 | | 0.14 | 0.14 | | 0.18 |
| | | | | | 6D | 75 | 0.05 | | 0.09 | 0.09 | | 0.14 | 0.11 | | 0.18 |
| | | | | | 8D | 65 | 0.05 | | 0.09 | 0.08 | | 0.14 | 0.10 | | 0.18 |
| | | | | | 10D | 55 | 0.04 | | 0.09 | 0.06 | | 0.14 | 0.08 | | 0.18 |
| Stainless Steel | M | Stainless Steel 300 & PH series | X | ● | 3D | 70 | 0.08 | 0.5 | 0.09 | 0.13 | 0.7 | 0.14 | 0.16 | 1.0 | 0.18 |
| | | | | | 4D | 65 | 0.07 | | 0.09 | 0.12 | | 0.14 | 0.14 | | 0.18 |
| | | | | | 5D | 60 | 0.07 | | 0.09 | 0.11 | | 0.14 | 0.14 | | 0.18 |
| | | | | | 6D | 55 | 0.05 | | 0.09 | 0.09 | | 0.14 | 0.11 | | 0.18 |
| | | | | | 8D | 50 | 0.05 | | 0.09 | 0.08 | | 0.14 | 0.10 | | 0.18 |
| | | | | | 10D | 40 | 0.04 | | 0.09 | 0.06 | | 0.14 | 0.08 | | 0.18 |
| Special Alloys | S | High Temp Alloys | X | ● | 3D | 30 | 0.03 | 0.4 | 0.05 | 0.04 | 0.6 | 0.08 | 0.05 | 0.8 | 0.10 |
| | | | | | 4D | 25 | 0.02 | | 0.05 | 0.04 | | 0.08 | 0.05 | | 0.10 |
| | | | | | 5D | 25 | 0.02 | | 0.05 | 0.03 | | 0.08 | 0.04 | | 0.10 |
| | | | | | 6D | 25 | 0.02 | | 0.05 | 0.03 | | 0.08 | 0.03 | | 0.10 |
| | | | | | 8D | 20 | 0.02 | | 0.05 | 0.02 | | 0.08 | 0.03 | | 0.10 |
| | | | | | 10D | 20 | 0.01 | | 0.05 | 0.02 | | 0.08 | 0.03 | | 0.10 |
| | | Titanium Alloys | X | ● | 3D | 70 | 0.06 | 0.4 | 0.08 | 0.09 | 0.6 | 0.12 | 0.11 | 0.8 | 0.15 |
| | | | | | 4D | 65 | 0.05 | | 0.08 | 0.08 | | 0.12 | 0.10 | | 0.15 |
| | | | | | 5D | 60 | 0.05 | | 0.08 | 0.07 | | 0.12 | 0.09 | | 0.15 |
| | | | | | 6D | 55 | 0.04 | | 0.08 | 0.06 | | 0.12 | 0.07 | | 0.15 |
| | | | | | 8D | 50 | 0.03 | | 0.08 | 0.05 | | 0.12 | 0.07 | | 0.15 |
| | | | | | 10D | 40 | 0.03 | | 0.08 | 0.04 | | 0.12 | 0.06 | | 0.15 |
| Cast Iron | K | GG, GGG | ● | ● | 3D | 120 | 0.10 | 0.5 | 0.10 | 0.16 | 0.7 | 0.16 | 0.20 | 1.0 | 0.20 |
| | | | | | 4D | 110 | 0.09 | | 0.10 | 0.14 | | 0.16 | 0.18 | | 0.20 |
| | | | | | 5D | 100 | 0.09 | | 0.10 | 0.14 | | 0.16 | 0.17 | | 0.20 |
| | | | | | 6D | 95 | 0.07 | | 0.10 | 0.11 | | 0.16 | 0.14 | | 0.20 |
| | | | | | 8D | 85 | 0.06 | | 0.10 | 0.10 | | 0.16 | 0.12 | | 0.20 |
| | | | | | 10D | 70 | 0.05 | | 0.10 | 0.08 | | 0.16 | 0.10 | | 0.20 |
| Hardened Steels | H | Hardened Steels HRC45-50 | ● | ○ | 3D | 80 | 0.06 | 0.5 | 0.07 | 0.10 | 0.7 | 0.11 | 0.12 | 1.0 | 0.14 |
| | | | | | 4D | 70 | 0.05 | | 0.07 | 0.09 | | 0.11 | 0.11 | | 0.14 |
| | | | | | 5D | 70 | 0.05 | | 0.07 | 0.08 | | 0.11 | 0.10 | | 0.14 |
| | | | | | 6D | 65 | 0.04 | | 0.07 | 0.07 | | 0.11 | 0.08 | | 0.14 |
| | | | | | 8D | 55 | 0.04 | | 0.07 | 0.06 | | 0.11 | 0.07 | | 0.14 |
| | | | | | 10D | 50 | 0.03 | | 0.07 | 0.05 | | 0.11 | 0.06 | | 0.14 |
| | | Hardened Steels HRC50-55 | ● | X | 3D | 60 | 0.05 | 0.4 | 0.05 | 0.08 | 0.6 | 0.08 | 0.10 | 0.8 | 0.10 |
| | | | | | 4D | 55 | 0.05 | | 0.05 | 0.07 | | 0.08 | 0.09 | | 0.10 |
| | | | | | 5D | 50 | 0.04 | | 0.05 | 0.07 | | 0.08 | 0.09 | | 0.10 |
| | | | | | 6D | 50 | 0.03 | | 0.05 | 0.05 | | 0.08 | 0.07 | | 0.10 |
| | | | | | 8D | 40 | 0.03 | | 0.05 | 0.05 | | 0.08 | 0.06 | | 0.10 |
| | | | | | 10D | 35 | 0.03 | | 0.05 | 0.04 | | 0.08 | 0.05 | | 0.10 |

● Preferred ○ Possible X Not Possible

# TuffCut® Series 158

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

## HSC Roughing

| Tool Diameter and Corner Radius | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6.0 x R1.5 | | | 8.0 x R2.0 | | | 10.0 x R2.0 | | | 12 x R2.0 | | | 16 x R3.0 | | |
| Ap | Ae | Fz | Ap | Ae | Fz | Ap | Ae | Fz | Ap | Ae | Fz | Ap | Ae | Fz |
| 0.30 | 1.5 | 0.30 | 0.40 | 2.0 | 0.4 | 0.40 | 3.0 | 0.40 | 0.40 | 4.0 | 0.40 | 0.60 | 5.0 | 0.6 |
| 0.27 | | 0.30 | 0.36 | | 0.4 | 0.36 | | 0.40 | 0.36 | | 0.40 | 0.54 | | 0.6 |
| 0.26 | | 0.30 | 0.34 | | 0.4 | 0.34 | | 0.40 | 0.34 | | 0.40 | 0.51 | | 0.6 |
| 0.20 | | 0.30 | 0.27 | | 0.4 | 0.27 | | 0.40 | 0.27 | | 0.40 | 0.41 | | 0.6 |
| 0.18 | | 0.30 | 0.24 | | 0.4 | 0.24 | | 0.40 | 0.24 | | 0.40 | 0.36 | | 0.6 |
| 0.15 | | 0.30 | 0.20 | | 0.4 | 0.20 | | 0.40 | 0.20 | | 0.40 | 0.30 | | 0.6 |
| 0.24 | 1.5 | 0.27 | 0.32 | 2.0 | 0.36 | 0.32 | 3.0 | 0.36 | 0.32 | 4.0 | 0.36 | 0.48 | 5.0 | 0.54 |
| 0.22 | | 0.27 | 0.29 | | 0.36 | 0.29 | | 0.36 | 0.29 | | 0.36 | 0.43 | | 0.54 |
| 0.20 | | 0.27 | 0.27 | | 0.36 | 0.27 | | 0.36 | 0.27 | | 0.36 | 0.41 | | 0.54 |
| 0.16 | | 0.27 | 0.22 | | 0.36 | 0.22 | | 0.36 | 0.22 | | 0.36 | 0.33 | | 0.54 |
| 0.14 | | 0.27 | 0.19 | | 0.36 | 0.19 | | 0.36 | 0.19 | | 0.36 | 0.29 | | 0.54 |
| 0.12 | | 0.27 | 0.16 | | 0.36 | 0.16 | | 0.36 | 0.16 | | 0.36 | 1.28 | | 0.54 |
| 0.24 | 1.5 | 0.27 | 0.32 | 2.0 | 0.36 | 0.32 | 3.0 | 0.36 | 0.32 | 4.0 | 0.36 | 0.48 | 5.0 | 0.54 |
| 0.22 | | 0.27 | 0.29 | | 0.36 | 0.29 | | 0.36 | 0.29 | | 0.36 | 0.43 | | 0.54 |
| 0.20 | | 0.27 | 0.27 | | 0.36 | 0.27 | | 0.36 | 0.27 | | 0.36 | 0.41 | | 0.54 |
| 0.16 | | 0.27 | 0.22 | | 0.36 | 0.22 | | 0.36 | 0.22 | | 0.36 | 0.33 | | 0.54 |
| 0.14 | | 0.27 | 0.19 | | 0.36 | 0.19 | | 0.36 | 0.19 | | 0.36 | 0.29 | | 0.54 |
| 0.12 | | 0.27 | 0.16 | | 0.36 | 0.16 | | 0.36 | 0.16 | | 0.36 | 0.24 | | 0.54 |
| 0.08 | 1.2 | 0.15 | 0.10 | 1.6 | 0.20 | 0.10 | 2.5 | 0.20 | 0.10 | 3.5 | 0.20 | 0.15 | 4.3 | 0.30 |
| 0.07 | | 0.15 | 0.09 | | 0.20 | 0.09 | | 0.20 | 0.09 | | 0.20 | 0.14 | | 0.30 |
| 0.06 | | 0.15 | 0.09 | | 0.20 | 0.09 | | 0.20 | 0.09 | | 0.20 | 0.13 | | 0.30 |
| 0.05 | | 0.15 | 0.07 | | 0.20 | 0.07 | | 0.20 | 0.07 | | 0.20 | 0.10 | | 0.30 |
| 0.05 | | 0.15 | 0.06 | | 0.20 | 0.06 | | 0.20 | 0.06 | | 0.20 | 0.09 | | 0.30 |
| 0.04 | | 0.15 | 0.05 | | 0.20 | 0.05 | | 0.20 | 0.05 | | 0.20 | 0.08 | | 0.30 |
| 0.17 | 1.2 | 0.23 | 0.22 | 1.6 | 0.30 | 0.22 | 2.5 | 0.30 | 0.22 | 3.5 | 0.30 | 0.33 | 4.3 | 0.45 |
| 0.15 | | 0.23 | 0.20 | | 0.30 | 0.20 | | 0.30 | 0.20 | | 0.30 | 0.30 | | 0.45 |
| 0.14 | | 0.23 | 0.19 | | 0.30 | 0.19 | | 0.30 | 0.19 | | 0.30 | 0.28 | | 0.45 |
| 0.11 | | 0.23 | 0.15 | | 0.30 | 0.15 | | 0.30 | 0.15 | | 0.30 | 0.22 | | 0.45 |
| 0.10 | | 0.23 | 0.13 | | 0.30 | 0.13 | | 0.30 | 0.13 | | 0.30 | 0.20 | | 0.45 |
| 0.08 | | 0.23 | 0.11 | | 0.30 | 0.11 | | 0.30 | 0.11 | | 0.30 | 0.17 | | 0.45 |
| 0.30 | 1.5 | 0.30 | 0.40 | 2.0 | 0.4 | 0.40 | 3.0 | 0.40 | 0.40 | 4.0 | 0.40 | 0.60 | 5.0 | 0.6 |
| 0.27 | | 0.30 | 0.36 | | 0.4 | 0.36 | | 0.40 | 0.36 | | 0.40 | 0.54 | | 0.6 |
| 0.26 | | 0.30 | 0.34 | | 0.4 | 0.34 | | 0.40 | 0.34 | | 0.40 | 0.51 | | 0.6 |
| 0.20 | | 0.30 | 0.27 | | 0.4 | 0.27 | | 0.40 | 0.27 | | 0.40 | 0.41 | | 0.6 |
| 0.18 | | 0.30 | 0.24 | | 0.4 | 0.24 | | 0.40 | 0.24 | | 0.40 | 0.36 | | 0.6 |
| 0.15 | | 0.30 | 0.20 | | 0.4 | 0.20 | | 0.40 | 0.20 | | 0.40 | 0.30 | | 0.6 |
| 0.18 | 1.5 | 0.21 | 0.24 | 2.0 | 0.28 | 0.24 | 3.0 | 0.28 | 0.24 | 4.0 | 0.28 | 0.36 | 5.0 | 0.42 |
| 0.16 | | 0.21 | 0.22 | | 0.28 | 0.22 | | 0.28 | 0.22 | | 0.28 | 0.32 | | 0.42 |
| 0.15 | | 0.21 | 0.20 | | 0.28 | 0.20 | | 0.28 | 0.20 | | 0.28 | 0.31 | | 0.42 |
| 0.12 | | 0.21 | 0.16 | | 0.28 | 0.16 | | 0.28 | 0.16 | | 0.28 | 0.24 | | 0.42 |
| 0.11 | | 0.21 | 0.14 | | 0.28 | 0.14 | | 0.28 | 0.14 | | 0.28 | 0.22 | | 0.42 |
| 0.09 | | 0.21 | 0.12 | | 0.28 | 0.12 | | 0.28 | 0.12 | | 0.28 | 0.18 | | 0.42 |
| 0.15 | 1.2 | 0.15 | 0.20 | 1.6 | 0.20 | 0.20 | 2.5 | 0.20 | 0.20 | 3.5 | 0.20 | 0.30 | 4.3 | 0.30 |
| 0.14 | | 0.15 | 0.18 | | 0.20 | 0.18 | | 0.20 | 0.18 | | 0.20 | 0.27 | | 0.30 |
| 0.13 | | 0.15 | 0.17 | | 0.20 | 0.17 | | 0.20 | 0.17 | | 0.20 | 0.26 | | 0.30 |
| 0.10 | | 0.15 | 0.14 | | 0.20 | 0.14 | | 0.20 | 0.14 | | 0.20 | 0.20 | | 0.30 |
| 0.09 | | 0.15 | 0.12 | | 0.20 | 0.12 | | 0.20 | 0.12 | | 0.20 | 0.18 | | 0.30 |
| 0.08 | | 0.15 | 0.10 | | 0.20 | 0.10 | | 0.20 | 0.10 | | 0.20 | 0.15 | | 0.30 |

# TuffCut® Series 158

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

## Cutting Speed

| Workpiece Material Group | | Material Type | Coolant | | 1 x D / 0.1 x D | 0.1 x D / 1 x D | 2D/3D HSC |
|---|---|---|---|---|---|---|---|
| | | | Air | Emulsion | Slotting | Profiling | 2D/3D HSC |
| | | | | | Vc-M/Min | | |
| Steels | P | Alloy & Tool Steels Below 260HB | ● | ○ | 100 | 180 | 200 |
| | | Pre-hardened Tools Steel HRC30-40 | ● | ● | 70 | 120 | 180 |
| Stainless Steels | M | Stainless Steels 300 & PH series | X | ● | 80 | 100 | 150 |
| Special Alloys | S | High Temp Alloys | X | ● | 25 | 50 | 70 |
| | | Titanium Alloys | X | ● | 60 | 100 | 120 |
| Cast Irons | K | GG, GGG | ● | ● | 100 | 200 | 220 |
| Hardened Steels | H | Hardened Steels HRC45-50 | ● | ○ | 75 | 90 | 140 |
| | | Hardened Steels HRC50-55 | ● | ○ | 40 | 70 | 120 |

● Preferred ○ Possible X Not Possible

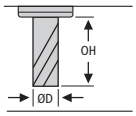
## Feed Per Tooth

| Workpiece Material Group | | Material Type | Operation | Tool Diameter | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2.0 | 3.0 | 4.0 | 6.0 | 8.0 | 10.0 | 12.0 | 16.0 |
| | | | | fz-mm/tooth | | | | | | | |
| Steels | P | Alloy & Tool Steels Below 260HB | Slotting | 0.010 | 0.015 | 0.020 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 |
| | | | Profiling | 0.020 | 0.030 | 0.040 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 |
| | | | HSC 2D/3D | 0.060 | 0.090 | 0.120 | 0.180 | 0.240 | 0.300 | 0.360 | 0.480 |
| | | Pre-hardened Tool Steels HRC30-40 | Slotting | 0.008 | 0.012 | 0.016 | 0.024 | 0.032 | 0.040 | 0.048 | 0.064 |
| | | | Profiling | 0.016 | 0.024 | 0.032 | 0.048 | 0.064 | 0.080 | 0.096 | 0.128 |
| | | | HSC 2D/3D | 0.050 | 0.075 | 0.100 | 0.150 | 0.200 | 0.250 | 0.300 | 0.400 |
| Stainless Steels | M | Stainless Steel 300 & PH series | Slotting | 0.007 | 0.010 | 0.013 | 0.020 | 0.026 | 0.033 | 0.040 | 0.053 |
| | | | Profiling | 0.013 | 0.020 | 0.026 | 0.040 | 0.053 | 0.066 | 0.079 | 0.106 |
| | | | HSC 2D/3D | 0.040 | 0.060 | 0.080 | 0.120 | 0.160 | 0.200 | 0.240 | 0.320 |
| Special Alloys | S | High Temp Alloys | Slotting | 0.004 | 0.006 | 0.008 | 0.013 | 0.017 | 0.021 | 0.025 | 0.034 |
| | | | Profiling | 0.008 | 0.013 | 0.017 | 0.025 | 0.034 | 0.042 | 0.050 | 0.067 |
| | | | HSC 2D/3D | 0.020 | 0.030 | 0.040 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 |
| | | Titanium Alloys | Slotting | 0.006 | 0.009 | 0.012 | 0.018 | 0.024 | 0.030 | 0.036 | 0.048 |
| | | | Profiling | 0.012 | 0.018 | 0.024 | 0.036 | 0.048 | 0.060 | 0.072 | 0.096 |
| | | | HSC 2D/3D | 0.040 | 0.060 | 0.080 | 0.120 | 0.160 | 0.200 | 0.240 | 0.320 |
| Cast Irons | K | GG, GGG | Slotting | 0.010 | 0.015 | 0.020 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 |
| | | | Profiling | 0.020 | 0.030 | 0.040 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 |
| | | | HSC 2D/3D | 0.060 | 0.090 | 0.120 | 0.180 | 0.240 | 0.300 | 0.360 | 0.480 |
| Hardened Steels | H | Hardened Steels HRC45-50 | Slotting | 0.007 | 0.010 | 0.013 | 0.020 | 0.026 | 0.033 | 0.040 | 0.053 |
| | | | Profiling | 0.013 | 0.020 | 0.026 | 0.040 | 0.053 | 0.066 | 0.079 | 0.106 |
| | | | HSC 2D/3D | 0.040 | 0.060 | 0.080 | 0.120 | 0.160 | 0.200 | 0.240 | 0.320 |
| | | Hardened Steels HRC50-55 | Slotting | 0.005 | 0.008 | 0.010 | 0.015 | 0.020 | 0.025 | 0.030 | 0.040 |
| | | | Profiling | 0.010 | 0.015 | 0.020 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 |
| | | | HSC 2D/3D | 0.030 | 0.045 | 0.060 | 0.090 | 0.120 | 0.150 | 0.180 | 0.240 |

# TuffCut® Series 158

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

## Depth of Cut
## HSC 2D/3D Axial & Radial







| Workpiece Material Group | | Material Type | OH | Tool Diameter | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 2.0 | 3.0 | 4.0 | 6.0 | 8.0 | 10.0 | 12.0 | 16.0 |
| | | | | Ap-mm / Ae-mm | | | | | | | |
| Steels | P | Alloy & Tool Steels Below 260HB | 3D-4D | 0.06 | 0.09 | 0.12 | 0.18 | 0.24 | 0.30 | 0.36 | 0.48 |
| | | | 5D-6D | 0.05 | 0.07 | 0.10 | 0.14 | 0.19 | 0.24 | 0.29 | 0.38 |
| | | | 8D-10D | 0.04 | 0.05 | 0.07 | 0.11 | 0.14 | 0.18 | 0.22 | 0.29 |
| | | Pre-hardened Tool Steels HRC30-40 | 3D-4D | 0.06 | 0.09 | 0.12 | 0.18 | 0.24 | 0.30 | 0.36 | 0.48 |
| | | | 5D-6D | 0.05 | 0.07 | 0.10 | 0.14 | 0.19 | 0.24 | 0.29 | 0.38 |
| | | | 8D-10D | 0.04 | 0.05 | 0.07 | 0.11 | 0.14 | 0.18 | 0.22 | 0.29 |
| Stainless Steels | M | Stainless Steel 300 & PH series | 3D-4D | 0.06 | 0.09 | 0.12 | 0.18 | 0.24 | 0.30 | 0.36 | 0.48 |
| | | | 5D-6D | 0.05 | 0.07 | 0.10 | 0.14 | 0.19 | 0.24 | 0.29 | 0.38 |
| | | | 8D-10D | 0.04 | 0.05 | 0.07 | 0.11 | 0.14 | 0.18 | 0.22 | 0.29 |
| Special Alloys | S | High Temp Alloys | 3D-4D | 0.04 | 0.06 | 0.08 | 0.12 | 0.16 | 0.20 | 0.24 | 0.32 |
| | | | 5D-6D | 0.03 | 0.05 | 0.06 | 0.10 | 0.13 | 0.16 | 0.19 | 0.26 |
| | | | 8D-10D | 0.02 | 0.04 | 0.05 | 0.07 | 0.10 | 0.12 | 0.14 | 0.19 |
| | | Titanium Alloys | 3D-4D | 0.06 | 0.09 | 0.12 | 0.18 | 0.24 | 0.30 | 0.36 | 0.48 |
| | | | 5D-6D | 0.05 | 0.07 | 0.10 | 0.14 | 0.19 | 0.24 | 0.29 | 0.38 |
| | | | 8D-10D | 0.04 | 0.05 | 0.07 | 0.11 | 0.14 | 0.18 | 0.22 | 0.29 |
| Cast Irons | K | GG, GGG | 3D-4D | 0.06 | 0.09 | 0.12 | 0.18 | 0.24 | 0.30 | 0.36 | 0.48 |
| | | | 5D-6D | 0.05 | 0.07 | 0.10 | 0.14 | 0.19 | 0.24 | 0.29 | 0.38 |
| | | | 8D-10D | 0.04 | 0.05 | 0.07 | 0.11 | 0.14 | 0.18 | 0.22 | 0.29 |
| Hardened Steels | H | Hardened Steels HRC45-50 | 3D-4D | 0.05 | 0.08 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 | 0.40 |
| | | | 5D-6D | 0.04 | 0.06 | 0.08 | 0.12 | 0.16 | 0.20 | 0.24 | 0.32 |
| | | | 8D-10D | 0.03 | 0.05 | 0.06 | 0.09 | 0.12 | 0.15 | 0.18 | 0.24 |
| | | Hardened Steels HRC50-55 | 3D-4D | 0.04 | 0.06 | 0.08 | 0.12 | 0.16 | 0.20 | 0.24 | 0.32 |
| | | | 5D-6D | 0.03 | 0.05 | 0.06 | 0.10 | 0.13 | 0.16 | 0.19 | 0.26 |
| | | | 8D-10D | 0.02 | 0.04 | 0.05 | 0.07 | 0.10 | 0.12 | 0.14 | 0.19 |

**Notes:**

**For profile machining adjust radial cut (Ae)**

| OH | Ae (x Ø) |
|---|---|
| 3D-4D | 0.1 |
| 5D-6D | 0.07 |
| 8D-10D | 0.05 |

| Radial Cut (Ae) | Chip thickness Compensation factor |
|---|---|
| 30% | 1.10 |
| 20% | 1.20 |
| 15% | 1.40 |
| 10% | 1.80 |
| 5% | 2.30 |
| 1% | 5.00 |

**For slotting adjust axial cut (Ap)**

| OH | Ap (x Ø) |
|---|---|
| 3D-4D | 0.1 |
| 5D-6D | 0.07 |
| 8D-10D | 0.05 |

# TuffCut® XT Series MFB

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Recommended Speeds by Material Group | | | | | | Finishing | Semi-Finishng |
|---|---|---|---|---|---|---|---|
| Workpiece Material Group | | Material Type | Ap | | | 0.01-0.03 x D | 0.05-0.1 x D |
| | | | Ae | | | 0.02-0.03 x D | 0.05-0.1 x D |
| | | | Coolant | | | Vc-M/Min | |
| | | | Max | Air | MMS | | |
| Steels | P | Low Carbon | ● | ● | ● | 450 | 350 |
| | | Medium Carbon | ● | ● | ● | 345 | 275 |
| | | Alloy Steels | ● | ● | ● | 315 | 255 |
| | | Die/Tool Steels | ● | ● | ● | 275 | 220 |
| Stainless Steels | M | Free Machining | ● | X | ○ | 205 | 165 |
| | | Austenitic | ● | X | ○ | 160 | 130 |
| | | Difficult Stainless | ● | X | ○ | 125 | 100 |
| | | PH Stainless | ● | X | ○ | 160 | 130 |
| | | Cobalt Chrome Alloys | ● | X | ○ | 125 | 100 |
| | | Duplex (22%) | ● | X | ○ | 75 | 60 |
| | | Super Duplex (25%) | ● | X | ○ | 75 | 60 |
| Special Alloys | S | High Temp Alloys | ● | X | X | 55 | 45 |
| | | Titanium Alloys | ● | X | X | 115 | 105 |
| Cast Irons | K | Gray Cast Iron | ● | ○ | ○ | 495 | 395 |
| | | Ductile Cast Iron | ● | ○ | ○ | 320 | 280 |
| | | Malleable Iron | ● | ○ | ○ | 205 | 165 |
| Hardened Steels | H | Hardened Steels 45 - 50 Rc | ● | ○ | ○ | 150 | 125 |
| | | Hardened Steels 50 - 55 Rc | ● | ○ | ○ | 100 | 95 |

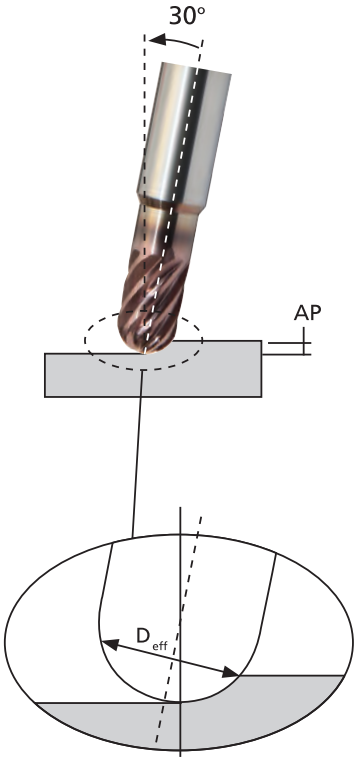
● Preferred ○ Possible X Not Possible

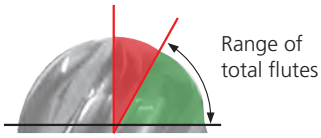
| Recommended Feeds by Material Group | | | Tool Diameter & Radius | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Workpiece Material Group | | Material Type | 4 | | 5 | | 6 | | 8 | | 10 | | 12 | | 16 | | 20 | |
| | | | 2 | | 2.5 | | 3 | | 4 | | 5 | | 6 | | 8 | | 10 | |
| | | | Semi Finish | Finish | Semi Finish | Finish | Semi Finish | Finish | Semi Finish | Finish | Semi Finish | Finish | Semi Finish | Finish | Semi Finish | Finish | Semi Finish | Finish |
| | | | Fz - mm/tooth | | | | | | | | | | | | | | | |
| Steels | P | Low Carbon | 0.12 | 0.06 | 0.15 | 0.075 | 0.18 | 0.09 | 0.24 | 0.12 | 0.3 | 0.15 | 0.36 | 0.18 | 0.48 | 0.24 | 0.6 | 0.3 |
| | | Medium Carbon | 0.12 | 0.06 | 0.15 | 0.075 | 0.18 | 0.09 | 0.24 | 0.12 | 0.3 | 0.15 | 0.36 | 0.18 | 0.48 | 0.24 | 0.6 | 0.3 |
| | | Alloy Steels | 0.12 | 0.06 | 0.15 | 0.075 | 0.18 | 0.09 | 0.24 | 0.12 | 0.3 | 0.15 | 0.36 | 0.18 | 0.48 | 0.24 | 0.6 | 0.3 |
| | | Die/Tool Steels | 0.08 | 0.06 | 0.1 | 0.075 | 0.12 | 0.09 | 0.16 | 0.12 | 0.2 | 0.15 | 0.24 | 0.18 | 0.32 | 0.24 | 0.4 | 0.3 |
| Stainless Steels | M | Free Machining | 0.08 | 0.06 | 0.1 | 0.075 | 0.12 | 0.09 | 0.16 | 0.12 | 0.2 | 0.15 | 0.24 | 0.18 | 0.32 | 0.24 | 0.4 | 0.3 |
| | | Austenitic | 0.08 | 0.06 | 0.1 | 0.075 | 0.12 | 0.09 | 0.16 | 0.12 | 0.2 | 0.15 | 0.24 | 0.18 | 0.32 | 0.24 | 0.4 | 0.3 |
| | | Difficult Stainless | 0.08 | 0.06 | 0.1 | 0.075 | 0.12 | 0.09 | 0.16 | 0.12 | 0.2 | 0.15 | 0.24 | 0.18 | 0.32 | 0.24 | 0.4 | 0.3 |
| | | PH Stainless | 0.08 | 0.06 | 0.1 | 0.075 | 0.12 | 0.09 | 0.16 | 0.12 | 0.2 | 0.15 | 0.24 | 0.18 | 0.32 | 0.24 | 0.4 | 0.3 |
| | | Cobalt Chrome Alloys | 0.072 | 0.048 | 0.09 | 0.06 | 0.108 | 0.072 | 0.144 | 0.096 | 0.18 | 0.12 | 0.216 | 0.144 | 0.288 | 0.192 | 0.36 | 0.24 |
| | | Duplex (22%) | 0.072 | 0.048 | 0.09 | 0.06 | 0.108 | 0.072 | 0.144 | 0.096 | 0.18 | 0.12 | 0.216 | 0.144 | 0.288 | 0.192 | 0.36 | 0.24 |
| | | Super Duplex (25%) | 0.068 | 0.044 | 0.085 | 0.055 | 0.102 | 0.066 | 0.136 | 0.088 | 0.17 | 0.11 | 0.204 | 0.132 | 0.272 | 0.176 | 0.34 | 0.22 |
| Special Alloys | S | High Temp Alloys | 0.06 | 0.04 | 0.075 | 0.05 | 0.09 | 0.06 | 0.12 | 0.08 | 0.15 | 0.1 | 0.18 | 0.12 | 0.24 | 0.16 | 0.3 | 0.2 |
| | | Titanium Alloys | 0.06 | 0.04 | 0.075 | 0.05 | 0.09 | 0.06 | 0.12 | 0.08 | 0.15 | 0.1 | 0.18 | 0.12 | 0.24 | 0.16 | 0.3 | 0.2 |
| Cast Irons | K | Gray Cast Iron | 0.12 | 0.08 | 0.15 | 0.1 | 0.18 | 0.12 | 0.24 | 0.16 | 0.3 | 0.2 | 0.36 | 0.24 | 0.48 | 0.32 | 0.6 | 0.4 |
| | | Ductile Cast Iron | 0.1 | 0.08 | 0.125 | 0.1 | 0.15 | 0.12 | 0.2 | 0.16 | 0.25 | 0.2 | 0.3 | 0.24 | 0.4 | 0.32 | 0.5 | 0.4 |
| | | Malleable Iron | 0.08 | 0.06 | 0.1 | 0.075 | 0.12 | 0.09 | 0.16 | 0.12 | 0.2 | 0.15 | 0.24 | 0.18 | 0.32 | 0.24 | 0.4 | 0.3 |
| Hardened Steels | H | Hardened Steels HRC45-50 | 0.06 | 0.056 | 0.075 | 0.07 | 0.09 | 0.084 | 0.12 | 0.112 | 0.15 | 0.14 | 0.18 | 0.168 | 0.24 | 0.224 | 0.3 | 0.28 |
| | | Hardened Steels HRC50-55 | 0.05 | 0.056 | 0.063 | 0.07 | 0.075 | 0.084 | 0.1 | 0.112 | 0.125 | 0.14 | 0.15 | 0.168 | 0.2 | 0.224 | 0.25 | 0.28 |

# TuffCut® XT Series MFB

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Effective Diameter at 30° | | | | | | | |
|---|---|---|---|---|---|---|---|
| Tool Ø | Axial Depth of Cut (mm) AP | | | | | | |
| | 0.2 | 0.4 | 0.6 | 0.8 | 1 | 1.5 | 2 |
| 4 | 3.31 | 3.68 | 3.87 | 3.97 | - | - | - |
| 5 | 4.00 | 4.45 | 4.71 | 4.87 | 4.96 | - | - |
| 6 | 4.66 | 5.16 | 5.52 | 5.73 | 5.87 | - | - |
| 8 | 5.96 | 6.62 | 7.05 | 7.36 | 7.60 | 7.91 | - |
| 10 | 7.22 | 8.00 | 8.51 | 8.90 | 9.20 | 9.68 | 9.93 |
| 12 | 8.46 | 9.33 | 9.94 | 10.38 | 10.74 | 11.37 | 11.75 |
| 16 | 10.88 | 11.92 | 12.66 | 13.24 | 13.71 | 14.58 | 15.16 |
| 20 | 13.25 | 14.44 | 15.30 | 15.98 | 16.55 | 17.62 | 18.40 |




| R | Tilt Angle | No. of Flutes |
|---|---|---|
| 4 | +31° | 6 |
| 5 | +33° | 6 |
| 6 | +33° | 6 |
| 8 | +25° | 8 |
| 10 | +22° | 8 |
| 12 | +24° | 8 |
| 16 | +25° | 8 |
| 20 | +25° | 10 |

| Effective Teeth | | | |
|---|---|---|---|
| Tool Ø | Tilt Angle | | |
| | 20° | 25° | 33° |
| 4 | 2 | 4 | 6 |
| 5 | 2 | 4 | 6 |
| 6 | 2 | 4 | 6 |
| 8 | 2 | 8 | 8 |
| 10 | 2 | 8 | 8 |
| 12 | 6 | 8 | 8 |
| 16 | 6 | 8 | 8 |
| 20 | 6 | 10 | 10 |

**Red Area:**
Does not have complete effective number of flutes to centre of tool.

**Green Area:**
Programming at the listed tilt angle will utilise the full effective number of flutes.

| ALtima® Xtreme Coating Properties | |
|---|---|
| Microhardness (HV) | 3800 |
| Max. Service Temp. | 1100° C / 2012° F |
| Friction Coefficient | 0.3 - 0.5 |
| Designation | AX |
| Colour | Copper |

| ALtima® Nano Coating Properties | |
|---|---|
| Microhardness (HV) | 3875 |
| Max. Service Temp. | 1100° C / 2012° F |
| Friction Coefficient | 0.3 |
| Designation | AN |
| Colour | Grey |

# TuffCut® X-AL Series 135

## Feed capability - Necked Tools | Capacités d'avance - Outils détalonnés | Vorschubleistung – Abgesetzter Schaft | Avanzamento - Utensili con collo scaricato | Zalecane parametry – narzędzia z odciążaną szyjką

| RPM | Diameter - mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
| | fz 0.035 | fz 0.035 | fz 0.084 | fz 0.12 | fz 0.26 | fz 0.61 | fz 0.77 | fz 0.79 | fz 0.762 | fz 0.76 |
| 4000 | 280 | 280 | 672 | 960 | 2080 | 4880 | 6160 | 6304 | 6096 | 6096 |
| 5000 | 350 | 350 | 840 | 1200 | 2600 | 6100 | 7700 | 7880 | 7620 | 7620 |
| 6000 | 420 | 420 | 1008 | 1440 | 3120 | 7320 | 9240 | 9456 | 9144 | 9144 |
| 7000 | 490 | 490 | 1176 | 1680 | 3640 | 8540 | 10780 | 11032 | 10668 | 10668 |
| 8000 | 560 | 560 | 1344 | 1920 | 4160 | 9760 | 12320 | 12608 | 12192 | 12192 |
| 9000 | 630 | 630 | 1512 | 2160 | 4680 | 10980 | 13860 | 14184 | 13716 | 13716 |
| 10000 | 700 | 700 | 1680 | 2400 | 5200 | 12200 | 15400 | 15760 | 15240 | 15240 |
| 11000 | 770 | 770 | 1848 | 2640 | 5720 | 13420 | 16940 | 17336 | 16764 | 16764 |
| 12000 | 840 | 840 | 2016 | 2880 | 6240 | 14640 | 18480 | 18912 | 18288 | 18288 |
| 13000 | 910 | 910 | 2184 | 3120 | 6760 | 15860 | 20020 | 20488 | 19812 | 19812 |
| 14000 | 980 | 980 | 2352 | 3360 | 7280 | 17080 | 21560 | 22064 | 21336 | 21336 |
| 15000 | 1050 | 1050 | 2520 | 3600 | 7800 | 18300 | 23100 | 23640 | 22860 | 22860 |
| 16000 | 1120 | 1120 | 2688 | 3840 | 8320 | 19520 | 24640 | 25216 | 24384 | 24384 |
| 17000 | 1190 | 1190 | 2856 | 4080 | 8840 | 20740 | 26180 | 26792 | 25908 | 25908 |
| 18000 | 1260 | 1260 | 3024 | 4320 | 9360 | 21960 | 27720 | 28368 | 27432 | 27432 |

| RPM | Diameter - mm | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
| | fz 0.035 | fz 0.035 | fz 0.084 | fz 0.12 | fz 0.26 | fz 0.61 | fz 0.77 | fz 0.79 | fz 0.762 | fz 0.76 |
| 19000 | 1330 | 1330 | 3192 | 4560 | 9880 | 23180 | 29260 | 29944 | 28956 | 28956 |
| 20000 | 1400 | 1400 | 3360 | 4800 | 10400 | 24400 | 30800 | 31520 | 30480 | 30480 |
| 21000 | 1470 | 1470 | 3528 | 5040 | 10920 | 25620 | 32340 | 33096 | 32004 | 32004 |
| 22000 | 1540 | 1540 | 3696 | 5280 | 11440 | 26840 | 33880 | 34672 | 33528 | 33528 |
| 23000 | 1610 | 1610 | 3864 | 5520 | 11960 | 28060 | 35420 | 36248 | 35052 | 35052 |
| 24000 | 1680 | 1680 | 4032 | 5760 | 12480 | 29280 | 36960 | 37824 | 36576 | 36576 |
| 25000 | 1750 | 1750 | 4200 | 6000 | 13000 | 30500 | 38500 | 39400 | 38100 | 38100 |
| 30000 | 2100 | 2100 | 5040 | 7200 | 15600 | 36600 | 46200 | 47280 | 45720 | 45720 |

FEED Shown in mm/min | Avance affichée en mm/min

### Feed rate allowance for length (Slotting)

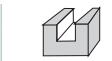
| Part no. example | length | Fz | Ae | Ap |
|---|---|---|---|---|
| 135 12N3 | Short | 1 | 1 x D | 1 X D |
| 135 12N5 | Medium | x 0.7 | 1 x D | 0.25 X D |
| 135 1202N | Long | x 0.6 | 0.1 x D | 1 X D |

**Feed rate for un-necked tools**
Please calculate feed rate based upon length from table above - then apply the following factors:

| Diameter | Factor |
|---|---|
| 3 - 8mm | Feed mm/min x 2.0 |
| 10 - 25mm | Feed mm/min x 1.35 |

# TuffCut® X-AL Series 135, 135B, 138B

## Recommended cutting data - Al / Al Si Alloy | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Series | | Type of cut | | Vc | Diameter - mm | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2 - 3 | 4 | 5 | 6 | 8 |
| | | Ae | Ap | M/Min | fz | fz | fz | fz | fz |
| 135 |  | 1 x D | 0.5 x D | 300-425 | 0.035 | 0.035 | 0.075-0.1 | 0.1-0.23 | 0.175-0.3 |
| | | 1 x D | 1 x D | 250-365 | 0.03 | 0.03 | 0.025-0.05 | 0.1-0.15 | 0.1-0.15 |
| |  | 0.2 x D | 1 x D | 300-425 | 0.03 | 0.03 | 0.05-0.1 | 0.1-0.23 | 0.1-0.23 |
| | | 0.5 x D | 1 x D | 300-425 | 0.03 | 0.03 | 0.05-0.1 | 0.1-0.23 | 0.1-0.23 |
| | | 1 x D | 1 x D | 250-365 | 0.025 | 0.025 | 0.025-0.05 | 0.1-0.15 | 0.1-0.15 |
| 135B |  | | | | | | | | |
| | | 1 x D | 0.5 x D | 150 | 0.05 | 0.08 | 0.12 | 0.16 | 0.2 |
| | | | | | | | | | |
| 138B |  | | | | | | | | |
| | | 0.1 x D | 1 x D | 300 | 0.05 | 0.08 | 0.12 | 0.16 | 0.2 |
| | | | | | | | | | |

# TuffCut® X-AL Series 135, 135B, 138B

## Recommended cutting data - Al / Al Si Alloy | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Series | | Type of cut | | Vc | Diameter - mm | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 10 | 12 | 16 | 20 | 25 |
| | | Ae | Ap | M/Min | fz | fz | fz | fz | fz |
| 135 |  | 1 x D | 0.5 x D | 300-425 | 0.175-0.3 | 0.25-1.15 | 0.38-1.02 | 0.38-1.02 | 0.38-1.02 |
| | | 1 x D | 1 x D | 250-365 | 0.1-0.15 | 0.25-0.75 | 0.38-0.75 | 0.38-0.75 | 0.38-0.75 |
| |  | 0.2 x D | 1 x D | 300-425 | 0.1-0.23 | 0.25-1.15 | 0.38-1.02 | 0.38-1.02 | 0.38-1.02 |
| | | 0.5 x D | 1 x D | 300-425 | 0.1-0.23 | 0.25-0.89 | 0.38-0.89 | 0.38-0.89 | 0.38-0.89 |
| | | 1 x D | 1 x D | 250-365 | 0.1-0.15 | 0.25-0.75 | 0.38-0.75 | 0.38-0.75 | 0.38-0.75 |
| 135B |  | 1 x D | 0.5 x D | 150 | 0.25 | 0.50 | 0.50 | - | - |
| 138B |  | 0.1 x D | 1 x D | 300 | 0.25 | 0.50 | 0.50 | - | - |

# TuffCut® X-AL Series 137V, 137V N3-4-5, 137VF

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Series | | Type of cut | | Vc | Diameter - mm | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | ø 3.0 | ø 4.0 | ø 5.0 | ø 6.0 | ø 8.0 |
| | | Ae | Ap | M/Min | fz | fz | fz | fz | fz |
| 137V N3 / 137VR N3 |  | 1 x D | 0.25 x D | 400-600 | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 |
| | | 1 x D | 0.5 x D | 400-600 | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 |
| | | 1 x D | 1 x D | 400-600 | 0.02 | 0.03 | 0.04 | 0.05 | 0.07 |
| |  | 0.75 x D | 0.5 x D | 500-700 | 0.045 | 0.06 | 0.075 | 0.09 | 0.12 |
| | | 0.5 x D | 1 x D | 500-700 | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 |
| | | 0.5 x D | 1.5 x D | 500-700 | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 |
| |  | ≤ 0.1 x D | ≤ 0.9 x $L^2$ | 800-1000 | 0.036 | 0.054 | 0.072 | 0.09 | 0.126 |

| Series | | Type of cut | | Vc | Diameter - mm | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | ø 10.0 | ø 12.0 | ø 16.0 | ø 20.0 |
| | | Ae | Ap | M/Min | fz | fz | fz | fz |
| 137V N3 / 137VR N3 |  | 1 x D | 0.25 x D | 400-600 | 0.10 | 0.12 | 0.16 | 0.20 |
| | | 1 x D | 0.5 x D | 400-600 | 0.10 | 0.12 | 0.16 | 0.20 |
| | | 1 x D | 1 x D | 400-600 | 0.09 | 0.11 | 0.15 | 0.19 |
| |  | 0.75 x D | 0.5 x D | 500-700 | 0.15 | 0.18 | 0.24 | 0.30 |
| | | 0.5 x D | 1 x D | 500-700 | 0.10 | 0.12 | 0.16 | 0.20 |
| | | 0.5 x D | 1.5 x D | 500-700 | 0.10 | 0.12 | 0.16 | 0.20 |
| |  | ≤ 0.1 x D | ≤ 0.9 x L2 | 800-1000 | 0.162 | 0.2 | 0.27 | 0.342 |

| Series | | Type of cut | | Vc | Diameter - mm | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | ø 3.0 | ø 4.0 | ø 5.0 | ø 6.0 | ø 8.0 |
| | | Ae | Ap | M/Min | fz | fz | fz | fz | fz |
| 137V N4 |  | 1 x D | 0.25 x D | 400-600 | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 |
| | | 1 x D | 0.5 x D | 400-600 | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 |
| | | 1 x D | 1 x D | 400-600 | 0.02 | 0.03 | 0.04 | 0.05 | 0.07 |
| |  | 0.75 x D | 0.5 x D | 500-700 | 0.045 | 0.06 | 0.075 | 0.09 | 0.12 |
| | | 0.5 x D | 1 x D | 500-700 | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 |
| | | 0.5 x D | 0.9 x L | 500-700 | 0.03 | 0.04 | 0.05 | 0.06 | 0.08 |
| |  | ≤ 0.1 x D | ≤ 0.9 x L2 | 800-1000 | 0.036 | 0.054 | 0.072 | 0.09 | 0.126 |

# TuffCut® X-AL Series 137V, 137V N3-4-5, 137VF

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Series | | Type of cut | | Vc | Diameter - mm | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | ø 10.0 | ø 12.0 | ø 16.0 | ø 20.0 |
| | | Ae | Ap | M/Min | fz | fz | fz | fz |
| 137V N4 |  | 1 x D | 0.25 x D | 400-600 | 0.10 | 0.12 | 0.16 | 0.20 |
| | | 1 x D | 0.5 x D | 400-600 | 0.10 | 0.12 | 0.16 | 0.20 |
| | | 1 x D | 1 x D | 400-600 | 0.09 | 0.11 | 0.15 | 0.19 |
| |  | 0.75 x D | 0.5 x D | 500-700 | 0.15 | 0.18 | 0.24 | 0.30 |
| | | 0.5 x D | 1 x D | 500-700 | 0.10 | 0.12 | 0.16 | 0.20 |
| | | 0.5 x D | 0.9 x L | 500-700 | 0.10 | 0.12 | 0.16 | 0.20 |
| |  | ≤ 0.1 x D | ≤ 0.9 x $L^2$ | 800-1000 | 0.162 | 0.20 | 0.27 | 0.342 |

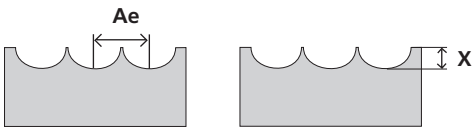
| Series | | Type of cut | | Vc | Diameter - mm | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | ø 3.0 | ø 4.0 | ø 5.0 | ø 6.0 | ø 8.0 |
| | | Ae | Ap | M/Min | fz | fz | fz | fz | fz |
| 137V N5 / 137VR N5 |  | ≤ 1 x D Max | ≤ 0.2 x D | 300-500 | 0.02 | 0.03 | 0.04 | 0.05 | 0.07 |
| |  | 0.1 - 0.2 x D | ≤ 1 x D Max | 300-500 | 0.03 | 0.06 | 0.08 | 0.10 | 0.14 |

| Series | | Type of cut | | Vc | Diameter - mm | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | ø 10.0 | ø 12.0 | ø 16.0 | ø 20.0 |
| | | Ae | Ap | M/Min | fz | fz | fz | fz |
| 137V N5 / 137VR N5 |  | ≤ 1 x D Max | ≤ 0.2 x D | 300-500 | 0.09 | 0.11 | 0.13 | 0.15 |
| |  | 0.1 - 0.2 x D | ≤ 1 x D Max | 300-500 | 0.16 | 0.18 | 0.2 | 0.23 |

## Profile Height-X (µm) / Surface finish

Profondeur de passe-X (µm) / Finition | Profilhöhe-X (µm)/Oberflächenausführung
Altezza del profilo X (µm) / Finitura superficiale | Wysokość profilu-X (µm) / Wykończenie powierzchni

| Ae mm | Diameter - mm | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 4 | 6 | 8 | 10 | 12 | 16 |
| 0.06 | 0.9 | 0.45 | 0.23 | 0.15 | 0.11 | 0.09 | 0.08 | 0.06 |
| 0.08 | 1.6 | 0.8 | 0.4 | 0.27 | 0.2 | 0.16 | 0.13 | 0.1 |
| 0.11 | 3 | 1.5 | 0.76 | 0.5 | 0.38 | 0.3 | 0.25 | 0.19 |
| 0.15 | 5.7 | 2.8 | 1.4 | 0.94 | 0.7 | 0.56 | 0.47 | 0.35 |
| 0.2 | 10 | 5 | 2.5 | 1.7 | 1.3 | 1 | 0.83 | 0.63 |
| 0.3 | 23 | 11 | 5.6 | 3.8 | 2.8 | 2.3 | 1.9 | 1.41 |
| 0.45 | 53 | 26 | 13 | 8.4 | 6.3 | 5.1 | 4.2 | 3.16 |



M.A. Ford Europe

Custom Tools Division

# Now your end mills have done their job, why not let us re-manufacture them to our OE standard so they can do it all over again?

When you select end mills from M.A.Ford® Europe, you're not only choosing precision, performance and enhanced productivity, but also the ability to get extended use by having your pre-used end mills re-manufactured to our original OE specifications at a fraction of the cost of purchasing a new tool.

**"Maintenant que vos fraises ont fait leur travail, pourquoi ne nous laissez-vous pas les re-conditionner à nos normes standard de fabrication (OE), afin qu'elles puissent de nouveau accomplir leur tâche?**

Lorsque vous choisissez des fraises M.A.Ford® Europe, vous ne choisissez pas seulement la précision, la performance ou une productivité accrue, mais également la possibilité d'étendre leur utilisation en re-conditionnant à neuf vos fraises usagées, avec leurs spécificités initiales, à un coût moindre que si vous aviez dû acheter à neuf."

**Ora che le frese hanno fatto il loro lavoro, perché non ce le fai ripristinare secondo le nostre specifiche di produzione originali, perché possano ricominciare da capo?**

Quando scegli le frese di M.A.Ford® Europe, non scegli solo la precisione, le prestazioni e la maggiore produttività, ma anche la possibilità di un utilizzo prolungato grazie al servizio di ripristino degli utensili usurati secondo le nostre specifiche originali, ad una frazione del costo di un utensile nuovo.

**Was geschieht mit Ihren Schaftfräsern, die alle ihre Aufgaben erfüllt und das Ende ihrer betrieblichen Nutzungsdauer erreicht haben? Warum überlassen Sie uns diese Werkzeuge nicht einfach zur Wiederverwertung in der Neufertigung gemäß unseren OE-Normen, sodass sie erneut eingesetzt werden können?**

Wenn Ihre Auswahl auf Schaftfräser von M.A. Ford Europe fällt, dann entscheiden Sie sich nicht nur für Präzision, Leistungsstärke und verbesserte Produktivität, sondern auch für die Möglichkeit, Ihre gebrauchten Schaftfräser gemäß unseren OE-Originalvorgaben neu fertigen zu lassen und dafür nur einen Bruchteil der Kosten zu tragen, die Sie für den Kauf eines neuen Werkzeugs aufwenden müssten.

Kiedy Twoje frezy wykonały swoją pracę, pozwól nam zregenerować narzędzie zgodnie z naszymi standardami, aby znów mogły wykonać swoją prace. Wybierając frezy M.A.Ford® Europe stawiasz na precyzję i wydajność

Gwarantujemy również zwiększoną produktywność, możliwość długiego użytkowania dzięki zastosowaniu narzędzi wyprodukowanych ponownie, jedynie za część ceny nowego narzędzia.

**Full regrind and re-coat service available**



For further information please contact:

**Tel: +44 (0)1332 267 960**



M.A. FORDMAX RANGE

# TuffCut®

## Carbide End Mills

Fraises carbure en bout | Hartmetall-Schaftfräser
Frese in Metallo Duro Integrale
Frezy palcowe pełnowęglikowe



For the efficient general purpose milling of all steels, cast irons and most other materials, including aluminium and softer alloys, our FordMax range provides a complete family of standard carbide end mills designed for batch production on applications where absolute performance is not essential.

FR

"Pour l'efficacité des fraises à usage général dans les aciers, fontes et la plupart des autres matériaux, y compris l'aluminium et les alliages légers, notre gamme FordMax vous propose un éventail complet de fraises carbure standard conçues pour la production en petite série, pour des utilisations où la performance absolue n'est pas nécessaire."

DE

Zum effizienten Ausführen von Universalfräsarbeiten bei allen Stahlarten, Gusseisen und vielen anderen Materialien, einschließlich Aluminium und weicheren Legierungen, stellt unser FordMax-Sortiment eine vollständige Produktfamilie von standardmäßigen Hartmetall-Schaftfräsern zur Verfügung. Diese ist zur Serienfertigung für Anwendungen ausgelegt sind, bei denen eine unschlagbare Leistung nicht unbedingt erforderlich ist.

IT

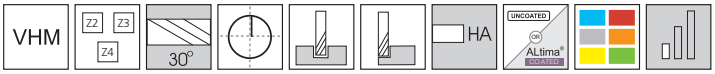
Nel programma FordMax è disponibile una famiglia di utensili in metallo duro per uso generico, idonei alla fresatura di tutti gli acciai, ghise, e della maggior parte dei materiali, compresi l'alluminio e le leghe leggere. Efficienti per lotti di produzione o applicazioni dove non sono necessarie le altissime prestazioni.

PL

W celu sprawnego ogólnego frezowania metali, żeliwa i większości materiałów. FordMax to kompletna gama standardowych frezów palcowych pełnowęglikowych zaprojektowanych do produkcji seryjnej w zastosowaniach, gdzie absolutna wydajność nie jest konieczna.


| | Page |
|---|---|
| **TuffCut® GP Endmills** Series 164, 169, 163 | 82 |
| **TuffCut® GP Endmills** Series 166, 165 | 83 |
| **TuffCut® GP Endmills** Series 192 | 84 |
| **TuffCut® GP Endmills** Series 121, 116, 111 | 84-85 |
| **TuffCut® GP Endmills** Series 150, 140 | 86 |
| **TuffCut® GP Endmills** Series VCM60, VCM90, ACR | 87 |
| **TuffCut® GP Endmills** Series MV4 with Corner Chamfer or Corner Radius | 88-90 |
| **TuffCut® GP Endmills** Series ASV4ACM | 91 |
| **TuffCut® GP Endmills** Series ASV4ACM-R | 92 |
| **TuffCut® GP Endmills** Series VMH | 93 |
| **TuffCut® GP Endmills** Series VMH-W, V4L | 94 |
| **TuffCut® GP Endmills** Series ASV4ACB, V4LB | 95 |
| **TuffCut® GP Endmills** Series GT2, GT3, ASVSM | 96 |
| **TuffCut® GP Endmills** Series GT2R, GT3R | 97 |
| **TuffCut® GP Endmills** Series GT2B, GT3B | 98 |
| **TuffCut® GP Endmills** Series 134 | 98 |
| **Technical Information** | 99-106 |

# TuffCut® GP Series 164, 169, 163

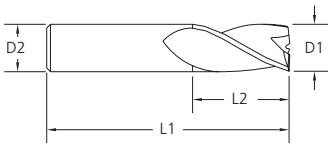




Z2


Z3

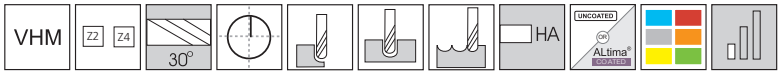

Z4




| Series 164 | | Series 169 | | Series 163 | | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|---|---|
| Uncoated | Coated | Uncoated | Coated | Uncoated | Coated | | | | |
| Tool No | Tool No | Tool No | Tool No | Tool No | Tool No | Ø D1 | Ø D2 | L1 | L2 |
| 164 0020 | - | - | - | - | - | 0.2 | 3.0 | 38.0 | 0.4 |
| 164 0030 | - | - | - | - | - | 0.3 | 3.0 | 38.0 | 0.6 |
| 164 0040 | - | - | - | - | - | 0.4 | 3.0 | 38.0 | 0.8 |
| 164 0050 | - | - | - | - | - | 0.5 | 3.0 | 38.0 | 1.0 |
| 164 0060 | - | - | - | - | - | 0.6 | 3.0 | 38.0 | 1.2 |
| 164 0070 | - | - | - | - | - | 0.7 | 3.0 | 38.0 | 1.4 |
| 164 0080 | - | - | - | - | - | 0.8 | 3.0 | 38.0 | 1.6 |
| 164 0090 | - | - | - | - | - | 0.9 | 3.0 | 38.0 | 1.8 |
| 164 0100 | - | 169 0100 | - | 163 0100 | - | 1.0 | 3.0 | 38.0 | 2.0 |
| 164 0110 | - | - | - | - | - | 1.1 | 3.0 | 38.0 | 2.2 |
| 164 0120 | - | - | - | - | - | 1.2 | 3.0 | 38.0 | 2.4 |
| 164 0130 | - | - | - | - | - | 1.3 | 3.0 | 38.0 | 2.6 |
| 164 0140 | - | - | - | - | - | 1.4 | 3.0 | 38.0 | 2.8 |
| 164 0150 | - | 169 0150 | - | 163 0150 | 163 0150A | 1.5 | 3.0 | 38.0 | 3.0 |
| 164 0160 | - | - | - | - | - | 1.6 | 3.0 | 38.0 | 3.2 |
| 164 0170 | - | - | - | - | - | 1.7 | 3.0 | 38.0 | 3.4 |
| 164 0180 | - | - | - | - | - | 1.8 | 3.0 | 38.0 | 3.6 |
| 164 0190 | - | - | - | - | - | 1.9 | 3.0 | 38.0 | 3.8 |
| 164 0200 | - | 169 0200 | - | 163 0200 | - | 2.0 | 3.0 | 38.0 | 4.0 |
| 164 0250 | - | 169 0250 | - | 163 0250 | 163 0250A | 2.5 | 3.0 | 38.0 | 5.0 |
| 164 0300 | 164 0300A | 169 0300 | 169 0300A | 163 0300 | 163 0300A | 3.0 | 3.0 | 38.0 | 6.0 |
| 164 0350 | - | 169 0350 | - | 163 0350 | - | 3.5 | 4.0 | 51.0 | 7.0 |
| 164 0400 | 164 0400A | 169 0400 | 169 0400A | 163 0400 | 163 0400A | 4.0 | 4.0 | 51.0 | 8.0 |
| 164 0450 | - | 169 0450 | - | 163 0450 | - | 4.5 | 5.0 | 51.0 | 9.0 |
| 164 0500 | 164 0500A | 169 0500 | 169 0500A | 163 0500 | 163 0500A | 5.0 | 5.0 | 51.0 | 11.0 |
| 164 0550 | - | 169 0550 | - | 163 0550 | - | 5.5 | 6.0 | 51.0 | 12.0 |
| 164 0600 | 164 0600A | 169 0600 | 169 0600A | 163 0600 | 163 0600A | 6.0 | 6.0 | 51.0 | 13.0 |
| 164 0700 | - | 169 0700 | - | 163 0700 | - | 7.0 | 8.0 | 51.0 | 13.0 |
| 164 0800 | 164 0800A | 169 0800 | 169 0800A | 163 0800 | 163 0800A | 8.0 | 8.0 | 51.0 | 13.0 |
| 164 0900 | - | 169 0900 | - | 163 0900 | - | 9.0 | 9.0 | 51.0 | 14.0 |
| 164 1000 | 164 1000A | 169 1000 | 169 1000A | 163 1000 | 163 1000A | 10.0 | 10.0 | 51.0 | 14.0 |
| 164 1100 | - | 169 1100 | - | 163 1100 | - | 11.0 | 11.0 | 64.0 | 16.0 |
| 164 1200 | 164 1200A | 169 1200 | 169 1200A | 163 1200 | 163 1200A | 12.0 | 12.0 | 64.0 | 16.0 |
| 164 1400 | - | 169 1400 | - | 163 1400 | - | 14.0 | 14.0 | 70.0 | 18.0 |
| 164 1600 | 164 1600A | 169 1600 | 169 1600A | 163 1600 | 163 1600A | 16.0 | 16.0 | 76.0 | 20.0 |
| 164 1800 | - | 169 1800 | 169 1800A | 163 1800 | - | 18.0 | 18.0 | 76.0 | 25.0 |
| 164 2000 | 164 2000A | 169 2000 | 169 2000A | 163 2000 | 163 2000A | 20.0 | 20.0 | 76.0 | 25.0 |

P99

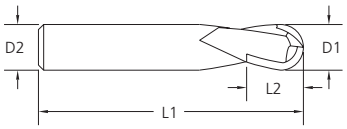
# TuffCut® GP Series 166, 165





Z2

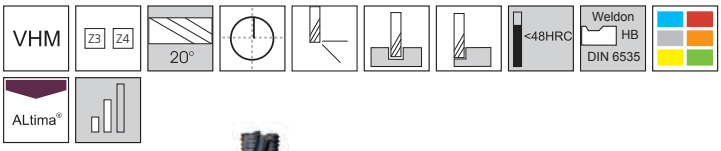

Z4




| Series 166 ..... | | Series 165 ..... | | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|
| Uncoated | Coated | Uncoated | Coated | | | | |
| Tool No | Tool No | Tool No | Tool No | Ø D1 | Ø D2 | L1 | L2 |
| 166 0100 | - | 165 0100 | 165 0100A | 1.0 | 3.0 | 38.0 | 2.0 |
| 166 0150 | - | 165 0150 | - | 1.5 | 3.0 | 38.0 | 3.0 |
| 166 0200 | - | 165 0200 | 165 0200A | 2.0 | 3.0 | 38.0 | 4.0 |
| 166 0250 | - | 165 0250 | 165 0250A | 2.5 | 3.0 | 38.0 | 5.0 |
| 166 0300 | 166 0300A | 165 0300 | 165 0300A | 3.0 | 3.0 | 38.0 | 6.0 |
| 166 0350 | - | 165 0350 | - | 3.5 | 4.0 | 51.0 | 7.0 |
| 166 0400 | 166 0400A | 165 0400 | 165 0400A | 4.0 | 4.0 | 51.0 | 8.0 |
| 166 0450 | - | 165 0450 | - | 4.5 | 5.0 | 51.0 | 9.0 |
| 166 0500 | 166 0500A | 165 0500 | 165 0500A | 5.0 | 5.0 | 51.0 | 11.0 |
| 166 0550 | - | 165 0550 | - | 5.5 | 6.0 | 51.0 | 12.0 |
| 166 0600 | 166 0600A | 165 0600 | 165 0600A | 6.0 | 6.0 | 51.0 | 13.0 |
| 166 0700 | - | 165 0700 | - | 7.0 | 8.0 | 51.0 | 13.0 |
| 166 0800 | 166 0800A | 165 0800 | 165 0800A | 8.0 | 8.0 | 51.0 | 13.0 |
| 166 0900 | - | 165 0900 | - | 9.0 | 9.0 | 51.0 | 14.0 |
| 166 1000 | 166 1000A | 165 1000 | 165 1000A | 10.0 | 10.0 | 51.0 | 14.0 |
| 166 1100 | - | 165 1100 | - | 11.0 | 11.0 | 64.0 | 16.0 |
| 166 1200 | 166 1200A | 165 1200 | 165 1200A | 12.0 | 12.0 | 64.0 | 16.0 |
| 166 1400 | - | 165 1400 | - | 14.0 | 14.0 | 70.0 | 18.0 |
| 166 1600 | 166 1600A | 165 1600 | 165 1600A | 16.0 | 16.0 | 76.0 | 20.0 |
| 166 1800 | - | 165 1800 | - | 18.0 | 18.0 | 76.0 | 25.0 |
| 166 2000 | 166 2000A | 165 2000 | 165 2000A | 20.0 | 20.0 | 76.0 | 25.0 |

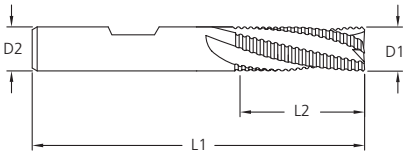
P99

# TuffCut® GP Series 192





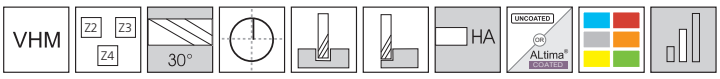

Z3 Z4




| Series 192 | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 192 0800A | 8.0 | 8.0 | 51.0 | 8.0 | 3 |
| 192 0801A | 8.0 | 8.0 | 64.0 | 16.0 | 3 |
| 192 1000A | 10.0 | 10.0 | 51.0 | 10.0 | 4 |
| 192 1001A | 10.0 | 10.0 | 70.0 | 20.0 | 4 |
| 192 1200A | 12.0 | 12.0 | 64.0 | 12.0 | 4 |
| 192 1201A | 12.0 | 12.0 | 76.0 | 25.0 | 4 |
| 192 1600A | 16.0 | 16.0 | 76.0 | 16.0 | 4 |
| 192 1601A | 16.0 | 16.0 | 89.0 | 32.0 | 4 |
| 192 2000A | 20.0 | 20.0 | 76.0 | 20.0 | 4 |
| 192 2001A | 20.0 | 20.0 | 102.0 | 38.0 | 4 |

P101

# TuffCut® GP Series 121, 116, 111





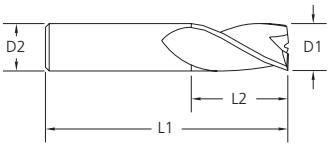

Z2



Z3



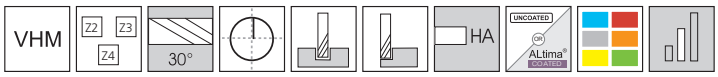
Z4




| Series 121 | | Series 116 | | Series 111 | | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|---|---|
| Uncoated | Coated | Uncoated | Coated | Uncoated | Coated | | | | |
| Tool No. | Tool No. | Tool No. | Tool No. | Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 |
| 121 0020 | - | - | - | 111 0020 | - | 0.2 | 3.0 | 38.0 | 0.6 |
| 121 0030 | - | - | - | 111 0030 | - | 0.3 | 3.0 | 38.0 | 0.9 |
| 121 0040 | - | - | - | 111 0040 | - | 0.4 | 3.0 | 38.0 | 1.2 |
| 121 0050 | 121 0050A | - | - | 111 0050 | - | 0.5 | 3.0 | 38.0 | 1.5 |
| 121 0060 | - | - | - | 111 0060 | - | 0.6 | 3.0 | 38.0 | 1.8 |
| 121 0070 | - | - | - | 111 0070 | - | 0.7 | 3.0 | 38.0 | 2.1 |
| 121 0080 | - | - | - | 111 0080 | - | 0.8 | 3.0 | 38.0 | 2.4 |
| 121 0090 | 121 0090A | - | - | 111 0090 | - | 0.9 | 3.0 | 38.0 | 2.7 |
| 121 0100 | 121 0100A | 116 0100 | 116 0100A | 111 0100 | 111 0100A | 1.0 | 3.0 | 38.0 | 3.0 |

P99

# TuffCut® GP Series 121, 116, 111

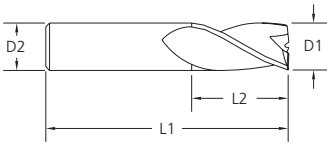




Z2


Z3

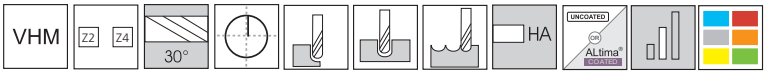

Z4




| Series 121 | | Series 116 | | Series 111 | | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|---|---|
| Uncoated | Coated | Uncoated | Coated | Uncoated | Coated | | | | |
| Tool No. | Tool No. | Tool No. | Tool No. | Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 |
| 121 0110 | 121 0110A | - | - | 111 0110 | - | 1.1 | 3.0 | 38.0 | 3.3 |
| 121 0120 | 121 0120A | - | - | 111 0120 | 111 0120A | 1.2 | 3.0 | 38.0 | 3.6 |
| 121 0130 | 121 0130A | - | - | 111 0130 | - | 1.3 | 3.0 | 38.0 | 3.9 |
| 121 0140 | 121 0140A | - | - | 111 0140 | - | 1.4 | 3.0 | 38.0 | 4.2 |
| 121 0150-1 | - | - | - | 111 0150-1 | - | 1.5 | 3.0 | 38.0 | 4.5 |
| 121 0150 | 121 0150A | 116 0150 | 116 0150A | 111 0150 | 111 0150A | 1.5 | 3.0 | 38.0 | 6.0 |
| 121 0160 | 121 0160A | - | - | 111 0160 | - | 1.6 | 3.0 | 38.0 | 4.8 |
| 121 0170 | - | - | - | 111 0170 | - | 1.7 | 3.0 | 38.0 | 5.1 |
| 121 0180 | - | - | - | 111 0180 | - | 1.8 | 3.0 | 38.0 | 5.4 |
| 121 0190 | - | - | - | 111 0190 | - | 1.9 | 3.0 | 38.0 | 5.7 |
| 121 0200-1 | 121 0200-1A | - | - | 111 0200-1 | - | 2.0 | 3.0 | 38.0 | 6.0 |
| 121 0200 | 121 0200A | 116 0200 | 116 0200A | 111 0200 | 111 0200A | 2.0 | 3.0 | 38.0 | 9.0 |
| 121 0250 | 121 0250A | 116 0250 | 116 0250A | 111 0250 | 111 0250A | 2.5 | 3.0 | 38.0 | 12.0 |
| 121 0300 | 121 0300A | 116 0300 | 116 0300A | 111 0300 | 111 0300A | 3.0 | 3.0 | 38.0 | 12.0 |
| 121 0350 | 121 0350A | 116 0350 | 116 0350A | 111 0350 | 111 0350A | 3.5 | 4.0 | 51.0 | 12.0 |
| 121 0400 | 121 0400A | 116 0400 | 116 0400A | 111 0400 | 111 0400A | 4.0 | 4.0 | 51.0 | 14.0 |
| 121 0450 | 121 0450A | 116 0450 | - | 111 0450 | 111 0450A | 4.5 | 5.0 | 51.0 | 14.0 |
| 121 0500 | 121 0500A | 116 0500 | 116 0500A | 111 0500 | 111 0500A | 5.0 | 5.0 | 51.0 | 20.0 |
| 121 0550 | - | 116 0550 | - | 111 0550 | 111 0550A | 5.5 | 6.0 | 64.0 | 20.0 |
| 121 0600 | 121 0600A | 116 0600 | 116 0600A | 111 0600 | 111 0600A | 6.0 | 6.0 | 64.0 | 20.0 |
| 121 0700 | 121 0700A | 116 0700 | - | 111 0700 | 111 0700A | 7.0 | 8.0 | 64.0 | 20.0 |
| 121 0800 | 121 0800A | 116 0800 | 116 0800A | 111 0800 | 111 0800A | 8.0 | 8.0 | 64.0 | 20.0 |
| 121 0900 | 121 0900A | 116 0900 | - | 111 0900 | 111 0900A | 9.0 | 9.0 | 64.0 | 20.0 |
| 121 1000 | 121 1000A | 116 1000 | 116 1000A | 111 1000 | 111 1000A | 10.0 | 10.0 | 70.0 | 25.0 |
| 121 1100 | 121 1100A | 116 1100 | - | 111 1100 | - | 11.0 | 11.0 | 70.0 | 25.0 |
| 121 1200 | 121 1200A | 116 1200 | 116 1200A | 111 1200 | 111 1200A | 12.0 | 12.0 | 76.0 | 25.0 |
| 121 1400 | 121 1400A | 116 1400 | - | 111 1400 | 111 1400A | 14.0 | 14.0 | 89.0 | 30.0 |
| 121 1600 | 121 1600A | 116 1600 | 116 1600A | 111 1600 | 111 1600A | 16.0 | 16.0 | 89.0 | 30.0 |
| 121 1800 | 121 1800A | 116 1800 | - | 111 1800 | 111 1800A | 18.0 | 18.0 | 102.0 | 35.0 |
| 121 2000 | 121 2000A | 116 2000 | 116 2000A | 111 2000 | 111 2000A | 20.0 | 20.0 | 102.0 | 38.0 |
| 121 2200 | - | 116 2200 | - | 111 2200 | - | 22.0 | 22.0 | 102.0 | 40.0 |
| 121 2500 | 121 2500A | 116 2500 | 116 2500A | 111 2500 | 111 2500A | 25.0 | 25.0 | 102.0 | 40.0 |

P99

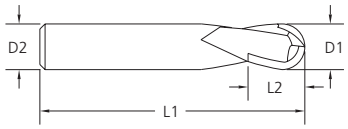
# TuffCut® GP Series 150,140







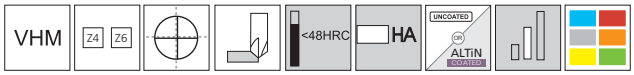


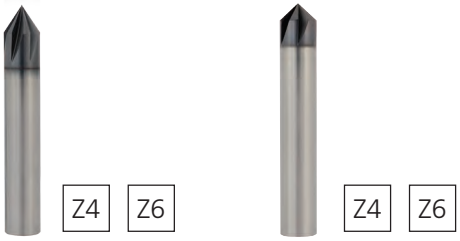



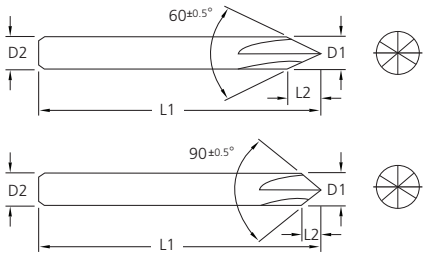

| Series 150 | | Series 140 | | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|
| Uncoated | Coated | Uncoated | Coated | | | | |
| Tool No. | Tool No. | Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 |
| 150 0040 | - | - | - | 0.4 | 3.0 | 38.0 | 1.2 |
| 150 0050 | - | - | - | 0.5 | 3.0 | 38.0 | 1.5 |
| 150 0060 | - | - | - | 0.6 | 3.0 | 38.0 | 1.8 |
| 150 0070 | - | - | - | 0.7 | 3.0 | 38.0 | 2.1 |
| 150 0080 | - | - | - | 0.8 | 3.0 | 38.0 | 2.4 |
| 150 0090 | - | - | - | 0.9 | 3.0 | 38.0 | 2.7 |
| 150 0100 | 150 0100A | 140 0100 | 140 0100A | 1.0 | 3.0 | 38.0 | 3.0 |
| 150 0110 | - | - | - | 1.1 | 3.0 | 38.0 | 3.3 |
| 150 0120 | - | - | - | 1.2 | 3.0 | 38.0 | 3.6 |
| 150 0130 | - | - | - | 1.3 | 3.0 | 38.0 | 3.9 |
| 150 0140 | - | - | - | 1.4 | 3.0 | 38.0 | 4.2 |
| 150 0150-1 | - | - | - | 1.5 | 3.0 | 38.0 | 4.5 |
| 150 0150 | 150 0150A | 140 0150 | 140 0150A | 1.5 | 3.0 | 38.0 | 6.0 |
| 150 0160 | - | - | - | 1.6 | 3.0 | 38.0 | 4.8 |
| 150 0170 | - | - | - | 1.7 | 3.0 | 38.0 | 5.1 |
| 150 0180 | - | - | - | 1.8 | 3.0 | 38.0 | 5.4 |
| 150 0190 | - | - | - | 1.9 | 3.0 | 38.0 | 5.7 |
| 150 0200-1 | - | - | - | 2.0 | 3.0 | 38.0 | 6.0 |
| 150 0200 | 150 0200A | 140 0200 | 140 0200A | 2.0 | 3.0 | 38.0 | 9.0 |
| 150 0250 | 150 0250A | 140 0250 | 140 0250A | 2.5 | 3.0 | 38.0 | 12.0 |
| 150 0300 | 150 0300A | 140 0300 | 140 0300A | 3.0 | 3.0 | 38.0 | 12.0 |
| 150 0350 | 150 0350A | 140 0350 | 140 0350A | 3.5 | 4.0 | 51.0 | 12.0 |
| 150 0400 | 150 0400A | 140 0400 | 140 0400A | 4.0 | 4.0 | 51.0 | 14.0 |
| 150 0450 | 150 0450A | 140 0450 | - | 4.5 | 5.0 | 51.0 | 14.0 |
| 150 0500 | 150 0500A | 140 0500 | 140 0500A | 5.0 | 5.0 | 51.0 | 20.0 |
| 150 0550 | - | 140 0550 | - | 5.5 | 6.0 | 64.0 | 20.0 |
| 150 0600 | 150 0600A | 140 0600 | 140 0600A | 6.0 | 6.0 | 64.0 | 20.0 |
| 150 0700 | 150 0700A | 140 0700 | - | 7.0 | 8.0 | 64.0 | 20.0 |
| 150 0800 | 150 0800A | 140 0800 | 140 0800A | 8.0 | 8.0 | 64.0 | 20.0 |
| 150 0900 | - | 140 0900 | - | 9.0 | 9.0 | 64.0 | 20.0 |
| 150 1000 | 150 1000A | 140 1000 | 140 1000A | 10.0 | 10.0 | 70.0 | 25.0 |
| 150 1100 | - | 140 1100 | - | 11.0 | 11.0 | 70.0 | 25.0 |
| 150 1200 | 150 1200A | 140 1200 | 140 1200A | 12.0 | 12.0 | 76.0 | 25.0 |
| 150 1400 | - | 140 1400 | - | 14.0 | 14.0 | 89.0 | 30.0 |
| 150 1600 | 150 1600A | 140 1600 | 140 1600A | 16.0 | 16.0 | 89.0 | 30.0 |
| 150 1800 | - | 140 1800 | - | 18.0 | 18.0 | 102.0 | 35.0 |
| 150 2000 | 150 2000A | 140 2000 | 140 2000A | 20.0 | 20.0 | 102.0 | 38.0 |
| 150 2200 | - | 140 2200 | - | 22.0 | 22.0 | 102.0 | 40.0 |
| 150 2500 | 150 2500A | 140 2500 | 140 2500A | 25.0 | 25.0 | 102.0 | 40.0 |

P99

# TuffCut® GP Chamfer Mills Series VCM60, VCM90

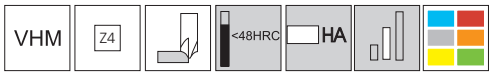


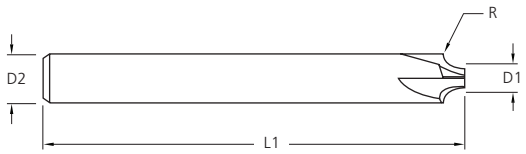

| Series VCM60 | | Series VCM90 | | Tool Dimensions | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Uncoated | Coated | Uncoated | Coated | Ø D1 | Ø D2 | Angle | L1 | L2 | Z |
| VCM60 0400 | VCM60 0400A | - | - | 4.0 | 4.0 | 60° | 51.0 | 3.3 | 4 |
| - | - | VCM90 0400 | VCM90 0400A | 4.0 | 4.0 | 90° | 51.0 | 1.8 | 4 |
| VCM60 0600 | VCM60 0600A | - | - | 6.0 | 6.0 | 60° | 64.0 | 5.0 | 4 |
| - | - | VCM90 0600 | VCM90 0600A | 6.0 | 6.0 | 90° | 64.0 | 2.8 | 4 |
| VCM60 0800 | VCM60 0800A | - | - | 8.0 | 8.0 | 60° | 64.0 | 6.8 | 4 |
| - | - | VCM90 0800 | VCM90 0800A | 8.0 | 8.0 | 90° | 64.0 | 3.8 | 4 |
| VCM60 1000 | VCM60 1000A | - | - | 10.0 | 10.0 | 60° | 73.0 | 8.5 | 6 |
| - | - | VCM90 1000 | VCM90 1000A | 10.0 | 10.0 | 90° | 73.0 | 4.8 | 6 |
| VCM60 1200 | VCM60 1200A | - | - | 12.0 | 12.0 | 60° | 84.0 | 10.0 | 6 |
| - | - | VCM90 1200 | VCM90 1200A | 12.0 | 12.0 | 90° | 84.0 | 5.8 | 6 |
| VCM60 1600 | VCM60 1600A | - | - | 16.0 | 16.0 | 60° | 93.0 | 13.5 | 6 |
| - | - | VCM90 1600 | VCM90 1600A | 16.0 | 16.0 | 90° | 93.0 | 7.8 | 6 |

# TuffCut® GP Corner Rounding Series ACR



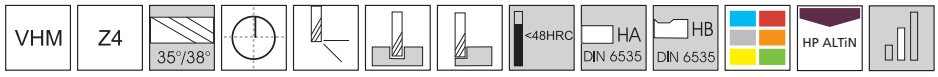






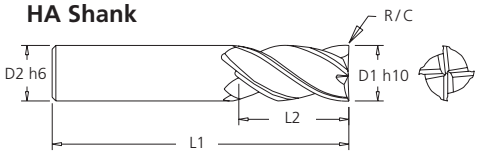

| Series ACR | Tool Dimensions | | | |
|---|---|---|---|---|
| Tool No. | Ø D1 | D2 | L1 | R |
| ACR0300-0.25R | 2.3 / 2.4 | 3.0 | 51.0 | 0.25 |
| ACR0400-0.5R | 2.8 / 2.9 | 4.0 | 51.0 | 0.5 |
| ACR0500-0.75R | 3.3 / 3.4 | 5.0 | 57.0 | 0.75 |
| ACR0500-1.0R | 2.7 / 2.9 | 5.0 | 57.0 | 1.0 |
| ACR0600-1.5R | 2.7 / 2.9 | 6.0 | 64.0 | 1.5 |
| ACR0600-2.0R | 1.7 / 1.9 | 6.0 | 64.0 | 2.0 |
| ACR0800-2.0R | 3.7 / 3.9 | 8.0 | 64.0 | 2.0 |
| ACR1000-3.0R | 3.7 / 3.9 | 10.0 | 73.0 | 3.0 |
| ACR1200-4.0R | 3.7 / 3.9 | 12.0 | 84.0 | 4.0 |
| ACR1600-5.0R | 5.7 / 5.9 | 16.0 | 93.0 | 5.0 |
| ACR1600-6.0R | 3.7 / 3.9 | 16.0 | 93.0 | 6.0 |

# TuffCut® GP Series MV4 with Corner Chamfer or Corner Radius

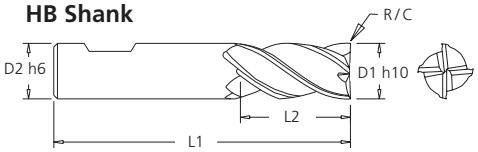





**HA Shank**




**HB Shank**



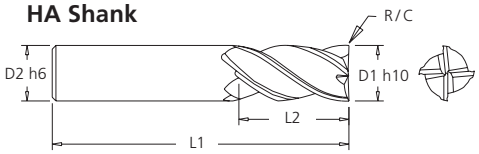

| Series MV4 | Tool Dimensions | | | | | | |
|---|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | R | C x 45° | Shank |
| MV4 0303HX | 3.0 | 3.0 | 50.0 | 6.0 | - | 0.1 | HA |
| MV4 0303-0.25RHX | 3.0 | 3.0 | 50.0 | 6.0 | 0.25 | - | HA |
| MV4 0303-12HX | 3.0 | 3.0 | 50.0 | 12.0 | - | 0.1 | HA |
| MV4 0303-12-0.25RHX | 3.0 | 3.0 | 50.0 | 12.0 | 0.25 | - | HA |
| MV4 03HX | 3.0 | 6.0 | 64.0 | 6.0 | - | 0.1 | HA |
| MV4 03-0.25RHX | 3.0 | 6.0 | 64.0 | 6.0 | 0.25 | - | HA |
| MV4 04HX | 4.0 | 6.0 | 64.0 | 11.0 | - | 0.1 | HA |
| MV4 04-0.25RHX | 4.0 | 6.0 | 64.0 | 11.0 | 0.25 | - | HA |
| MV4 04-0.5RHX | 4.0 | 6.0 | 64.0 | 11.0 | 0.5 | - | HA |
| MV4 04-1.0RHX | 4.0 | 6.0 | 64.0 | 11.0 | 1.0 | - | HA |
| MV4 05HX | 5.0 | 6.0 | 64.0 | 12.0 | - | 0.1 | HA |
| MV4 05-0.25RHX | 5.0 | 6.0 | 64.0 | 12.0 | 0.25 | - | HA |
| MV4 05-0.5RHX | 5.0 | 6.0 | 64.0 | 12.0 | 0.5 | - | HA |
| MV4 05-1.0RHX | 5.0 | 6.0 | 64.0 | 12.0 | 1.0 | - | HA |
| MV4 05-15HX | 5.0 | 6.0 | 64.0 | 15.0 | - | 0.1 | HA |
| MV4 05-15-0.5RHX | 5.0 | 6.0 | 64.0 | 15.0 | 0.5 | - | HA |
| MV4 06HX | 6.0 | 6.0 | 64.0 | 15.0 | - | 0.1 | HA |
| MV4 06HXW | 6.0 | 6.0 | 64.0 | 15.0 | - | 0.1 | HB |
| MV4 06-0.25RHX | 6.0 | 6.0 | 64.0 | 15.0 | 0.25 | - | HA |
| MV4 06-0.25RHXW | 6.0 | 6.0 | 64.0 | 15.0 | 0.25 | - | HB |
| MV4 06-0.5RHX | 6.0 | 6.0 | 64.0 | 15.0 | 0.5 | - | HA |
| MV4 06-0.5RHXW | 6.0 | 6.0 | 64.0 | 15.0 | 0.5 | - | HB |
| MV4 06-1.0RHX | 6.0 | 6.0 | 64.0 | 15.0 | 1.0 | - | HA |
| MV4 06-1.0RHXW | 6.0 | 6.0 | 64.0 | 15.0 | 1.0 | - | HB |
| MV4 06-19HX | 6.0 | 6.0 | 64.0 | 19.0 | - | 0.1 | HA |
| MV4 06-19-0.25RHX | 6.0 | 6.0 | 64.0 | 19.0 | 0.25 | - | HA |
| MV4 06-19-0.5RHX | 6.0 | 6.0 | 64.0 | 19.0 | 0.5 | - | HA |
| MV4 06-19-1.0RHX | 6.0 | 6.0 | 64.0 | 19.0 | 1.0 | - | HA |
| MV4 08HX | 8.0 | 8.0 | 64.0 | 22.0 | - | 0.15 | HA |
| MV4 08HXW | 8.0 | 8.0 | 64.0 | 22.0 | - | 0.15 | HB |
| MV4 08-0.25RHX | 8.0 | 8.0 | 64.0 | 22.0 | 0.25 | - | HA |
| MV4 08-0.25RHXW | 8.0 | 8.0 | 64.0 | 22.0 | 0.25 | - | HB |
| MV4 08-0.5RHX | 8.0 | 8.0 | 64.0 | 22.0 | 0.5 | - | HA |
| MV4 08-0.5RHXW | 8.0 | 8.0 | 64.0 | 22.0 | 0.5 | - | HB |
| MV4 08-1.0RHX | 8.0 | 8.0 | 64.0 | 22.0 | 1.0 | - | HA |
| MV4 08-1.0RHXW | 8.0 | 8.0 | 64.0 | 22.0 | 1.0 | - | HB |
| MV4 08-1.5RHX | 8.0 | 8.0 | 64.0 | 22.0 | 1.5 | - | HA |
| MV4 08-1.5RHXW | 8.0 | 8.0 | 64.0 | 22.0 | 1.5 | - | HB |
| MV4 08-2.0RHX | 8.0 | 8.0 | 64.0 | 22.0 | 2.0 | - | HA |
| MV4 08-2.0RHXW | 8.0 | 8.0 | 64.0 | 22.0 | 2.0 | - | HB |
| MV4 10HX | 10.0 | 10.0 | 73.0 | 22.0 | - | 0.15 | HA |
| MV4 10HXW | 10.0 | 10.0 | 73.0 | 22.0 | - | 0.15 | HB |

# TuffCut® GP Series MV4 with Corner Chamfer or Corner Radius

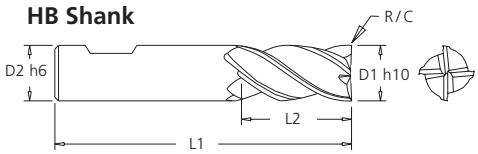





**HA Shank**

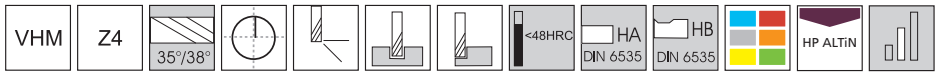



**HB Shank**



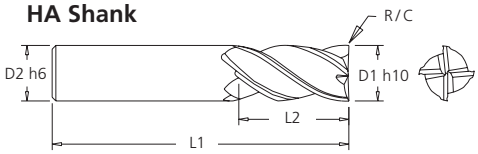

| Series MV4 | Tool Dimensions | | | | | | |
|---|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | R | C x 45° | Shank |
| MV4 10-0.5RHX | 10.0 | 10.0 | 73.0 | 22.0 | 0.5 | - | HA |
| MV4 10-0.5RHXW | 10.0 | 10.0 | 73.0 | 22.0 | 0.5 | - | HB |
| MV4 10-1.0RHX | 10.0 | 10.0 | 73.0 | 22.0 | 1.0 | - | HA |
| MV4 10-1.0RHXW | 10.0 | 10.0 | 73.0 | 22.0 | 1.0 | - | HB |
| MV4 10-1.5RHX | 10.0 | 10.0 | 73.0 | 22.0 | 1.5 | - | HA |
| MV4 10-1.5RHXW | 10.0 | 10.0 | 73.0 | 22.0 | 1.5 | - | HB |
| MV4 10-2.0RHX | 10.0 | 10.0 | 73.0 | 22.0 | 2.0 | - | HA |
| MV4 10-2.0RHXW | 10.0 | 10.0 | 73.0 | 22.0 | 2.0 | - | HB |
| MV4 10-2.5RHX | 10.0 | 10.0 | 73.0 | 22.0 | 2.5 | - | HA |
| MV4 10-2.5RHXW | 10.0 | 10.0 | 73.0 | 22.0 | 2.5 | - | HB |
| MV4 10-3.0RHX | 10.0 | 10.0 | 73.0 | 22.0 | 3.0 | - | HA |
| MV4 10-3.0RHXW | 10.0 | 10.0 | 73.0 | 22.0 | 3.0 | - | HB |
| MV4 12HX | 12.0 | 12.0 | 73.0 | 27.0 | - | 0.15 | HA |
| MV4 12HXW | 12.0 | 12.0 | 83.0 | 27.0 | - | 0.15 | HB |
| MV4 12-0.5RHX | 12.0 | 12.0 | 73.0 | 27.0 | 0.5 | - | HA |
| MV4 12-0.5RHXW | 12.0 | 12.0 | 83.0 | 27.0 | 0.5 | - | HB |
| MV4 12-1.0RHX | 12.0 | 12.0 | 73.0 | 27.0 | 1.0 | - | HA |
| MV4 12-1.0RHXW | 12.0 | 12.0 | 83.0 | 27.0 | 1.0 | - | HB |
| MV4 12-1.5RHX | 12.0 | 12.0 | 73.0 | 27.0 | 1.5 | - | HA |
| MV4 12-1.5RHXW | 12.0 | 12.0 | 83.0 | 27.0 | 1.5 | - | HB |
| MV4 12-2.0RHX | 12.0 | 12.0 | 73.0 | 27.0 | 2.0 | - | HA |
| MV4 12-2.0RHXW | 12.0 | 12.0 | 83.0 | 27.0 | 2.0 | - | HB |
| MV4 12-2.5RHX | 12.0 | 12.0 | 73.0 | 27.0 | 2.5 | - | HA |
| MV4 12-2.5RHXW | 12.0 | 12.0 | 83.0 | 27.0 | 2.5 | - | HB |
| MV4 12-3.0RHX | 12.0 | 12.0 | 73.0 | 27.0 | 3.0 | - | HA |
| MV4 12-3.0RHXW | 12.0 | 12.0 | 83.0 | 27.0 | 3.0 | - | HB |
| MV4 12-32HX | 12.0 | 12.0 | 73.0 | 32.0 | - | 0.15 | HA |
| MV4 12-32-1.0RHX | 12.0 | 12.0 | 73.0 | 32.0 | 1.0 | - | HA |
| MV4 16HX | 16.0 | 16.0 | 92.0 | 33.0 | - | 0.3 | HA |
| MV4 16HXW | 16.0 | 16.0 | 92.0 | 33.0 | - | 0.3 | HB |
| MV4 16-0.5RHX | 16.0 | 16.0 | 92.0 | 33.0 | 0.5 | - | HA |
| MV4 16-0.5RHXW | 16.0 | 16.0 | 92.0 | 33.0 | 0.5 | - | HB |
| MV4 16-1.0RHX | 16.0 | 16.0 | 92.0 | 33.0 | 1.0 | - | HA |
| MV4 16-1.0RHXW | 16.0 | 16.0 | 92.0 | 33.0 | 1.0 | - | HB |
| MV4 16-1.5RHX | 16.0 | 16.0 | 92.0 | 33.0 | 1.5 | - | HA |
| MV4 16-1.5RHXW | 16.0 | 16.0 | 92.0 | 33.0 | 1.5 | - | HB |
| MV4 16-2.0RHX | 16.0 | 16.0 | 92.0 | 33.0 | 2.0 | - | HA |
| MV4 16-2.0RHXW | 16.0 | 16.0 | 92.0 | 33.0 | 2.0 | - | HB |
| MV4 16-2.5RHX | 16.0 | 16.0 | 92.0 | 33.0 | 2.5 | - | HA |
| MV4 16-2.5RHXW | 16.0 | 16.0 | 92.0 | 33.0 | 2.5 | - | HB |
| MV4 16-3.0RHX | 16.0 | 16.0 | 92.0 | 33.0 | 3.0 | - | HA |
| MV4 16-3.0RHXW | 16.0 | 16.0 | 92.0 | 33.0 | 3.0 | - | HB |

# TuffCut® GP Series MV4 with Corner Chamfer or Corner Radius

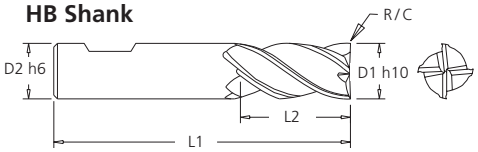





**HA Shank**



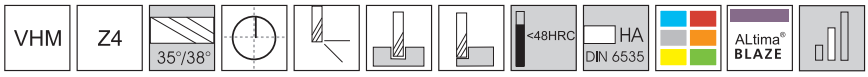

**HB Shank**



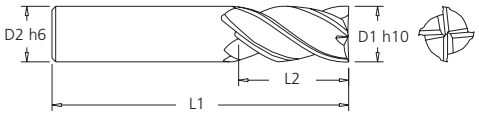

| Series MV4 | Tool Dimensions | | | | | | |
|---|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | R | C x 45° | Shank |
| MV4 20HX | 20.0 | 20.0 | 104.0 | 40.0 | - | 0.3 | HA |
| MV4 20HXW | 20.0 | 20.0 | 104.0 | 40.0 | - | 0.3 | HB |
| MV4 20-1.0RHX | 20.0 | 20.0 | 104.0 | 40.0 | 1.0 | - | HA |
| MV4 20-1.0RHXW | 20.0 | 20.0 | 104.0 | 40.0 | 1.0 | - | HB |
| MV4 20-1.5RHX | 20.0 | 20.0 | 104.0 | 40.0 | 1.5 | - | HA |
| MV4 20-1.5RHXW | 20.0 | 20.0 | 104.0 | 40.0 | 1.5 | - | HB |
| MV4 20-2.0RHX | 20.0 | 20.0 | 104.0 | 40.0 | 2.0 | - | HA |
| MV4 20-2.0RHXW | 20.0 | 20.0 | 104.0 | 40.0 | 2.0 | - | HB |
| MV4 20-3.0RHX | 20.0 | 20.0 | 104.0 | 40.0 | 3.0 | - | HA |
| MV4 20-3.0RHXW | 20.0 | 20.0 | 104.0 | 40.0 | 3.0 | - | HB |
| MV4 20-4.0RHX | 20.0 | 20.0 | 104.0 | 40.0 | 4.0 | - | HA |
| MV4 20-4.0RHXW | 20.0 | 20.0 | 104.0 | 40.0 | 4.0 | - | HB |
| MV4 20-5.0RHX | 20.0 | 20.0 | 104.0 | 40.0 | 5.0 | - | HA |
| MV4 20-5.0RHXW | 20.0 | 20.0 | 104.0 | 40.0 | 5.0 | - | HB |
| MV4 20-6.0RHX | 20.0 | 20.0 | 104.0 | 40.0 | 6.0 | - | HA |
| MV4 20-6.0RHXW | 20.0 | 20.0 | 104.0 | 40.0 | 6.0 | - | HB |

P103

# TuffCut® GP Series ASV4ACM





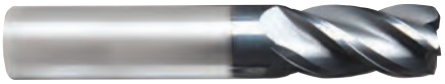

Z4

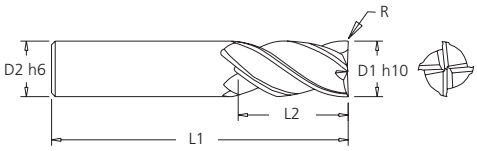
| Series ASV4ACM | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | C x 45° |
| ASV4ACM0300 | 3.0 | 3.0 | 51.0 | 6.0 | 0.1 |
| ASV4ACM0400 | 4.0 | 4.0 | 51.0 | 11.0 | 0.1 |
| ASV4ACM0500 | 5.0 | 5.0 | 57.0 | 12.0 | 0.1 |
| ASV4ACM0600 | 6.0 | 6.0 | 64.0 | 15.0 | 0.1 |
| ASV4ACM0800 | 8.0 | 8.0 | 64.0 | 22.0 | 0.15 |
| ASV4ACM1000 | 10.0 | 10.0 | 72.0 | 22.0 | 0.15 |
| ASV4ACM1200 | 12.0 | 12.0 | 73.0 | 27.0 | 0.15 |
| ASV4ACM1400 | 14.0 | 14.0 | 84.0 | 30.0 | 0.3 |
| ASV4ACM1600 | 16.0 | 16.0 | 92.0 | 33.0 | 0.3 |
| ASV4ACM2000 | 20.0 | 20.0 | 105.0 | 40.0 | 0.3 |

P104

# TuffCut® GP Series ASV4ACM-R

VHM | Z4 | 35°/38° | <48HRC | HA DIN 6535 | ALtima® BLAZE | Corner Radius



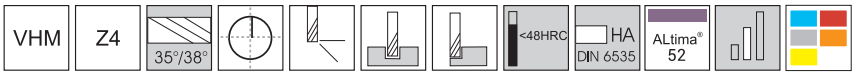



Z4

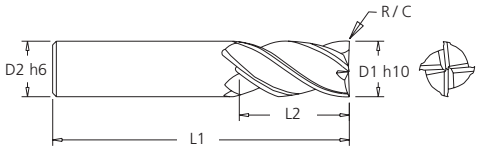
| Series ASV4ACM-R | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | R |
| ASV4ACM0400R0.25 | 4.0 | 4.0 | 51.0 | 11.0 | 0.25 |
| ASV4ACM0400R0.5 | 4.0 | 4.0 | 51.0 | 11.0 | 0.5 |
| ASV4ACM0400R0.75 | 4.0 | 4.0 | 51.0 | 11.0 | 0.75 |
| ASV4ACM0400R1.0 | 4.0 | 4.0 | 51.0 | 11.0 | 1.0 |
| ASV4ACM0500R0.25 | 5.0 | 5.0 | 57.0 | 12.0 | 0.25 |
| ASV4ACM0500R0.5 | 5.0 | 5.0 | 57.0 | 12.0 | 0.5 |
| ASV4ACM0500R1.0 | 5.0 | 5.0 | 57.0 | 12.0 | 1.0 |
| ASV4ACM0600R0.25 | 6.0 | 6.0 | 64.0 | 15.0 | 0.25 |
| ASV4ACM0600R0.5 | 6.0 | 6.0 | 64.0 | 15.0 | 0.5 |
| ASV4ACM0600R1.0 | 6.0 | 6.0 | 64.0 | 15.0 | 1.0 |
| ASV4ACM0800R0.25 | 8.0 | 8.0 | 64.0 | 22.0 | 0.25 |
| ASV4ACM0800R0.5 | 8.0 | 8.0 | 64.0 | 22.0 | 0.5 |
| ASV4ACM0800R1.0 | 8.0 | 8.0 | 64.0 | 22.0 | 1.0 |
| ASV4ACM0800R1.5 | 8.0 | 8.0 | 64.0 | 22.0 | 1.5 |
| ASV4ACM0800R2.0 | 8.0 | 8.0 | 64.0 | 22.0 | 2.0 |
| ASV4ACM1000R0.25 | 10.0 | 10.0 | 72.0 | 22.0 | 0.25 |
| ASV4ACM1000R0.5 | 10.0 | 10.0 | 72.0 | 22.0 | 0.5 |
| ASV4ACM1000R1.0 | 10.0 | 10.0 | 72.0 | 22.0 | 1.0 |
| ASV4ACM1000R1.5 | 10.0 | 10.0 | 72.0 | 22.0 | 1.5 |
| ASV4ACM1000R2.0 | 10.0 | 10.0 | 72.0 | 22.0 | 2.0 |
| ASV4ACM1000R2.5 | 10.0 | 10.0 | 72.0 | 22.0 | 2.5 |
| ASV4ACM1000R3.0 | 10.0 | 10.0 | 72.0 | 22.0 | 3.0 |
| ASV4ACM1200R0.25 | 12.0 | 12.0 | 73.0 | 27.0 | 0.25 |
| ASV4ACM1200R0.5 | 12.0 | 12.0 | 73.0 | 27.0 | 0.5 |
| ASV4ACM1200R1.0 | 12.0 | 12.0 | 73.0 | 27.0 | 1.0 |
| ASV4ACM1200R1.5 | 12.0 | 12.0 | 73.0 | 27.0 | 1.5 |
| ASV4ACM1200R1.75 | 12.0 | 12.0 | 73.0 | 27.0 | 1.75 |
| ASV4ACM1200R2.0 | 12.0 | 12.0 | 73.0 | 27.0 | 2.0 |
| ASV4ACM1200R2.5 | 12.0 | 12.0 | 73.0 | 27.0 | 2.5 |
| ASV4ACM1200R3.0 | 12.0 | 12.0 | 73.0 | 27.0 | 3.0 |
| ASV4ACM1200R4.0 | 12.0 | 12.0 | 73.0 | 27.0 | 4.0 |
| ASV4ACM1400R0.2 | 14.0 | 14.0 | 84.0 | 30.0 | 0.2 |
| ASV4ACM1600R0.5 | 16.0 | 16.0 | 92.0 | 33.0 | 0.5 |
| ASV4ACM1600R1.0 | 16.0 | 16.0 | 92.0 | 33.0 | 1.0 |
| ASV4ACM1600R1.5 | 16.0 | 16.0 | 92.0 | 33.0 | 1.5 |
| ASV4ACM1600R2.0 | 16.0 | 16.0 | 92.0 | 33.0 | 2.0 |
| ASV4ACM1600R2.5 | 16.0 | 16.0 | 92.0 | 33.0 | 2.5 |
| ASV4ACM1600R3.0 | 16.0 | 16.0 | 92.0 | 33.0 | 3.0 |
| ASV4ACM1600R4.0 | 16.0 | 16.0 | 92.0 | 33.0 | 4.0 |

P104

# TuffCut® GP Series VMH



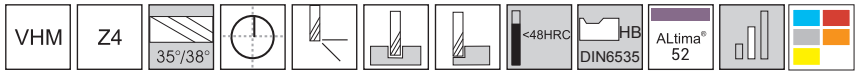


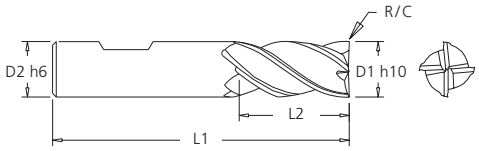

| Series VMH | Tool Dimensions | | | | | |
|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D² | L1 | L2 | R | C x 45° |
| VMH 0300 | 3.0 | 6.0 | 64.0 | 7.5 | - | 0.15 |
| VMH 03-0.3R | 3.0 | 6.0 | 64.0 | 7.5 | 0.3 | - |
| VMH 0400 | 4.0 | 6.0 | 64.0 | 10.0 | - | 0.2 |
| VMH 04-0.3R | 4.0 | 6.0 | 64.0 | 10.0 | 0.3 | - |
| VMH 0500 | 5.0 | 6.0 | 64.0 | 12.5 | - | 0.2 |
| VMH 05-0.3R | 5.0 | 6.0 | 64.0 | 12.5 | 0.3 | - |
| VMH 0600 | 6.0 | 6.0 | 64.0 | 15.0 | - | 0.2 |
| VMH 06-0.3R | 6.0 | 6.0 | 64.0 | 15.0 | 0.3 | - |
| VMH 0800 | 8.0 | 8.0 | 64.0 | 20.0 | - | 0.25 |
| VMH 08-0.5R | 8.0 | 8.0 | 64.0 | 20.0 | 0.5 | - |
| VMH 1000 | 10.0 | 10.0 | 73.0 | 25.0 | - | 0.3 |
| VMH 10-0.5R | 10.0 | 10.0 | 73.0 | 25.0 | 0.5 | - |
| VMH 1200 | 12.0 | 12.0 | 84.0 | 30.0 | - | 0.35 |
| VMH 12-1.0R | 12.0 | 12.0 | 84.0 | 30.0 | 1.0 | - |
| VMH 1600 | 16.0 | 16.0 | 93.0 | 40.0 | - | 0.4 |
| VMH 16-1.0R | 16.0 | 16.0 | 93.0 | 40.0 | 1.0 | - |
| VMH 2000 | 20.0 | 20.0 | 105.0 | 50.0 | - | 0.5 |
| VMH 20-1.0R | 20.0 | 20.0 | 105.0 | 50.0 | 1.0 | - |

P104

# TuffCut® GP Series VMH-W



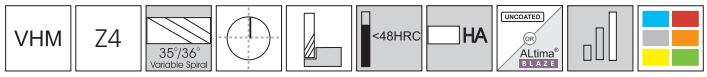


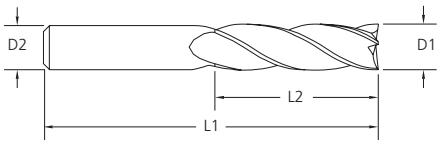

| Series VMH | Tool Dimensions | | | | | |
|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | R | C x 45° |
| VMH 0300-W | 3.0 | 6.0 | 64.0 | 7.5 | - | 0.15 |
| VMH 0400-W | 4.0 | 6.0 | 64.0 | 10.0 | - | 0.2 |
| VMH 0500-W | 5.0 | 6.0 | 64.0 | 12.5 | - | 0.2 |
| VMH 0600-W | 6.0 | 6.0 | 64.0 | 15.0 | - | 0.2 |
| VMH 06-1.0RW | 6.0 | 6.0 | 64.0 | 15.0 | 1.0 | - |
| VMH 0800-W | 8.0 | 8.0 | 64.0 | 20.0 | - | 0.25 |
| VMH 08-1.0RW | 8.0 | 8.0 | 64.0 | 20.0 | 1.0 | - |
| VMH 1000-W | 10.0 | 10.0 | 73.0 | 25.0 | - | 0.3 |
| VMH 10-1.0RW | 10.0 | 10.0 | 73.0 | 25.0 | 1.0 | - |
| VMH 1200-W | 12.0 | 12.0 | 84.0 | 30.0 | - | 0.35 |
| VMH 12-1.0RW | 12.0 | 12.0 | 84.0 | 30.0 | 1.0 | - |
| VMH 1600-W | 16.0 | 16.0 | 93.0 | 40.0 | - | 0.4 |
| VMH 16-1.0RW | 16.0 | 16.0 | 93.0 | 40.0 | 1.0 | - |
| VMH 2000-W | 20.0 | 20.0 | 105.0 | 50.0 | - | 0.5 |
| VMH 20-1.0RW | 20.0 | 20.0 | 105.0 | 50.0 | 1.0 | - |

P104

# TuffCut® GP Series V4L



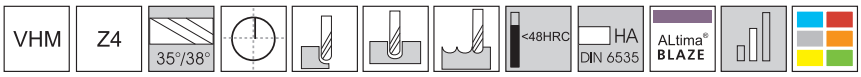


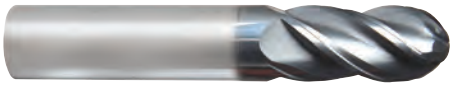



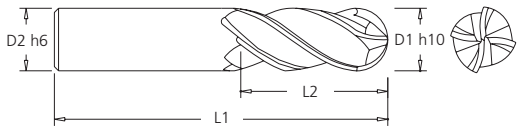

| Series V4L | | Tool Dimensions | | | |
|---|---|---|---|---|---|
| Uncoated | Coated | | | | |
| Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 |
| V4L 0600 | V4L 0600B | 6.0 | 6.0 | 75.0 | 25.0 |
| V4L 0800 | V4L 0800B | 8.0 | 8.0 | 75.0 | 25.0 |
| V4L 1000 | V4L 1000B | 10.0 | 10.0 | 100.0 | 40.0 |
| V4L 1200 | V4L 1200B | 12.0 | 12.0 | 100.0 | 50.0 |
| V4L 1201 | V4L 1201B | 12.0 | 12.0 | 150.0 | 75.0 |
| V4L 1600 | V4L 1600B | 16.0 | 16.0 | 150.0 | 75.0 |
| V4L 2000 | V4L 2000B | 20.0 | 20.0 | 150.0 | 75.0 |

P100

# TuffCut® GP Series ASV4ACB



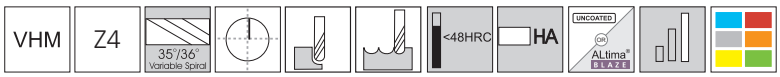





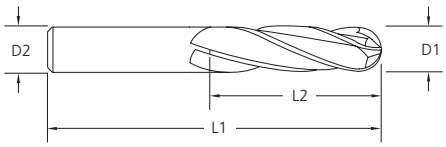

| Series ASV4ACB | Tool Dimensions | | | |
|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 |
| ASV4ACBNM0300 | 3.0 | 3.0 | 51.0 | 6.0 |
| ASV4ACBNM0400 | 4.0 | 4.0 | 51.0 | 11.0 |
| ASV4ACBNM0500 | 5.0 | 5.0 | 57.0 | 12.0 |
| ASV4ACBNM0600 | 6.0 | 6.0 | 64.0 | 15.0 |
| ASV4ACBNM0800 | 8.0 | 8.0 | 64.0 | 22.0 |
| ASV4ACBNM1000 | 10.0 | 10.0 | 72.0 | 22.0 |
| ASV4ACBNM1200 | 12.0 | 12.0 | 73.0 | 27.0 |
| ASV4ACBNM1400 | 14.0 | 14.0 | 84.0 | 30.0 |
| ASV4ACBNM1600 | 16.0 | 16.0 | 92.0 | 33.0 |
| ASV4ACBNM2000 | 20.0 | 20.0 | 104.0 | 40.0 |

P103

# TuffCut® GP Series V4LB



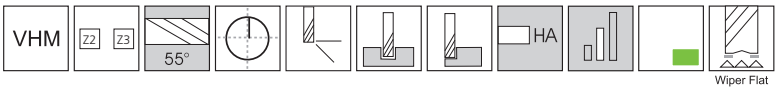



| Series V4LB | | Tool Dimensions | | | |
|---|---|---|---|---|---|
| Uncoated | Coated | | | | |
| Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 |
| V4LB 0600 | V4LB 0600B | 6.0 | 6.0 | 75.0 | 25.0 |
| V4LB 0800 | V4LB 0800B | 8.0 | 8.0 | 75.0 | 25.0 |
| V4LB 1000 | V4LB 1000B | 10.0 | 10.0 | 100.0 | 40.0 |
| V4LB 1200 | V4LB 1200B | 12.0 | 12.0 | 100.0 | 50.0 |
| V4LB 1201 | V4LB 1201B | 12.0 | 12.0 | 150.0 | 75.0 |
| V4LB 1600 | V4LB 1600B | 16.0 | 16.0 | 150.0 | 75.0 |
| V4LB 2000 | V4LB 2000B | 20.0 | 20.0 | 150.0 | 75.0 |

P100

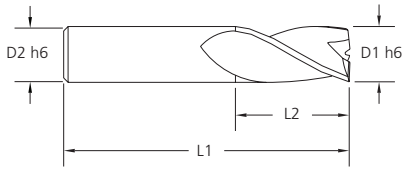
# TuffCut® GP Series GT2, GT3







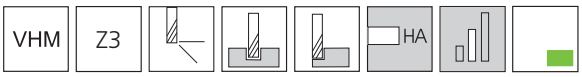


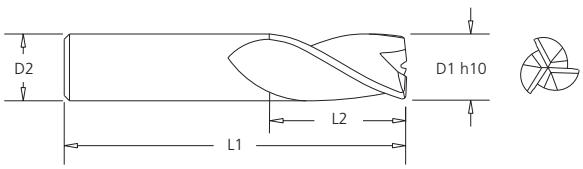

| Series GT2 | Series GT3 | Tool Dimensions | | | |
|---|---|---|---|---|---|
| Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 |
| GT2 0100 | - | 1.0 | 3.0 | 50.0 | 5.0 |
| GT2 0150 | - | 1.5 | 3.0 | 50.0 | 6.0 |
| GT2 0200 | - | 2.0 | 3.0 | 50.0 | 7.0 |
| GT2 0250 | - | 2.5 | 3.0 | 50.0 | 10.0 |
| GT2 0300 | GT3 0300 | 3.0 | 3.0 | 51.0 | 12.0 |
| GT2 0400 | GT3 0400 | 4.0 | 4.0 | 51.0 | 15.0 |
| GT2 0500 | GT3 0500 | 5.0 | 5.0 | 57.0 | 20.0 |
| GT2 0600 | GT3 0600 | 6.0 | 6.0 | 64.0 | 20.0 |
| GT2 0800 | GT3 0800 | 8.0 | 8.0 | 64.0 | 20.0 |
| GT2 1000 | GT3 1000 | 10.0 | 10.0 | 73.0 | 25.0 |
| GT2 1200 | GT3 1200 | 12.0 | 12.0 | 73.0 | 25.0 |
| GT2 1400 | GT3 1400 | 14.0 | 14.0 | 84.0 | 30.0 |
| GT2 1600 | GT3 1600 | 16.0 | 16.0 | 93.0 | 35.0 |
| GT2 2000 | GT3 2000 | 20.0 | 20.0 | 105.0 | 40.0 |

P106

# TuffCut® GP Series ASVSM



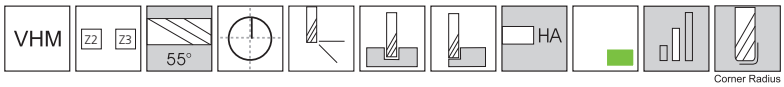



| Series ASVSM | Tool Dimensions | | | |
|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 |
| ASVSM0300 | 3.0 | 3.0 | 51.0 | 7.0 |
| ASVSM0400 | 4.0 | 4.0 | 51.0 | 10.0 |
| ASVSM0500 | 5.0 | 5.0 | 57.0 | 16.0 |
| ASVSM0600 | 6.0 | 6.0 | 64.0 | 18.0 |
| ASVSM0800 | 8.0 | 8.0 | 64.0 | 20.0 |
| ASVSM1000 | 10.0 | 10.0 | 73.0 | 22.0 |
| ASVSM1200 | 12.0 | 12.0 | 73.0 | 25.0 |
| ASVSM1400 | 14.0 | 14.0 | 84.0 | 30.0 |
| ASVSM1600 | 16.0 | 16.0 | 93.0 | 33.0 |
| ASVSM2000 | 20.0 | 20.0 | 105.0 | 40.0 |

P106

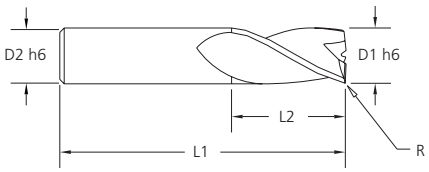
# TuffCut® GP Series GT2R, GT3R







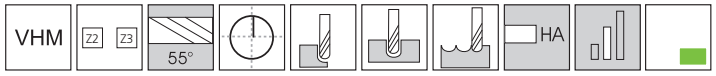



| Series GT2R | Series GT3R | Tool Dimensions | | | | |
|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 | R |
| - | GT3 0300-0.3R | 3.0 | 3.0 | 51.0 | 12.0 | 0.3 |
| - | GT3 0300-0.5R | 3.0 | 3.0 | 51.0 | 12.0 | 0.5 |
| GT2 0400-0.25R | GT3 0400-0.25R | 4.0 | 4.0 | 51.0 | 15.0 | 0.25 |
| GT2 0400-0.5R | GT3 0400-0.5R | 4.0 | 4.0 | 51.0 | 15.0 | 0.5 |
| GT2 0400-1.0R | GT3 0400-1.0R | 4.0 | 4.0 | 51.0 | 15.0 | 1.0 |
| GT2 0500-0.25R | GT3 0500-0.25R | 5.0 | 5.0 | 57.0 | 20.0 | 0.25 |
| GT2 0500-0.5R | GT3 0500-0.5R | 5.0 | 5.0 | 57.0 | 20.0 | 0.5 |
| GT2 0500-1.0R | GT3 0500-1.0R | 5.0 | 5.0 | 57.0 | 20.0 | 1.0 |
| - | GT3 0500-1.5R | 5.0 | 5.0 | 57.0 | 20.0 | 1.5 |
| GT2 0600-0.25R | GT3 0600-0.25R | 6.0 | 6.0 | 64.0 | 20.0 | 0.25 |
| GT2 0600-0.5R | GT3 0600-0.5R | 6.0 | 6.0 | 64.0 | 20.0 | 0.5 |
| GT2 0600-1.0R | GT3 0600-1.0R | 6.0 | 6.0 | 64.0 | 20.0 | 1.0 |
| GT2 0600-1.5R | GT3 0600-1.5R | 6.0 | 6.0 | 64.0 | 20.0 | 1.5 |
| GT2 0600-2.0R | GT3 0600-2.0R | 6.0 | 6.0 | 64.0 | 20.0 | 2.0 |
| GT2 0800-0.25R | GT3 0800-0.25R | 8.0 | 8.0 | 64.0 | 20.0 | 0.25 |
| GT2 0800-0.5R | GT3 0800-0.5R | 8.0 | 8.0 | 64.0 | 20.0 | 0.5 |
| GT2 0800-1.0R | GT3 0800-1.0R | 8.0 | 8.0 | 64.0 | 20.0 | 1.0 |
| GT2 0800-1.5R | GT3 0800-1.5R | 8.0 | 8.0 | 64.0 | 20.0 | 1.5 |
| GT2 0800-2.0R | GT3 0800-2.0R | 8.0 | 8.0 | 64.0 | 20.0 | 2.0 |
| GT2 0800-3.0R | GT3 0800-3.0R | 8.0 | 8.0 | 64.0 | 20.0 | 3.0 |
| GT2 1000-0.5R | GT3 1000-0.5R | 10.0 | 10.0 | 73.0 | 25.0 | 0.5 |
| GT2 1000-1.0R | GT3 1000-1.0R | 10.0 | 10.0 | 73.0 | 25.0 | 1.0 |
| - | GT3 1000-1.5R | 10.0 | 10.0 | 73.0 | 25.0 | 1.5 |
| GT2 1000-2.0R | GT3 1000-2.0R | 10.0 | 10.0 | 73.0 | 25.0 | 2.0 |
| GT2 1000-3.0R | - | 10.0 | 10.0 | 73.0 | 25.0 | 3.0 |
| GT2 1200-0.25R | - | 12.0 | 12.0 | 73.0 | 25.0 | 0.25 |
| GT2 1200-0.5R | GT3 1200-0.5R | 12.0 | 12.0 | 73.0 | 25.0 | 0.5 |
| GT2 1200-1.0R | GT3 1200-1.0R | 12.0 | 12.0 | 73.0 | 25.0 | 1.0 |
| GT2 1200-1.5R | GT3 1200-1.5R | 12.0 | 12.0 | 73.0 | 25.0 | 1.5 |
| GT2 1200-2.0R | GT3 1200-2.0R | 12.0 | 12.0 | 73.0 | 25.0 | 2.0 |
| GT2 1200-3.0R | GT3 1200-3.0R | 12.0 | 12.0 | 73.0 | 25.0 | 3.0 |
| - | GT3 1600-0.5R | 16.0 | 16.0 | 93.0 | 35.0 | 0.5 |
| GT2 1600-1.0R | GT3 1600-1.0R | 16.0 | 16.0 | 93.0 | 35.0 | 1.0 |
| - | GT3 1600-1.5R | 16.0 | 16.0 | 93.0 | 35.0 | 1.5 |
| GT2 1600-2.0R | GT3 1600-2.0R | 16.0 | 16.0 | 93.0 | 35.0 | 2.0 |
| - | GT3 1600-3.0R | 16.0 | 16.0 | 93.0 | 35.0 | 3.0 |

P106

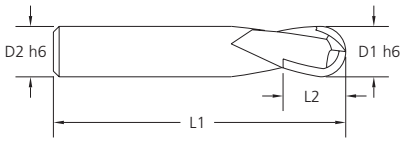
# TuffCut® GP Series GT2B, GT3B







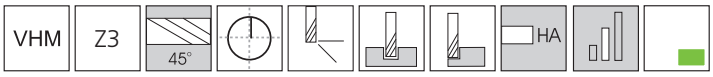



| Series GT2B | Series GT3B | Tool Dimensions | | | |
|---|---|---|---|---|---|
| Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 |
| GT2B 0300 | GT3B 0300 | 3.0 | 3.0 | 51.0 | 12.0 |
| GT2B 0400 | GT3B 0400 | 4.0 | 4.0 | 51.0 | 15.0 |
| GT2B 0500 | GT3B 0500 | 5.0 | 5.0 | 57.0 | 20.0 |
| GT2B 0600 | GT3B 0600 | 6.0 | 6.0 | 64.0 | 20.0 |
| GT2B 0800 | GT3B 0800 | 8.0 | 8.0 | 64.0 | 20.0 |
| GT2B 1000 | GT3B 1000 | 10.0 | 10.0 | 73.0 | 25.0 |
| GT2B 1200 | GT3B 1200 | 12.0 | 12.0 | 73.0 | 25.0 |
| GT2B 1400 | GT3B 1400 | 14.0 | 14.0 | 84.0 | 30.0 |
| GT2B 1600 | GT3B 1600 | 16.0 | 16.0 | 93.0 | 35.0 |
| GT2B 2000 | GT3B 2000 | 20.0 | 20.0 | 105.0 | 40.0 |

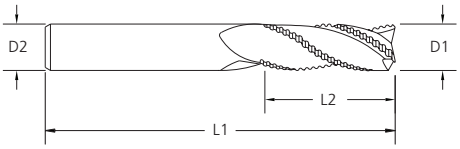
P106

# TuffCut® GP Series 134










| Series 134 | Tool Dimensions | | | |
|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 |
| 134 0600 | 6.0 | 6.0 | 64.0 | 20.0 |
| 134 0800 | 8.0 | 8.0 | 64.0 | 20.0 |
| 134 1000 | 10.0 | 10.0 | 70.0 | 25.0 |
| 134 1200 | 12.0 | 12.0 | 76.0 | 25.0 |
| 134 1400 | 14.0 | 14.0 | 89.0 | 30.0 |
| 134 1600 | 16.0 | 16.0 | 89.0 | 30.0 |
| 134 1800 | 18.0 | 18.0 | 102.0 | 35.0 |
| 134 2000 | 20.0 | 20.0 | 102.0 | 38.0 |
| 134 2500 | 25.0 | 25.0 | 102.0 | 50.0 |

P105

# TuffCut® FORDMAX Carbide Endmills

## Series 164, 169, 163, 166, 165, 121, 116, 111, 150, 140, V4L, V4LB

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Tool Lengths | 2 Flute (Z2) | | 3 Flute (Z3) | | 4 Flute (Z4) | |
|---|---|---|---|---|---|---|
| | GP Series | | GP Series | | GP Series | |
| Stub/Short | 164 | 166 | 169 | - | 163 * | 165 * |
| Standard | 121 | 150 | 116 | - | 111 * | 140 * |
| Long | - | - | - | - | V4L ** | V4LB ** |

* Please Note - 4 Flute (Z4) Endmills Are Not Recommended For Full Diameter Engagement/Slotting Applications

** V4L & V4LB long series Endmills are for profile milling
For V4L & V4LB reduce speed by 20%
For V4L & V4LB - Maximum Radial Cut (Ae) = 0.01 x D

Please use lower Vc values shown for uncoated tools.
Please use higher Vc values shown for ALtima® coated tools

| Cutting Speeds By Material Group | | | | Feed Recommendations | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Tool Diameter (mm) | | | | |
| Workpiece Material Group | | Material Type | Vc (m/min) | 3.0 | 5.0 | 6.0 | 8.0 | 10.0 |
| | | | | Feed/Tooth (fz - mm) | | | | |
| Steels | P | Low Carbon | 100 – 150 | .013 - .020 | .025 - .030 | .038 - .051 | .038 - .051 | .053 - .076 |
| | | Medium Carbon | 90 – 125 | | | | | |
| | | Mould/Tool Steel | 60 - 75 | .008 - .013 | .020 - .025 | .030 - .038 | .036 - .046 | .046 - .051 |
| Stainless Steels | M | Free Machining | 70 - 90 | .013 - .020 | .025 - .030 | .038 - .051 | .038 - .051 | .053 - .076 |
| | | Ferritic | 60 - 85 | | | | | |
| | | Austenitic | 55 - 70 | .008 - .013 | .020 - .025 | .030 - .038 | .036 - .046 | .046 - .051 |
| | | Martensitic | 45 - 60 | | | | | |
| | | PH Stainless | 40 - 50 | | | | | |
| Cast Irons | K | Grey Cast Iron | 120 - 140 | .013 - .020 | .025 - .030 | .038 - .051 | .038 - .051 | .053 - .076 |
| | | Ductile Cast Iron | 90 - 120 | | | | | |
| | | Malleable Iron | 70 - 90 | | | | | |
| Special Alloys | S | High Temp Alloys | 10 - 20 | .005 - .010 | .005 - .012 | .005 - .015 | .015 - .030 | .015 - .030 |
| | | Titanium Alloys | 20 - 50 | .008 - .010 | .010 - .015 | .015 - .020 | .020 - .030 | .020 - .030 |
| Hardened Steels | H | 35 - 45 HRc | 60 - 75 | .008 - .013 | .010 - .030 | .010 - .030 | .025 - .050 | .025 - .050 |
| | | 45 - 55 Rc Steel | 45 - 60 | | | | | |
| Non-Ferrous | N | Aluminium Alloys | 150 - 200 | .020 - .040 | .040 - .050 | .050 - .060 | .060 - .070 | .070 - .080 |
| | | Brass / Bronze | 120 - 180 | | | | | |
| | | Magnesium & Alloys | 200 - 300 | | | | | |

RPM Formula For Metric Endmills - RPM = (Vc x 318.0) ÷ Endmill Ø
Feedrate Formula For Metric Endmills - Feedrate = RPM x fz x Number Of Cutting Teeth

# TuffCut® FORDMAX Carbide Endmills

## Series 164, 169, 163, 166, 165, 121, 116, 111, 150, 140, V4L, V4LB

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

Please use lower Vc values shown for uncoated tools.
Please use higher Vc values shown for ALtima® coated tools.

| Cutting Speeds By Material Group | | | | Feed Recommendations | | | |
|---|---|---|---|---|---|---|---|
| | | | | Tool Diameter (mm) | | | |
| Workpiece Material Group | | Material Type | Vc (m/min) | 12.0 | 16.0 | 20.0 | 25.0 |
| | | | | Feed/Tooth (fz - mm) | | | |
| Steels | P | Low Carbon | 100 – 150 | .051 - .089 | .058 - .102 | .056 - .110 | .080 - .130 |
| | | Medium Carbon | 90 – 125 | | | | |
| | | Mould/Tool Steel | 60 - 75 | .051 - .058 | .058 - .076 | .061 - .081 | .061 - .081 |
| Stainless Steels | M | Free Machining | 70 - 90 | .051 - .089 | .058 - .102 | .056 - .110 | .080 - .130 |
| | | Ferritic | 60 - 85 | | | | |
| | | Austenitic | 55 - 70 | .051 - .058 | .058 - .076 | .061 - .081 | .061 - .081 |
| | | Martensitic | 45 - 60 | | | | |
| | | PH Stainless | 40 - 50 | | | | |
| Cast Irons | K | Grey Cast Iron | 120 - 140 | .051 - .089 | .058 - .102 | .056 - .109 | .081 - .127 |
| | | Ductile Cast Iron | 90 - 120 | | | | |
| | | Malleable Iron | 70 - 90 | | | | |
| Special Alloys | S | High Temp Alloys | 10 - 20 | .020 - .030 | .030 - .040 | .030 - .045 | .045 - .050 |
| | | Titanium Alloys | 20 - 50 | .030 - .040 | .040 - .045 | .045 - .050 | .050 - .075 |
| Hardened Steels | H | 35 - 45 HRc | 60 - 75 | .030 - .060 | .050 - .070 | .060 - .080 | .070 - .090 |
| | | 45 - 55 Rc Steel | 45 - 60 | | | | |
| Non-Ferrous | N | Aluminium Alloys | 150 - 200 | .080 - .100 | .100 - .200 | .200 - .250 | .200 - .250 |
| | | Brass / Bronze | 120 - 180 | | | | |
| | | Magnesium & Alloys | 200 - 300 | | | | |

RPM Formula For Metric Endmills - RPM = (Vc x 318.0) ÷ Endmill Ø
Feedrate Formula For Metric Endmills - Feedrate = RPM x fz x Number Of Cutting Teeth

# TuffCut® FORDMAX Carbide Endmills

## Series 192

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | | Material Type | Coolant | | | 1 x D / 0.5 x D | 1 x D / 1 x D | 0.05 x D / 2 x D | 0.1 x D / 2 x D | 0.2 x D / 2 x D | 0.3 x D / 1.5 x D | 0.5 x D / 1.5 x D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Max | Air | MMS | Vc (m/min) | | | | | | |
| Steels | P | Low Carbon | ● | ● | ● | 210 | 210 | 450 | 450 | 350 | 300 | 250 |
| | | Medium Carbon | ● | ● | ● | 180 | 180 | 270 | 270 | 250 | 230 | 200 |
| | | Alloy Steels | ● | ● | ● | 160 | 160 | 250 | 250 | 230 | 210 | 180 |
| | | Die/Tool Steels | ● | ● | ● | 130 | 130 | 225 | 225 | 200 | 170 | 130 |
| Stainless Steels | M | Free Machining | ● | - | ○ | 110 | 110 | 150 | 150 | 130 | 120 | 105 |
| | | Austenitic | ● | - | ○ | 100 | 100 | 130 | 130 | 120 | 110 | 100 |
| | | Difficult Stainless | ● | - | ○ | 70 | 70 | 100 | 100 | 90 | 80 | 70 |
| | | PH Stainless | ● | - | ○ | 100 | 100 | 130 | 130 | 120 | 110 | 100 |
| | | Cobalt Chrome Alloys | ● | - | ○ | 70 | 70 | 100 | 100 | 90 | 80 | 70 |
| | | Duplex (22%) | ● | - | ○ | 70 | 70 | 100 | 100 | 90 | 80 | 70 |
| | | Super Duplex (25%) | ● | - | ○ | 50 | 50 | 60 | 60 | 55 | 50 | 45 |
| Cast Irons | K | Grey Cast Iron | ● | ○ | ○ | 180 | 180 | 360 | 360 | 340 | 240 | 190 |
| | | Ductile Cast Iron | ● | ○ | ○ | 170 | 170 | 270 | 270 | 240 | 190 | 170 |
| | | Malleable Iron | ● | ○ | ○ | 130 | 130 | 160 | 160 | 150 | 140 | 130 |
| Special Alloys | S | High Temp Alloys | ● | - | - | 30 | 30 | 50 | 50 | 40 | 35 | 30 |
| | | Inconel | ● | - | - | 30 | 30 | 50 | 50 | 40 | 35 | 30 |
| | | Titanium Alloys | ● | - | - | 70 | 70 | 120 | 120 | 110 | 90 | 75 |
| Hardened Steels | H | Hardened Steels 45 - 50 Rc | ● | ○ | ○ | 55 | 55 | 135 | 135 | 125 | 90 | 50 |
| | | Hardened Steels 50 - 55 Rc | ● | ○ | ○ | 45 | 45 | 115 | 115 | 105 | 75 | 45 |

● Preferred ○ Possible X Not Possible

# TuffCut® FORDMAX Carbide Endmills

## Series 192

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | | Type of Machining | Tool Diameter | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 6mm | 8mm | 10mm | 12mm | 16mm | 20mm |
| | | | Feed/Tooth (fz - mm) | | | | | |
| Steels | P | Profiling | 0.085 | 0.100 | 0.120 | 0.170 | 0.200 | 0.230 |
| | | Slotting | 0.043 | 0.050 | 0.060 | 0.085 | 0.100 | 0.125 |
| Stainless Steels | M | Profiling | 0.085 | 0.100 | 0.120 | 0.170 | 0.200 | 0.230 |
| | | Slotting | 0.043 | 0.050 | 0.060 | 0.085 | 0.100 | 0.125 |
| | | Profiling | 0.064 | 0.076 | 0.086 | 0.125 | 0.150 | 0.175 |
| | | Slotting | 0.032 | 0.038 | 0.045 | 0.060 | 0.075 | 0.085 |
| Cast Irons | K | Profiling | 0.085 | 0.100 | 0.120 | 0.170 | 0.200 | 0.230 |
| | | Slotting | 0.043 | 0.050 | 0.060 | 0.085 | 0.100 | 0.125 |
| Special Alloys | S | Profiling | 0.043 | 0.050 | 0.060 | 0.085 | 0.100 | 0.120 |
| | | Slotting | 0.022 | 0.025 | 0.030 | 0.045 | 0.050 | 0.060 |
| | | Profiling | 0.085 | 0.100 | 0.120 | 0.170 | 0.200 | 0.230 |
| | | Slotting | 0.022 | 0.025 | 0.030 | 0.045 | 0.050 | 0.060 |
| Hardened Steels | H | Profiling | 0.076 | 0.090 | 0.100 | 0.150 | 0.180 | 0.200 |
| | | Slotting | 0.035 | 0.045 | 0.050 | 0.075 | 0.090 | 0.100 |
| | | Profiling | 0.053 | 0.066 | 0.076 | 0.100 | 0.132 | 0.155 |
| | | Slotting | 0.025 | 0.033 | 0.036 | 0.050 | 0.065 | 0.080 |

RPM Formula For Metric Endmills - RPM = (Vc x 318.0) ÷ Endmill Ø
Feedrate Formula For Metric Endmills - Feedrate = RPM x fz x Number Of Cutting Teeth

# TuffCut® FORDMAX Carbide Endmills

## Series VMH, ASV4, MV4

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | | Material Type | Coolant | | | 1 x D / 0.5 x D | 1 x D / 1 x D | 0.05 x D / 2 x D | 0.1 x D / 2 x D | 0.2 x D / 2 x D | 0.3 x D / 1.5 x D | 0.5 x D / 1.5 x D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Max | Air | MMS | Vc-M/Min | | | | | | |
| Steels | P | Low Carbon | ● | ● | ● | 230 | 220 | 480 | 385 | 330 | 275 | 220 |
| | | Medium Carbon | ● | ● | ● | 200 | 185 | 345 | 275 | 255 | 220 | 185 |
| | | Alloy Steels | ● | ● | ● | 175 | 165 | 315 | 255 | 230 | 200 | 165 |
| | | Die/Tool Steels | ● | ● | ● | 145 | 130 | 275 | 220 | 187 | 145 | 130 |
| Stainless Steels | M | Free Machining | ● | X | ○ | 120 | 110 | 205 | 165 | 130 | 115 | 110 |
| | | Austenitic | ● | X | ○ | 110 | 100 | 160 | 130 | 120 | 110 | 100 |
| | | Difficult Stainless | ● | X | ○ | 75 | 65 | 125 | 100 | 90 | 75 | 65 |
| | | PH Stainless | ● | X | ○ | 110 | 100 | 160 | 130 | 120 | 110 | 100 |
| | | Cobalt Chrome Alloys | ● | X | ○ | 75 | 65 | 125 | 100 | 90 | 75 | 65 |
| | | Duplex (22%) | ● | X | ○ | 75 | 65 | 125 | 100 | 90 | 75 | 65 |
| | | Super Duplex (25%) | ● | X | ○ | 55 | 45 | 75 | 60 | 55 | 50 | 45 |
| Cast Irons | K | Gray Cast Iron | ● | ○ | ○ | 200 | 175 | 495 | 395 | 265 | 210 | 175 |
| | | Ductile Cast Iron | ● | ○ | ○ | 185 | 165 | 370 | 300 | 210 | 185 | 165 |
| | | Malleable Iron | ● | ○ | ○ | 145 | 132 | 205 | 165 | 155 | 145 | 130 |
| Special Alloys | S | High Temp Alloys | ● | X | X | 35 | 28 | 55 | 45 | 40 | 35 | 28 |
| | | | ● | X | X | 35 | 28 | 55 | 45 | 40 | 35 | 28 |
| | | Titanium Alloys | ● | X | X | 75 | 66 | 160 | 130 | 100 | 85 | 65 |
| Hardened Steels | H | Hardened Steels 35 - 45 Rc | ● | ○ | ○ | 60 | 50 | 185 | 150 | 100 | 55 | 50 |
| | | Hardened Steels 45 - 55 Rc | ● | ○ | ○ | 50 | 45 | 155 | 125 | 85 | 50 | 45 |

● Preferred ○ Possible X Not Possible

# TuffCut® FORDMAX Carbide Endmills

## Series VMH, ASV4, MV4

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | | Type of Machining | Tool Diameter | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3mm | 5mm | 6mm | 8mm | 10mm | 12mm | 16mm | 20mm |
| | | | Feed/Tooth (fz - mm) | | | | | | | |
| Steels | P | Profiling | 0.030 | 0.050 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 | 0.200 |
| | | Slotting | 0.015 | 0.025 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 | 0.100 |
| Stainless Steels | M | Profiling | 0.030 | 0.050 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 | 0.200 |
| | | Slotting | 0.015 | 0.025 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 | 0.100 |
| Cast Irons | K | Profiling | 0.030 | 0.050 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 | 0.200 |
| | | Slotting | 0.015 | 0.025 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 | 0.100 |
| High Temp Alloys | S | Profiling | 0.009 | 0.013 | 0.032 | 0.038 | 0.044 | 0.064 | 0.076 | 0.089 |
| | | Slotting | 0.005 | 0.007 | 0.016 | 0.019 | 0.022 | 0.032 | 0.038 | 0.045 |
| Titanium | S | Profiling | 0.030 | 0.050 | 0.060 | 0.080 | 0.100 | 0.120 | 0.160 | 0.200 |
| | | Slotting | 0.015 | 0.025 | 0.030 | 0.040 | 0.050 | 0.060 | 0.080 | 0.100 |
| Hardened Steels | H | Profiling 35 - 45 Rc | 0.016 | 0.023 | 0.057 | 0.069 | 0.080 | 0.114 | 0.137 | 0.160 |
| | | Slotting 35 - 45 Rc | 0.010 | 0.015 | 0.025 | 0.035 | 0.045 | 0.065 | 0.070 | 0.075 |
| | | Profiling 45 - 55 Rc | 0.010 | 0.015 | 0.041 | 0.051 | 0.058 | 0.084 | 0.102 | 0.119 |
| | | Slotting 45 - 55 Rc | 0.008 | 0.011 | 0.020 | 0.030 | 0.040 | 0.050 | 0.055 | 0.080 |

RPM Formula For Metric Endmills - RPM = (Vc x 318.0) ÷ Endmill Ø
Feedrate Formula For Metric Endmills - Feedrate = RPM x fz x Number Of Cutting Teeth

# TuffCut® FORDMAX Carbide Endmills

## Series 134

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Material Group | | |
|---|---|---|
| Workpiece Material | | Material Type |
| Non Ferrous | N | Aluminium/Aluminium Alloys ≤ 10% Si |

| | | | | | | Tool Diameter (mm) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Vc (m/min) | 6.0 | 8.0 | 10.0 | 12.0 | 16.0 |
| Series | Type Of Cut | | ap | ae | | Feed/Tooth (fz - mm) | | | | |
| 134 |  | Slotting | 0.5 x D | 1 x D | 300 - 500 | 0.06 | 0.08 | 0.09 | 0.12 | 0.17 |
| | | | 1 x D | 1 x D | 300 - 500 | 0.05 | 0.07 | 0.08 | 0.10 | 0.15 |
| |  | Profiling | 1 x D | 0.2 x D | 300 - 500 | 0.07 | 0.12 | 0.13 | 0.15 | 0.20 |
| | | | 1 x D | 0.5 x D | 300 - 500 | 0.06 | 0.08 | 0.09 | 0.12 | 0.17 |

| | | | | | | Tool Diameter (mm) | |
|---|---|---|---|---|---|---|---|
| | | | | | Vc (m/min) | 20.0 | 25.0 |
| Series | Type Of Cut | | ap | ae | | Feed/Tooth (fz - mm) | |
| 134 |  | Slotting | 0.5 x D | 1 x D | 300 - 500 | 0.20 | 0.25 |
| | | | 1 x D | 1 x D | 300 - 500 | 0.15 | 0.20 |
| |  | Profiling | 1 x D | 0.2 x D | 300 - 500 | 0.22 | 0.28 |
| | | | 1 x D | 0.5 x D | 300 - 500 | 0.20 | 0.25 |

RPM Formula For Metric Endmills - RPM = (Vc x 318.0) ÷ Endmill Ø
Feedrate Formula For Metric Endmills - Feedrate = RPM x fz x Number Of Cutting Teeth.

# TuffCut® FORDMAX Carbide Endmills

## Series GT2 GT3 & GT2B GT3B, ASVSM

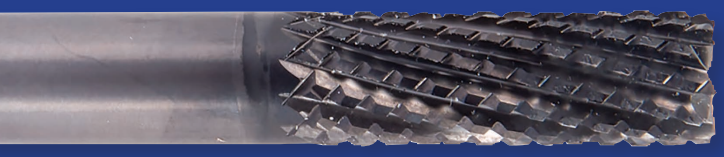
Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Material Group | | |
|---|---|---|
| Workpiece Material | | Material Type |
| Non Ferrous | N | Aluminium/Aluminium Alloys |

| | | | | | | Tool Diameter (mm) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 3.0 | 4.0 | 5.0 | 6.0 | 8.0 |
| **Series** | **Type Of Cut** | | **ap** | **ae** | **Vc (m/min)** | **Feed/Tooth (fz - mm)** | | | | |
| GT2 & GT3 GT2B & GT3B |  | Slotting | 0.5 x D | 1 x D | 300 - 500 | 0.02 | 0.03 | 0.04 | 0.05 | 0.07 |
| |  | Profiling | 1 x D | 0.2 x D | 300 - 500 | 0.03 | 0.045 | 0.06 | 0.075 | 0.105 |
| | | | 1 x D | 0.5 x D | 300 - 500 | 0.02 | 0.03 | 0.04 | 0.05 | 0.07 |

| | | | | | | Tool Diameter (mm) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 10.0 | 12.0 | 14.0 | 16.0 | 20.0 |
| **Series** | **Type Of Cut** | | **ap** | **ae** | **Vc (m/min)** | **Feed/Tooth (fz - mm)** | | | | |
| GT2 & GT3 GT2B & GT3B |  | Slotting | 0.5 x D | 1 x D | 300 - 500 | 0.10 | 0.12 | 0.15 | 0.16 | 0.20 |
| |  | Profiling | 1 x D | 0.2 x D | 300 - 500 | 0.15 | 0.18 | 0.225 | 0.24 | 0.30 |
| | | | 1 x D | 0.5 x D | 300 - 500 | 0.10 | 0.12 | 0.15 | 0.16 | 0.20 |

RPM Formula For Metric Endmills - RPM = (Vc x 318.0) ÷ Endmill Ø
Feedrate Formula For Metric Endmills - Feedrate = RPM x fz x Number Of Cutting Teeth



## 'The "Black" Diamond'

Designed specifically for the high performance machining of aerospace composites, the 239 Series combines our advanced 'Black Diamond GemX' coating and an application specific carbide substrate, together with specially designed rake angles and flute structures, to deliver increased routing rates while removing the risk of delamination and flaking.

(FR)

"Conçues spécifiquement pour l'usinage haute performance de composites aéronautiques, les gammes 239 combinent notre revêtement à technologie avancée « Black Diamond GemX » avec un substrat de carbure spécifique, allié à des angles de coupe et formes de goujure spécialement conçus pour augmenter les prises de passe, tout en éliminant les risques de délaminage et d'écaillage."

(DE)

Die Produktreihe 239 wurde speziell für die Hochleistungsbearbeitung von Verbundstoffen der Luft- und Raumfahrt konzipiert. Sie vereint unsere fortschrittliche „Black Diamond GemX"-Beschichtung sowie ein anwendungsspezifisches Hartmetallsubstrat mit speziell ausgelegten Spanwinkeln und Schneidenstrukturen für erhöhte Fräsgeschwindigkeiten bei gleichzeitiger Beseitigung eines Risikos von Schichtablösung und Abplatzung.

(IT)

Specifica per lavorazioni ad alte prestazioni su compositi aerospaziali, la Serie 239 è una combinazione di tecnologie avanzate: il rivestimento evoluto "Black Diamond GemX", lo specifico substrato in metallo duro, la geometria dei taglienti e la struttura delle gole appositamente studiati per permettere lavorazioni ad alto avanzamento senza delaminazione o sfaldatura.

(PL)

Zaprojektowany specjalnie do wysokowydajnej obróbki kompozytów lotniczych. Seria 239 łączy naszą zaawansowaną powłokę 'Black Diamond GemX' z podłożem ze spiekanego węglika wraz z unikalnymi kątami natarcia i strukturami rowkowymi w celu zwiększenia szybkości trasowania przy jednoczesnym zmniejszeniu ryzyka rozwarstwienia i łuszczenia.

ADVANCED PRODUCT GROUP

# Diamond Grind Routers

Fraises diamant pour composites
Diamant-Oberfräsen
Router con taglio a diamante
Pilnik obrotowy z pokryciem diamentowym


| | Page |
|---|---|
| **Diamond Grind Routers**<br>Series 239 'The "Black" Diamond | 108 |
| **Technical Information** | 109 |

# Diamond Grind Routers Series 239 'The "Black" Diamond'

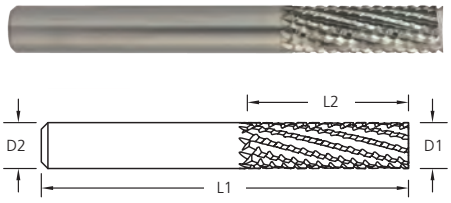
### GemX Coating
- Microhardness (HV) – 10,000
- Maximum Service Temp. 600° C / 1100° F
- Friction Coefficient 0.10

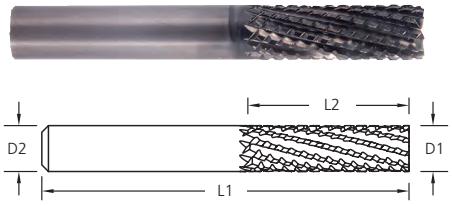
### Features
- GemX coating
- Unique carbide substrate
- Specially treated cutting edges

### Benefits
- Longer tool life
- Faster cycle times
- No delamination or flaking
- Great edge quality
- Excellent for composite materials and fiberglass

### Applications
- Trimming
- Routing
- Pocketing
- Interpolation of holes
- Low plastic content CFRP






| Tool No. | D1 | D2 | L1 | L2 | # Flutes (RHC) | End cut |
|---|---|---|---|---|---|---|
| 239M0300 | 3.0 | 3.0 | 38.0 | 12.0 | 6 | Safe End |
| 239M0300B | 3.0 | 3.0 | 38.0 | 12.0 | 6 | Burr |
| 239M0300E | 3.0 | 3.0 | 38.0 | 12.0 | 6 | End Mill |
| 239M0300F | 3.0 | 3.0 | 38.0 | 12.0 | 6 | Fishtail |
| 239M0400 | 4.0 | 4.0 | 50.0 | 15.0 | 6 | Safe End |
| 239M0400B | 4.0 | 4.0 | 50.0 | 15.0 | 6 | Burr |
| 239M0400E | 4.0 | 4.0 | 50.0 | 15.0 | 6 | End Mill |
| 239M0400F | 4.0 | 4.0 | 50.0 | 15.0 | 6 | Fishtail |
| 239M0500 | 5.0 | 5.0 | 50.0 | 20.0 | 6 | Safe End |
| 239M0500B | 5.0 | 5.0 | 50.0 | 20.0 | 6 | Burr |
| 239M0500E | 5.0 | 5.0 | 50.0 | 20.0 | 6 | End Mill |
| 239M0500F | 5.0 | 5.0 | 50.0 | 20.0 | 6 | Fishtail |
| 239M0600 | 6.0 | 6.0 | 63.0 | 20.0 | 10 | Safe End |
| 239M0600B | 6.0 | 6.0 | 63.0 | 20.0 | 10 | Burr |
| 239M0600E | 6.0 | 6.0 | 63.0 | 20.0 | 10 | End Mill |
| 239M0600F | 6.0 | 6.0 | 63.0 | 20.0 | 10 | Fishtail |
| 239M0601 | 6.0 | 6.0 | 75.0 | 25.0 | 10 | Safe End |
| 239M0601B | 6.0 | 6.0 | 75.0 | 25.0 | 10 | Burr |
| 239M0601E | 6.0 | 6.0 | 75.0 | 25.0 | 10 | End Mill |
| 239M0601F | 6.0 | 6.0 | 75.0 | 25.0 | 10 | Fishtail |
| 239M0800 | 8.0 | 8.0 | 75.0 | 25.0 | 10 | Safe End |
| 239M0800B | 8.0 | 8.0 | 75.0 | 25.0 | 10 | Burr |
| 239M0800E | 8.0 | 8.0 | 75.0 | 25.0 | 10 | End Mill |
| 239M0800F | 8.0 | 8.0 | 75.0 | 25.0 | 10 | Fishtail |
| 239M1000 | 10.0 | 10.0 | 90.0 | 30.0 | 12 | Safe End |
| 239M1000B | 10.0 | 10.0 | 90.0 | 30.0 | 12 | Burr |
| 239M1000E | 10.0 | 10.0 | 90.0 | 30.0 | 12 | End Mill |
| 239M1000F | 10.0 | 10.0 | 90.0 | 30.0 | 12 | Fishtail |

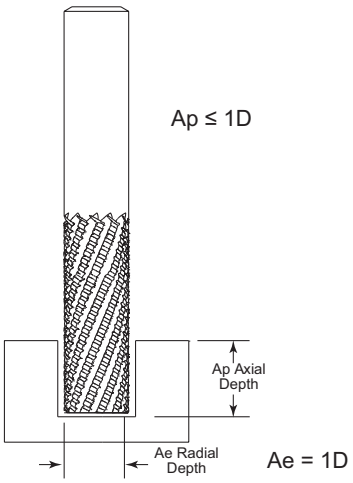
| Tool No. | D1 | D2 | L1 | L2 | # Flutes (RHC) | End cut |
|---|---|---|---|---|---|---|
| 239M1200 | 12.0 | 12.0 | 100.0 | 40.0 | 14 | Safe End |
| 239M1200B | 12.0 | 12.0 | 100.0 | 40.0 | 14 | Burr |
| 239M1200E | 12.0 | 12.0 | 100.0 | 40.0 | 14 | End Mill |
| 239M1200F | 12.0 | 12.0 | 100.0 | 40.0 | 14 | Fishtail |
| 239M0300BGX | 3.0 | 3.0 | 38.0 | 12.0 | 6 | Burr |
| 239M0300EGX | 3.0 | 3.0 | 38.0 | 12.0 | 6 | End Mill |
| 239M0300FGX | 3.0 | 3.0 | 38.0 | 12.0 | 6 | Fishtail |
| 239M0400BGX | 4.0 | 4.0 | 50.0 | 15.0 | 6 | Burr |
| 239M0400EGX | 4.0 | 4.0 | 50.0 | 15.0 | 6 | End Mill |
| 239M0400FGX | 4.0 | 4.0 | 50.0 | 15.0 | 6 | Fishtail |
| 239M0500BGX | 5.0 | 5.0 | 50.0 | 20.0 | 6 | Burr |
| 239M0500EGX | 5.0 | 5.0 | 50.0 | 20.0 | 6 | End Mill |
| 239M0500FGX | 5.0 | 5.0 | 50.0 | 20.0 | 6 | Fishtail |
| 239M0600BGX | 6.0 | 6.0 | 63.0 | 20.0 | 10 | Burr |
| 239M0600EGX | 6.0 | 6.0 | 63.0 | 20.0 | 10 | End Mill |
| 239M0600FGX | 6.0 | 6.0 | 63.0 | 20.0 | 10 | Fishtail |
| 239M0601BGX | 6.0 | 6.0 | 75.0 | 25.0 | 10 | Burr |
| 239M0601EGX | 6.0 | 6.0 | 75.0 | 25.0 | 10 | End Mill |
| 239M0601FGX | 6.0 | 6.0 | 75.0 | 25.0 | 10 | Fishtail |
| 239M0800BGX | 8.0 | 8.0 | 75.0 | 25.0 | 10 | Burr |
| 239M0800EGX | 8.0 | 8.0 | 75.0 | 25.0 | 10 | End Mill |
| 239M0800FGX | 8.0 | 8.0 | 75.0 | 25.0 | 10 | Fishtail |
| 239M1000BGX | 10.0 | 10.0 | 90.0 | 30.0 | 12 | Burr |
| 239M1000EGX | 10.0 | 10.0 | 90.0 | 30.0 | 12 | End Mill |
| 239M1000FGX | 10.0 | 10.0 | 90.0 | 30.0 | 12 | Fishtail |
| 239M1200BGX | 12.0 | 12.0 | 100.0 | 40.0 | 14 | Burr |
| 239M1200EGX | 12.0 | 12.0 | 100.0 | 40.0 | 14 | End Mill |
| 239M1200FGX | 12.0 | 12.0 | 100.0 | 40.0 | 14 | Fishtail |

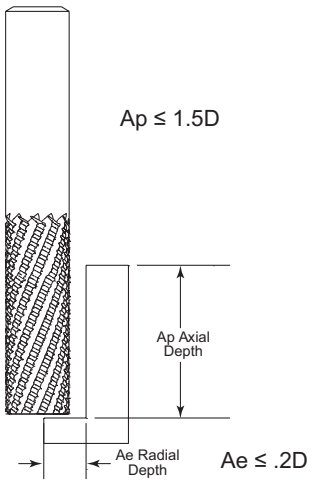
M.A. Ford® has an agreement with The Boeing Company and has been granted license rights to use Boeing patents and proprietary data.

P109

# Diamond Grind Routers Series 239 'The "Black" Diamond'

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane dane o Cięciu




| Slotting 90 (m/min) | | |
|---|---|---|
| Tool Diameter | RPM | mm/ min |
| 3.0 | 9000 | 254 |
| 5.0 | 6000 | 304 |
| 6.0 | 5000 | 381 |
| 8.0 | 4000 | 457 |
| 10.0 | 3000 | 508 |
| 12.0 | 2000 | 635 |

| Slotting 182 (m/min) | | |
|---|---|---|
| Tool Diameter | RPM | mm/ min |
| 3.0 | 18000 | 508 |
| 5.0 | 12000 | 635 |
| 6.0 | 9000 | 762 |
| 7.0 | 7000 | 889 |
| 10.0 | 6000 | 1016 |
| 12.0 | 5000 | 1270 |

| Feed adjustment to part thickness | |
|---|---|
| ≤ 0.5D | x 150% |
| 0.5D - 1D | x 120% |
| 1D - 2D | x 80% |
| 3D-4D | x 50% |

| Side Milling 120(m/min) | | |
|---|---|---|
| Tool Diameter | RPM | mm/ min |
| 3.0 | 12000 | 508 |
| 5.0 | 8000 | 635 |
| 6.0 | 6000 | 762 |
| 8.0 | 5000 | 889 |
| 10.0 | 4000 | 1016 |
| 12.0 | 3000 | 1270 |

| Side Milling 240 (m/min) | | |
|---|---|---|
| Tool Diameter | RPM | mm/ min |
| 3.0 | 24000 | 1016 |
| 5.0 | 16000 | 1270 |
| 6.0 | 12000 | 1524 |
| 8.0 | 10000 | 1778 |
| 10.0 | 8000 | 2032 |
| 12.0 | 6000 | 2540 |

EN

** Tool must have end grind in order to slot.

**Note:** The parameters in this table are for common material thickness of 6mm. You must use the Radial Depth (Ae) of 20% or less for Side Milling. For best surface finish conventional mill is recommended. Higher feed rates are possible but surface finish may change.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

FR

"** L'outil doit avoir une coupe en bout pour le rainurage.

À noter: Les paramètres de ce tableau peuvent s'appliquer aux matériaux ordinaires d'une épaisseur de 6mm. Vous devez prévoir un engagement (Ae) inférieur ou égal à 20% du diamètre pour un contournage. Pour obtenir un meilleur état de surface, une fraise conventionnelle est recommandée. Des vitesses d'avance plus élevées sont possibles mais l'état de surface risque de changer.

Les données techniques sont seulement fourni à titre indicatif, étant donné que des variations peuvent s'avérer nécessaires en fonction de l'application donnée."

DE

** Werkzeug muss an Nute angeschliffenes Ende aufweisen.

Hinweis: Die Parameter in dieser Tabelle beziehen sich auf eine allgemeine Materialstärke von 6 mm. Beim Scheibenfräsen müssen Sie eine Radialtiefe (Ae) von höchstens 20 % verwenden. Zum Erzielen der besten Oberflächengüte wird ein herkömmlicher Fräser empfohlen. Es sind höhere Vorschubgeschwindigkeiten möglich. Die Oberflächengüte kann sich dadurch jedoch ändern.

Die aufgeführten technischen Daten sollten nur als Empfehlung angesehen werden, da in Abhängigkeit von bestimmten Anwendungen Änderungen erforderlich sein können.

IT

** L'utensile deve avere il tagliente in testa per operazioni di scanalatura.

Nota: I parametri riportati in tabella si riferiscono a uno spessore convenzionale di 6 mm. È necessario utilizzare un impegno radiale (Ae) del 20% o inferiore in contornatura. Per una migliore finitura superficiale è consigliata la fresatura in discordanza. E' possibile aumentare l'avanzamento ma la finitura superficiale potrebbe cambiare.

I dati tecnici forniti devono essere considerati orientativi, potrebbero essere necessari aggiustamenti a seconda della particolare applicazione.

PL

** Przy operacji rowkowania, narzędzie musi mieć czoło z ostrzem centralnym.

Uwaga: Parametry w tabeli podane są dla materiałów o grubości 6 mm. Należy użyć głębokości promieniowej (Ae) 20% lub mniej dla bocznego frezowania. Dla lepszego wykończenia powierzchni zalecana jest konwencjonalna frezarka. Wyższe wartości posuwu są możliwe, ale wykończenie powierzchni może się zmienić.

Podane dane techniczne należy traktować tylko jako poglądowe, ponieważ mogą wystąpić różnice w zależności od konkretnego zastosowania.



M.A. FORDMAX RANGE

# Diamond Grind Routers

Fraises diamant pour composites
Diamant-Oberfräsen
Router con taglio a diamante
Pilnik obrotowy z pokryciem diamentowym

M.A. FordMax diamond grind routers provide an effective, high performance solution for routing glass reinforced PCB's, phenolic epoxy composites together with a range of other composite materials and plastics. Availalable as standard uncoated tools or incorporating the advanced ceramic CERAedge™ coating, which delivers outstanding performance and tool life, five different down-cut geometries are included in the range for maximum versatility.

FR

"Les fraise diamant M.A.FordMax fournissent une solution efficace et performante pour l'ébauche des PCB renforcés en fibre de verre, des composites époxydes phénoliques ainsi qu'une gamme d'autres matériaux composites et de matières plastiques. Les outils non revêtus standard ou intégrant le revêtement en céramique avancé CERAedge™, qui offre des performances exceptionnelles et une longue durée de vie, cinq géométries différentes sont incluses dans la gamme pour une polyvalence maximale."

DE

M.A.FordMax Fräser für Verbundwerkstoffe bieten eine effektive, leistungsstarke Lösung für die Verlegung von glasverstärkten Leiterplatten, Phenol-Epoxid-Verbundwerkstoffen zusammen mit einer Reihe von anderen Verbundwerkstoffen und Kunststoffen. Als Standard-unbeschichtete Werkzeuge erhältlich oder mit der fortschrittlichen Keramik-CERAedge™ Beschichtung, die eine hervorragende Leistung und Werkzeuglebensdauer bietet, sind fünf verschiedene Down-Cut-Geometrien im Bereich für maximale Vielseitigkeit enthalten.

IT

I router con taglio a diamante M.A.FordMax forniscono una soluzione efficace, ad alte prestazioni, per la lavorazione di PCB rinforzati con fibra di vetro, compositi di resine fenoliche ed epossidiche, ed una vasta gamma di compositi e materie plastiche. Sono disponibili come standard nudi o con l'esclusivo rivestimento ceramico CERAedge™, che consente di ottenere prestazioni eccezionali e lunga vita utensile. Per la massima versatilità vengono prodotti con cinque diverse affilature di testa.

PL

Pilniki obrotowe z pokryciem diamentowym M.A.FordMax zapewniają skuteczne, wydajne rozwiązania do trasowania płyt warstwowych wzmocnionych włóknami szklanymi, kompozytów fenolowych epoksydów wraz z wieloma innymi materiałami kompozytowymi i tworzywami sztucznymi. Dostępne jako standardowe niepowlekane narzędzia jak również wyposażone w zaawansowaną ceramiczną powłokę CERAedge™, która zapewnia znakomitą wydajność i żywotność narzędzia. W zakresie maksymalnej uniwersalności uwzględniono pięć różnych geometrycznych kształtów.


| | Page |
|---|---|
| **Diamond Grind Routers** | |
| **Standard Uncoated** | |
| Series 230<br>Series 231<br>Series 231B<br>Series 231D<br>Series 231F | 111 |
| **Diamond Grind Routers** | |
| **CERAedge® Coating** | |
| Series 230CE CERAedge®<br>Series 231CE CERAedge®<br>Series 231BCE CERAedge®<br>Series 231DCE CERAedge® | 111 |
| **Technical Information** | 112 |

# Diamond Grind Routers Series 230 & 231

## Standard Uncoated



Series 230 Down Cut
Safe End



Series 231 Down Cut
End Mill



Series 231B Down Cut
Burr End



Series 231D Down Cut
Drill Point



Series 231F Down Cut
Fishtail

## CERAedge™ Coating



Series 230CE CERAedge®
Down Cut Safe End



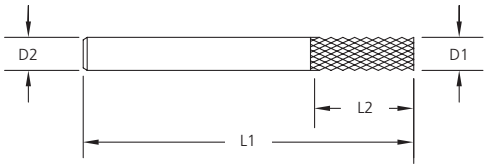
Series 231CE CERAedge®
Down Cut End Mill



Series 231BCE CERAedge®
Down Cut Burr End



Series 231DCE CERAedge®
Down Cut Drill Point




| Ø D1 | Ø D2 | L1 | L2 |
|---|---|---|---|
| 0.8 | 3.175 | 38.0 | 3.0 |
| 1.0 | 3.175 | 38.0 | 4.0 |
| 1.2 | 3.175 | 38.0 | 4.0 |
| 1.5 | 3.175 | 38.0 | 5.0 |
| 1.6 | 3.175 | 38.0 | 5.0 |
| 2.0 | 3.175 | 38.0 | 8.0 |
| 2.4 | 3.175 | 38.0 | 9.5 |
| 3.0 | 3.0 | 38.0 | 12.5 |
| 5.0 | 5.0 | 51.0 | 16.0 |
| 6.0 | 6.0 | 51.0 | 19.0 |
| 8.0 | 8.0 | 64.0 | 22.0 |

### CERAedge™ Coating

- Diamond grind designed for routing glass-reinforced printed circuit boards, phenolic-epoxy, composites and other highly abrasive materials.
- Available with a non-cutting safe end, or in three popular end-cutting styles with down cut geometries.

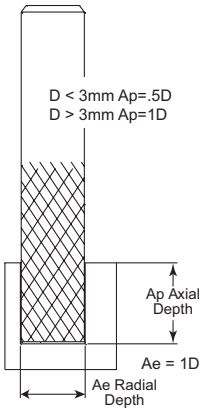
| Diameter mm | Series 230 | Series 230CE | Series 231 | Series 231CE | Series 231B | Series 231BCE | Series 231D | Series 231DCE | Series 231F |
|---|---|---|---|---|---|---|---|---|---|
| 0.8 | 230 0080 | - | 231 0080 | - | 231 0080B | - | 231 0080D | - | 231 0080F |
| 1.0 | 230 0100 | - | 231 0100 | - | 231 0100B | - | 231 0100D | - | 231 0100F |
| 1.2 | 230 0120 | - | 231 0120 | - | 231 0120B | - | 231 0120D | - | 231 0120F |
| 1.5 | 230 0150 | - | 231 0150 | - | 231 0150B | - | 231 0150D | - | 231 0150F |
| 1.6 | 230 0160 | - | 231 0160 | - | 231 0160B | - | - | - | 231 0160F |
| 2.0 | 230 0200 | - | 231 0200 | - | 231 0200B | - | 231 0200D | - | 231 0200F |
| 2.4 | 230 0240 | - | 231 0240 | - | 231 0240B | - | 231 0240D | - | 231 0240F |
| 3.0 | 230 0300 | 230 0300CE | 231 0300 | 231 0300CE | 231 0300B | 231 0300BCE | 231 0300D | 231 0300DCE | 231 0300F |
| 5.0 | 230 0500 | - | 231 0500 | 231 0500CE | 231 0500B | 231 0500BCE | 231 0500D | 231 0500DCE | 231 0500F |
| 6.0 | 230 0600 | 230 0600CE | 231 0600 | 231 0600CE | 231 0600B | 231 0600BCE | 231 0600D | 231 0600DCE | 231 0600F |
| 8.0 | 230 0800 | - | 231 0800 | - | 231 0800B | - | 231 0800D | - | 231 0800F |

P112

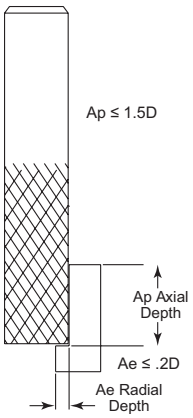
# Diamond Grind Routers Series 230 & 231 Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane dane o Cięciu

| Slotting 90 (m/min) | | | Slotting 182 (m/min) | | |
|---|---|---|---|---|---|
| Tool Diameter | RPM | mm/ min | Tool Diameter | RPM | mm/ min |
| 0.8 | 35000 | 141 | 0.8 | 72000 | 289 |
| 1.0 | 28000 | 226 | 1.0 | 57000 | 463 |
| 1.2 | 23000 | 306 | 1.2 | 48000 | 627 |
| 1.5 | 18000 | 376 | 1.5 | 38000 | 771 |
| 1.6 | 17000 | 388 | 1.6 | 36000 | 795 |
| 2.0 | 14000 | 423 | 2.0 | 28000 | 868 |
| 2.4 | 11000 | 447 | 2.4 | 24000 | 916 |
| 3.0 | 9400 | 480 | 3.0 | 19000 | 984 |
| 5.0 | 5600 | 395 | 5.0 | 11000 | 810 |
| 6.0 | 4700 | 423 | 6.0 | 9600 | 868 |
| 8.0 | 3500 | 353 | 8.0 | 7200 | 723 |




| Side Milling 120(m/min) | | | Side Milling 240 (m/min) | | |
|---|---|---|---|---|---|
| Tool Diameter | RPM | mm/ min | Tool Diameter | RPM | mm/ min |
| 0.8 | 47000 | 190 | 0.8 | 95000 | 381 |
| 1.0 | 38000 | 305 | 1.0 | 76000 | 610 |
| 1.2 | 31000 | 413 | 1.2 | 63000 | 826 |
| 1.5 | 25000 | 508 | 1.5 | 50000 | 1017 |
| 1.6 | 23000 | 524 | 1.6 | 47000 | 1049 |
| 2.0 | 19000 | 572 | 2.0 | 38000 | 1145 |
| 2.4 | 15000 | 604 | 2.4 | 31000 | 1208 |
| 3.0 | 12000 | 648 | 3.0 | 25000 | 1297 |
| 5.0 | 7600 | 534 | 5.0 | 15000 | 1068 |
| 6.0 | 6300 | 572 | 6.0 | 12000 | 1145 |
| 8.0 | 4700 | 477 | 8.0 | 9500 | 954 |




EN

** Tool must have end grind in order to slot.

**Note:** The parameters in this table are for common material thickness of 6mm. You must use the Radial Depth (Ae) of 20% or less for Side Milling. For best surface finish conventional mill is recommended. Higher feed rates are possible but surface finish may change.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

FR

** L'outil doit avoir une coupe en bout pour le rainurage.

**À noter:** Les paramètres de ce tableau peuvent s'appliquer aux matériaux ordinaires d'une épaisseur de 6mm. Vous devez prévoir un engagement (Ae) inférieur ou égal à 20% du diamètre pour un contournage. Pour obtenir un meilleur état de surface, une fraise conventionnelle est recommandée. Des vitesses d'avance plus élevées sont possibles mais l'état de surface risque de changer.

Les données techniques sont seulement fourni à titre indicatif, étant donné que des variations peuvent s'avérer nécessaires en fonction de l'application donnée."

DE

** Werkzeug muss an Nute angeschliffenes Ende aufweisen.

Hinweis: Die Parameter in dieser Tabelle beziehen sich auf eine allgemeine Materialstärke von 6 mm. Beim Scheibenfräsen müssen Sie eine Radialtiefe (Ae) von höchstens 20 % verwenden. Zum Erzielen der besten Oberflächengüte wird ein herkömmlicher Fräser empfohlen. Es sind höhere Vorschubgeschwindigkeiten möglich. Die Oberflächengüte kann sich dadurch jedoch ändern.

Die aufgeführten technischen Daten sollten nur als Empfehlung angesehen werden, da in Abhängigkeit von bestimmten Anwendungen Änderungen erforderlich sein können.

IT

** L'utensile deve avere il tagliente in testa per operazioni di scanalatura.

Nota: I parametri riportati in tabella si riferiscono a uno spessore convenzionale di 6 mm. È necessario utilizzare un impegno radiale (Ae) del 20% o inferiore in contornatura. Per una migliore finitura superficiale è consigliata la fresatura in discordanza. E' possibile aumentare l'avanzamento ma la finitura superficiale potrebbe cambiare.

I dati tecnici forniti devono essere considerati orientativi, potrebbero essere necessari aggiustamenti a seconda della particolare applicazione.

PL

** Przy operacji rowkowania, narzędzie musi mieć czoło z ostrzem centralnym.

Uwaga: Parametry w tabeli podane są dla materiałów o grubości 6 mm. Należy użyć głębokości promieniowej (Ae) 20% lub mniej dla bocznego frezowania. Dla lepszego wykończenia powierzchni zalecana jest konwencjonalna frezarka. Wyższe wartości posuwu są możliwe, ale wykończenie powierzchni może się zmienić.

Podane dane techniczne należy traktować tylko jako poglądowe, ponieważ mogą wystąpić różnice w zależności od konkretnego zastosowania.



APG
ADVANCED PRODUCT GROUP

# Twister® & cyclone

## High Performance Drills

Foret Haute Performance | Hochleistungsbohrer
Punte ad alte prestazioni | Wiertła wysoko wydajne

Our high performance Twister® and Cyclone drill ranges deliver extreme performance, penetration rates and outstanding hole finish on a wide range of materials from titanium, stainless steels and high temperature alloys through to aluminium and other non-ferrous metals.

FR

"Nos gammes de forets haute performance Twister® et Cyclone offrent des résultats exceptionnels, des vitesses d'avance et une qualité de trous remarquables sur un vaste éventail de matériaux comme le titane, les aciers inoxydables et les alliages à haute température ainsi que l'aluminium et les autres métaux non-ferreux."

DE

Unser Hochleistungssortiment der Twister®- und Cyclone-Bohrer bieten höchste Leistungsfähigkeit, außergewöhnliche Bohrgeschwindigkeit und hervorragende Oberflächengüte der Bohrungen bei einem breiten Spektrum an Werkstoffen, von Titan, rostfreiem Stahl sowie hochtemperaturfesten Legierungen über Aluminium bis zu anderen, Nichteisenmetallen.

IT

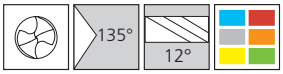
Le nostre linee di punte ad alte prestazioni Twister® e Cyclone offrono estremo rendimento, capacità di penetrazione e straordinaria finitura del foro su una vasta gamma di materiali come titanio, acciai inossidabili e leghe ad alta temperatura, alluminio e altri metalli non ferrosi.

PL

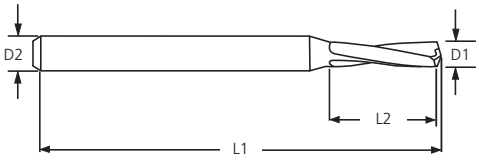
Nasze wysokowydajne wiertła Twister® i Cyclone zapewniają ekstremalne osiągi, prędkość zagłębiania się i doskonałe wykończenie otworów w szerokim zakresie materiałów od tytanu, stali nierdzewnych i stopów wysokotemperaturowych do aluminium i innych metali nieżelaznych.


| | Page |
|---|---|
| **Twister® Micro Tuff™ Drills**<br>Series 305 Uncoated<br>Series 305AM Coated | 114 - 115<br>116 |
| **Twister®**<br>Series MPDCS | 117 |
| **Twister® Micro XD Drills**<br>Series MXDSR | 118 |
| **Twister®**<br>Series MXDCR | 119 |
| **Twister® XD Spot Drill**<br>Series 200S | 120 |
| **Cyclone CXD High Performance Drills 3xD**<br>Series CXDSS, CXDCS | 120 - 123 |
| **Twister® XD High Performance Drills 3xD**<br>Series XDSSM, XDCSM | 124 - 126 |
| **Cyclone CXD High Performance Drills 5xD**<br>Series CXDSR, CXDCR | 127 - 129 |
| **Twister® XD High Performance Drills 5xD**<br>Series XDSRM & XDCRM | 130 - 133 |
| **Twister® XD High Performance Drills 7+xD**<br>Series XDCLM | 133 - 135 |
| **Cyclone CXD High Performance Drills 8xD**<br>Series CXDCLM | 135 - 138 |
| **Cyclone CXD High Performance Drills 15xD**<br>Series CXDCEM | 139 |
| **Twister® XD High Performance Micro Drill 10xD**<br>Series MDCLM | 140 |
| **Twister® High Performance Micro Drill 12xD**<br>Series MXDCL | 141 |
| **Twister® XD High Performance Drill 12+xD**<br>Series XDCEM | 142 |
| **Cyclone CDA High Performance Aluminium Drill 5xD**<br>Series CDACRM | 143 - 144 |
| **Technical Information** | 145 - 156 |

# Twister® Micro-Tuff™ Drill Series 305 Uncoated



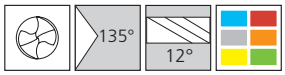


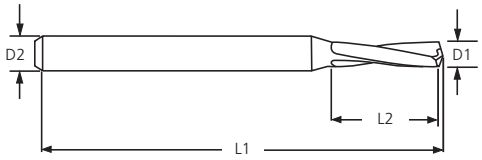

| Series 305 | Drill Dimensions | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| 305 0010 | 0.1 | 3.0 | 38.0 | 1.7 |
| 305 0011 | 0.11 | 3.0 | 38.0 | 1.7 |
| 305 0012 | 0.12 | 3.0 | 38.0 | 1.7 |
| 305 0013 | 0.13 | 3.0 | 38.0 | 1.7 |
| 305 0014 | 0.14 | 3.0 | 38.0 | 1.7 |
| 305 0015 | 0.15 | 3.0 | 38.0 | 2.5 |
| 305 0016 | 0.16 | 3.0 | 38.0 | 2.5 |
| 305 0017 | 0.17 | 3.0 | 38.0 | 2.5 |
| 305 0018 | 0.18 | 3.0 | 38.0 | 2.5 |
| 305 0019 | 0.19 | 3.0 | 38.0 | 2.5 |
| 305 0020 | 0.2 | 3.0 | 38.0 | 2.5 |
| 305 0021 | 0.21 | 3.0 | 38.0 | 2.5 |
| 305 0022 | 0.22 | 3.0 | 38.0 | 2.5 |
| 305 0023 | 0.23 | 3.0 | 38.0 | 2.5 |
| 305 0024 | 0.24 | 3.0 | 38.0 | 2.5 |
| 305 0025 | 0.25 | 3.0 | 38.0 | 3.2 |
| 305 0026 | 0.26 | 3.0 | 38.0 | 3.2 |
| 305 0027 | 0.27 | 3.0 | 38.0 | 3.2 |
| 305 0028 | 0.28 | 3.0 | 38.0 | 3.2 |
| 305 0029 | 0.29 | 3.0 | 38.0 | 3.2 |
| 305 0030 | 0.3 | 3.0 | 38.0 | 4.8 |
| 305 0031 | 0.31 | 3.0 | 38.0 | 4.8 |
| 305 0032 | 0.32 | 3.0 | 38.0 | 4.8 |
| 305 0033 | 0.33 | 3.0 | 38.0 | 4.8 |
| 305 0034 | 0.34 | 3.0 | 38.0 | 4.8 |
| 305 0035 | 0.35 | 3.0 | 38.0 | 4.8 |
| 305 0036 | 0.36 | 3.0 | 38.0 | 4.8 |
| 305 0037 | 0.37 | 3.0 | 38.0 | 4.8 |
| 305 0038 | 0.38 | 3.0 | 38.0 | 4.8 |
| 305 0039 | 0.39 | 3.0 | 38.0 | 4.8 |
| 305 0040 | 0.4 | 3.0 | 38.0 | 4.8 |
| 305 0041 | 0.41 | 3.0 | 38.0 | 6.4 |
| 305 0042 | 0.42 | 3.0 | 38.0 | 6.4 |
| 305 0043 | 0.43 | 3.0 | 38.0 | 6.4 |
| 305 0044 | 0.44 | 3.0 | 38.0 | 6.4 |
| 305 0045 | 0.45 | 3.0 | 38.0 | 6.4 |
| 305 0046 | 0.46 | 3.0 | 38.0 | 6.4 |
| 305 0047 | 0.47 | 3.0 | 38.0 | 6.4 |
| 305 0048 | 0.48 | 3.0 | 38.0 | 6.4 |
| 305 0049 | 0.49 | 3.0 | 38.0 | 6.4 |
| 305 0050 | 0.5 | 3.0 | 38.0 | 6.4 |
| 305 0051 | 0.51 | 3.0 | 38.0 | 6.4 |
| 305 0052 | 0.52 | 3.0 | 38.0 | 6.4 |
| 305 0053 | 0.53 | 3.0 | 38.0 | 6.4 |
| 305 0054 | 0.54 | 3.0 | 38.0 | 6.4 |

| Series 305 | Drill Dimensions | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| 305 0055 | 0.55 | 3.0 | 38.0 | 6.4 |
| 305 0056 | 0.56 | 3.0 | 38.0 | 6.4 |
| 305 0057 | 0.57 | 3.0 | 38.0 | 6.4 |
| 305 0058 | 0.58 | 3.0 | 38.0 | 6.4 |
| 305 0059 | 0.59 | 3.0 | 38.0 | 6.4 |
| 305 0060 | 0.6 | 3.0 | 38.0 | 6.4 |
| 305 0061 | 0.61 | 3.0 | 38.0 | 6.4 |
| 305 0062 | 0.62 | 3.0 | 38.0 | 6.4 |
| 305 0063 | 0.63 | 3.0 | 38.0 | 6.4 |
| 305 0064 | 0.64 | 3.0 | 38.0 | 6.4 |
| 305 0065 | 0.65 | 3.0 | 38.0 | 6.4 |
| 305 0066 | 0.66 | 3.0 | 38.0 | 8.1 |
| 305 0067 | 0.67 | 3.0 | 38.0 | 8.1 |
| 305 0068 | 0.68 | 3.0 | 38.0 | 8.1 |
| 305 0069 | 0.69 | 3.0 | 38.0 | 8.1 |
| 305 0070 | 0.7 | 3.0 | 38.0 | 8.1 |
| 305 0071 | 0.71 | 3.0 | 38.0 | 8.1 |
| 305 0072 | 0.72 | 3.0 | 38.0 | 8.1 |
| 305 0073 | 0.73 | 3.0 | 38.0 | 8.1 |
| 305 0074 | 0.74 | 3.0 | 38.0 | 8.1 |
| 305 0075 | 0.75 | 3.0 | 38.0 | 8.1 |
| 305 0076 | 0.76 | 3.0 | 38.0 | 10.2 |
| 305 0077 | 0.77 | 3.0 | 38.0 | 10.2 |
| 305 0078 | 0.78 | 3.0 | 38.0 | 10.2 |
| 305 0079 | 0.79 | 3.0 | 38.0 | 10.2 |
| 305 0080 | 0.8 | 3.0 | 38.0 | 10.2 |
| 305 0081 | 0.81 | 3.0 | 38.0 | 10.2 |
| 305 0082 | 0.82 | 3.0 | 38.0 | 10.2 |
| 305 0083 | 0.83 | 3.0 | 38.0 | 10.2 |
| 305 0084 | 0.84 | 3.0 | 38.0 | 10.2 |
| 305 0085 | 0.85 | 3.0 | 38.0 | 10.2 |
| 305 0086 | 0.86 | 3.0 | 38.0 | 10.2 |
| 305 0087 | 0.87 | 3.0 | 38.0 | 10.2 |
| 305 0088 | 0.88 | 3.0 | 38.0 | 10.2 |
| 305 0089 | 0.89 | 3.0 | 38.0 | 10.2 |
| 305 0090 | 0.9 | 3.0 | 38.0 | 10.2 |
| 305 0091 | 0.91 | 3.0 | 38.0 | 10.2 |
| 305 0092 | 0.92 | 3.0 | 38.0 | 10.2 |
| 305 0093 | 0.93 | 3.0 | 38.0 | 10.2 |
| 305 0094 | 0.94 | 3.0 | 38.0 | 10.2 |
| 305 0095 | 0.95 | 3.0 | 38.0 | 10.2 |
| 305 0096 | 0.96 | 3.0 | 38.0 | 10.2 |
| 305 0097 | 0.97 | 3.0 | 38.0 | 10.2 |
| 305 0098 | 0.98 | 3.0 | 38.0 | 10.2 |
| 305 0099 | 0.99 | 3.0 | 38.0 | 10.2 |

# Twister® Micro-Tuff™ Drill Series 305 Uncoated






| Series 305 | Drill Dimensions | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| 305 0100 | 1.0 | 3.0 | 38.0 | 10.2 |
| 305 0105 | 1.05 | 3.0 | 38.0 | 10.2 |
| 305 0110 | 1.1 | 3.0 | 38.0 | 10.2 |
| 305 0115 | 1.15 | 3.0 | 38.0 | 10.2 |
| 305 0120 | 1.2 | 3.0 | 38.0 | 10.2 |
| 305 0125 | 1.25 | 3.0 | 38.0 | 10.2 |
| 305 0130 | 1.3 | 3.0 | 38.0 | 10.2 |
| 305 0135 | 1.35 | 3.0 | 38.0 | 10.2 |
| 305 0140 | 1.4 | 3.0 | 38.0 | 10.2 |
| 305 0145 | 1.45 | 3.0 | 38.0 | 10.2 |
| 305 0150 | 1.5 | 3.0 | 38.0 | 10.2 |
| 305 0155 | 1.55 | 3.0 | 38.0 | 10.2 |
| 305 0160 | 1.6 | 3.0 | 38.0 | 12.2 |
| 305 0165 | 1.65 | 3.0 | 38.0 | 12.2 |
| 305 0170 | 1.7 | 3.0 | 38.0 | 12.2 |
| 305 0175 | 1.75 | 3.0 | 38.0 | 12.2 |
| 305 0180 | 1.8 | 3.0 | 38.0 | 12.2 |
| 305 0185 | 1.85 | 3.0 | 38.0 | 12.2 |
| 305 0190 | 1.9 | 3.0 | 38.0 | 12.2 |
| 305 0195 | 1.95 | 3.0 | 38.0 | 12.2 |
| 305 0200 | 2.0 | 3.0 | 38.0 | 12.2 |

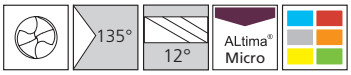
| Series 305 | Drill Dimensions | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| 305 0205 | 2.05 | 3.0 | 38.0 | 12.2 |
| 305 0210 | 2.1 | 3.0 | 38.0 | 12.2 |
| 305 0215 | 2.15 | 3.0 | 38.0 | 12.2 |
| 305 0220 | 2.2 | 3.0 | 38.0 | 12.2 |
| 305 0225 | 2.25 | 3.0 | 38.0 | 12.2 |
| 305 0230 | 2.3 | 3.0 | 38.0 | 12.2 |
| 305 0235 | 2.35 | 3.0 | 38.0 | 12.2 |
| 305 0240 | 2.4 | 3.0 | 38.0 | 12.2 |
| 305 0245 | 2.45 | 3.0 | 38.0 | 12.2 |
| 305 0250 | 2.5 | 3.0 | 38.0 | 12.2 |
| 305 0255 | 2.55 | 3.0 | 38.0 | 12.2 |
| 305 0260 | 2.6 | 3.0 | 38.0 | 12.2 |
| 305 0265 | 2.65 | 3.0 | 38.0 | 12.2 |
| 305 0270 | 2.7 | 3.0 | 38.0 | 12.2 |
| 305 0275 | 2.75 | 3.0 | 38.0 | 12.2 |
| 305 0280 | 2.8 | 3.0 | 38.0 | 12.2 |
| 305 0285 | 2.85 | 3.0 | 38.0 | 12.2 |
| 305 0290 | 2.9 | 3.0 | 38.0 | 12.2 |
| 305 0295 | 2.95 | 3.0 | 38.0 | 12.2 |
| 305 0300 | 3.0 | 3.0 | 38.0 | 12.2 |

P145

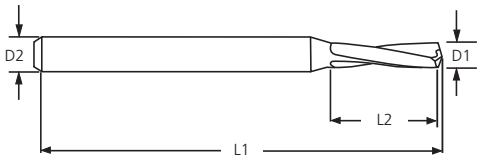
| Metric (mm) | |
|---|---|
| D1 | Tolerance |
| 0.10 - 3.00 | +0/-0.008 |

| Metric (mm) | |
|---|---|
| D2 | Tolerance (h6) |
| 3.00 | +0/-0.005 |

# Twister® Micro-Tuff™ Drill Series 305AM Coated






| Series 305 | Drill Dimensions | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| 305 0030AM | 0.3 | 3.0 | 38.0 | 4.8 |
| 305 0035AM | 0.35 | 3.0 | 38.0 | 4.8 |
| 305 0040AM | 0.4 | 3.0 | 38.0 | 4.8 |
| 305 0045AM | 0.45 | 3.0 | 38.0 | 6.4 |
| 305 0050AM | 0.5 | 3.0 | 38.0 | 6.4 |
| 305 0055AM | 0.55 | 3.0 | 38.0 | 6.4 |
| 305 0060AM | 0.6 | 3.0 | 38.0 | 6.4 |
| 305 0065AM | 0.65 | 3.0 | 38.0 | 6.4 |
| 305 0070AM | 0.7 | 3.0 | 38.0 | 8.1 |
| 305 0075AM | 0.75 | 3.0 | 38.0 | 8.1 |
| 305 0080AM | 0.8 | 3.0 | 38.0 | 10.2 |
| 305 0085AM | 0.85 | 3.0 | 38.0 | 10.2 |
| 305 0090AM | 0.9 | 3.0 | 38.0 | 10.2 |
| 305 0095AM | 0.95 | 3.0 | 38.0 | 10.2 |
| 305 0100AM | 1.0 | 3.0 | 38.0 | 10.2 |
| 305 0105AM | 1.05 | 3.0 | 38.0 | 10.2 |
| 305 0110AM | 1.1 | 3.0 | 38.0 | 10.2 |
| 305 0115AM | 1.15 | 3.0 | 38.0 | 10.2 |
| 305 0120AM | 1.2 | 3.0 | 38.0 | 10.2 |
| 305 0125AM | 1.25 | 3.0 | 38.0 | 10.2 |
| 305 0130AM | 1.3 | 3.0 | 38.0 | 10.2 |
| 305 0135AM | 1.35 | 3.0 | 38.0 | 10.2 |
| 305 0140AM | 1.4 | 3.0 | 38.0 | 10.2 |
| 305 0145AM | 1.45 | 3.0 | 38.0 | 10.2 |
| 305 0150AM | 1.5 | 3.0 | 38.0 | 10.2 |
| 305 0155AM | 1.55 | 3.0 | 38.0 | 10.2 |
| 305 0160AM | 1.6 | 3.0 | 38.0 | 12.2 |
| 305 0165AM | 1.65 | 3.0 | 38.0 | 12.2 |

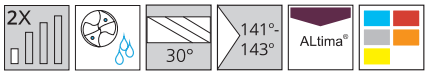
| Series 305 | Drill Dimensions | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| 305 0170AM | 1.7 | 3.0 | 38.0 | 12.2 |
| 305 0175AM | 1.75 | 3.0 | 38.0 | 12.2 |
| 305 0180AM | 1.8 | 3.0 | 38.0 | 12.2 |
| 305 0185AM | 1.85 | 3.0 | 38.0 | 12.2 |
| 305 0190AM | 1.9 | 3.0 | 38.0 | 12.2 |
| 305 0195AM | 1.95 | 3.0 | 38.0 | 12.2 |
| 305 0200AM | 2.0 | 3.0 | 38.0 | 12.2 |
| 305 0205AM | 2.05 | 3.0 | 38.0 | 12.2 |
| 305 0210AM | 2.1 | 3.0 | 38.0 | 12.2 |
| 305 0215AM | 2.15 | 3.0 | 38.0 | 12.2 |
| 305 0220AM | 2.2 | 3.0 | 38.0 | 12.2 |
| 305 0225AM | 2.25 | 3.0 | 38.0 | 12.2 |
| 305 0230AM | 2.3 | 3.0 | 38.0 | 12.2 |
| 305 0235AM | 2.35 | 3.0 | 38.0 | 12.2 |
| 305 0240AM | 2.4 | 3.0 | 38.0 | 12.2 |
| 305 0245AM | 2.45 | 3.0 | 38.0 | 12.2 |
| 305 0250AM | 2.5 | 3.0 | 38.0 | 12.2 |
| 305 0255AM | 2.55 | 3.0 | 38.0 | 12.2 |
| 305 0260AM | 2.6 | 3.0 | 38.0 | 12.2 |
| 305 0265AM | 2.65 | 3.0 | 38.0 | 12.2 |
| 305 0270AM | 2.7 | 3.0 | 38.0 | 12.2 |
| 305 0275AM | 2.75 | 3.0 | 38.0 | 12.2 |
| 305 0280AM | 2.8 | 3.0 | 38.0 | 12.2 |
| 305 0285AM | 2.85 | 3.0 | 38.0 | 12.2 |
| 305 0290AM | 2.9 | 3.0 | 38.0 | 12.2 |
| 305 0295AM | 2.95 | 3.0 | 38.0 | 12.2 |
| 305 0300AM | 3.0 | 3.0 | 38.0 | 12.2 |

P145

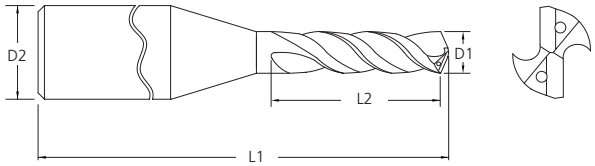
| Metric (mm) | |
|---|---|
| D1 | Tolerance |
| 0.10 - 3.00 | +0/-0.008 |

| Metric (mm) | |
|---|---|
| D2 | Tolerance (h6) |
| 3.00 | +0/-0.005 |

# Twister® Micro XD Series MPDCS






| Series MPDCS | | Drill Dimensions | | | |
|---|---|---|---|---|---|
| Tool No. | EDP | Ø D1 | Ø D2 | L1 | L2 |
| MPDCSM0100A | 04874 | 1.0 | 3.0 | 45.0 | 4.0 |
| MPDCSM0105A | 04875 | 1.0 | 3.0 | 45.0 | 4.0 |
| MPDCSM0110A | 04876 | 1.1 | 3.0 | 45.0 | 4.0 |
| MPDCSM0115A | 04877 | 1.15 | 3.0 | 45.0 | 5.0 |
| MPDCSM0120A | 04878 | 1.2 | 3.0 | 45.0 | 5.0 |
| MPDCSM0125A | 04879 | 1.25 | 3.0 | 45.0 | 5.0 |
| MPDCSM0130A | 04880 | 1.3 | 3.0 | 45.0 | 5.0 |
| MPDCSM0135A | 04881 | 1.35 | 3.0 | 45.0 | 5.0 |
| MPDCSM0140A | 04882 | 1.4 | 3.0 | 45.0 | 6.0 |
| MPDCSM0145A | 04883 | 1.45 | 3.0 | 45.0 | 6.0 |
| MPDCSM0150A | 04884 | 1.5 | 3.0 | 45.0 | 6.0 |
| MPDCSM0155A | 04885 | 1.55 | 3.0 | 45.0 | 6.0 |
| MPDCSM0160A | 04886 | 1.6 | 3.0 | 45.0 | 6.0 |
| MPDCSM0165A | 04887 | 1.65 | 3.0 | 50.0 | 7.0 |
| MPDCSM0170A | 04888 | 1.7 | 3.0 | 50.0 | 7.0 |
| MPDCSM0175A | 04889 | 1.75 | 3.0 | 50.0 | 7.0 |
| MPDCSM0180A | 04890 | 1.8 | 3.0 | 50.0 | 7.0 |
| MPDCSM0185A | 04891 | 1.85 | 3.0 | 50.0 | 7.0 |
| MPDCSM0190A | 04892 | 1.9 | 3.0 | 50.0 | 8.0 |
| MPDCSM0195A | 04893 | 1.95 | 3.0 | 50.0 | 8.0 |

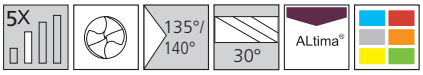
| Series MPDCS | | Drill Dimensions | | | |
|---|---|---|---|---|---|
| Tool No. | EDP | Ø D1 | Ø D2 | L1 | L2 |
| MPDCSM0200A | 04894 | 2.0 | 3.0 | 50.0 | 8.0 |
| MPDCSM0205A | 04895 | 2.05 | 3.0 | 60.0 | 8.0 |
| MPDCSM0210A | 04896 | 2.1 | 3.0 | 60.0 | 8.0 |
| MPDCSM0215A | 04897 | 2.15 | 3.0 | 60.0 | 9.0 |
| MPDCSM0220A | 04898 | 2.2 | 3.0 | 60.0 | 9.0 |
| MPDCSM0225A | 04899 | 2.25 | 3.0 | 60.0 | 9.0 |
| MPDCSM0230A | 04900 | 2.3 | 3.0 | 60.0 | 9.0 |
| MPDCSM0235A | 04901 | 2.35 | 3.0 | 60.0 | 9.0 |
| MPDCSM0240A | 04902 | 2.4 | 3.0 | 60.0 | 10.0 |
| MPDCSM0245A | 04903 | 2.45 | 3.0 | 60.0 | 10.0 |
| MPDCSM0250A | 04904 | 2.5 | 3.0 | 60.0 | 10.0 |
| MPDCSM0255A | 04905 | 2.55 | 3.0 | 60.0 | 10.0 |
| MPDCSM0260A | 04906 | 2.6 | 3.0 | 60.0 | 10.0 |
| MPDCSM0265A | 04907 | 2.65 | 3.0 | 60.0 | 11.0 |
| MPDCSM0270A | 04908 | 2.7 | 3.0 | 60.0 | 11.0 |
| MPDCSM0275A | 04909 | 2.75 | 3.0 | 60.0 | 11.0 |
| MPDCSM0280A | 04910 | 2.8 | 3.0 | 60.0 | 11.0 |
| MPDCSM0285A | 04911 | 2.85 | 3.0 | 60.0 | 11.0 |
| MPDCSM0290A | 04912 | 2.9 | 3.0 | 60.0 | 12.0 |
| MPDCSM0295A | 04913 | 2.95 | 3.0 | 60.0 | 12.0 |

| Metric (mm) | |
|---|---|
| D1 | Tolerance |
| 1.00 - 2.95 | +0.004/+0.014 |

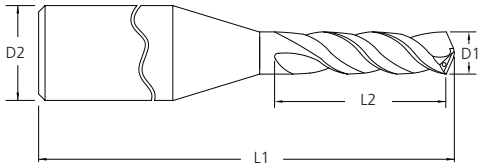
| Metric (mm) | |
|---|---|
| D2 | Tolerance (h6) |
| 3.00 | +0/-0.006 |

P149

# Twister® Micro XD Series MXDSR






| ALtima® | | Drill Dimensions | | | |
|---|---|---|---|---|---|
| Tool No | EDP | Ø D1 | Ø D2 | L1 | L2 |
| MXDSRM0050A | 04694 | 0.5 | 3.0 | 57.0 | 4.0 |
| MXDSRM0055A | 04696 | 0.55 | 3.0 | 57.0 | 4.0 |
| MXDSRM0060A | 04698 | 0.6 | 3.0 | 57.0 | 5.0 |
| MXDSRM0065A | 04700 | 0.65 | 3.0 | 57.0 | 5.0 |
| MXDSRM0070A | 04702 | 0.7 | 3.0 | 57.0 | 5.0 |
| MXDSRM0075A | 04704 | 0.75 | 3.0 | 57.0 | 6.0 |
| MXDSRM0080A | 04706 | 0.8 | 3.0 | 57.0 | 6.0 |
| MXDSRM0085A | 04708 | 0.85 | 3.0 | 57.0 | 7.0 |
| MXDSRM0090A | 04710 | 0.9 | 3.0 | 57.0 | 7.0 |
| MXDSRM0095A | 04712 | 0.95 | 3.0 | 57.0 | 7.0 |
| MXDSRM0100A | 04714 | 1.0 | 3.0 | 57.0 | 8.0 |
| MXDSRM0105A | 04716 | 1.05 | 3.0 | 57.0 | 8.0 |
| MXDSRM0110A | 04718 | 1.1 | 3.0 | 57.0 | 8.0 |
| MXDSRM0115A | 04720 | 1.15 | 3.0 | 57.0 | 9.0 |
| MXDSRM0120A | 04722 | 1.2 | 3.0 | 57.0 | 9.0 |
| MXDSRM0125A | 04724 | 1.25 | 3.0 | 57.0 | 9.0 |
| MXDSRM0130A | 04726 | 1.3 | 3.0 | 57.0 | 10.0 |
| MXDSRM0135A | 04728 | 1.35 | 3.0 | 57.0 | 10.0 |
| MXDSRM0140A | 04730 | 1.4 | 3.0 | 57.0 | 10.0 |
| MXDSRM0145A | 04732 | 1.45 | 3.0 | 57.0 | 11.0 |
| MXDSRM0150A | 04734 | 1.5 | 3.0 | 57.0 | 11.0 |
| MXDSRM0155A | 04736 | 1.55 | 3.0 | 57.0 | 12.0 |
| MXDSRM0160A | 04738 | 1.6 | 3.0 | 57.0 | 12.0 |
| MXDSRM0165A | 04740 | 1.65 | 3.0 | 57.0 | 12.0 |
| MXDSRM0170A | 04742 | 1.7 | 3.0 | 57.0 | 13.0 |

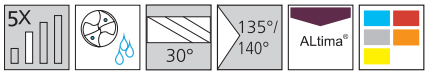
| ALtima® | | Drill Dimensions | | | |
|---|---|---|---|---|---|
| Tool No | EDP | Ø D1 | Ø D2 | L1 | L2 |
| MXDSRM0175A | 04744 | 1.75 | 3.0 | 57.0 | 13.0 |
| MXDSRM0180A | 04746 | 1.8 | 3.0 | 57.0 | 13.0 |
| MXDSRM0185A | 04748 | 1.85 | 3.0 | 57.0 | 14.0 |
| MXDSRM0190A | 04750 | 1.9 | 3.0 | 57.0 | 14.0 |
| MXDSRM0195A | 04752 | 1.95 | 3.0 | 57.0 | 14.0 |
| MXDSRM0200A | 04754 | 2.0 | 3.0 | 57.0 | 15.0 |
| MXDSRM0205A | 04756 | 2.05 | 3.0 | 57.0 | 15.0 |
| MXDSRM0210A | 04758 | 2.1 | 3.0 | 57.0 | 15.0 |
| MXDSRM0215A | 04760 | 2.15 | 3.0 | 57.0 | 16.0 |
| MXDSRM0220A | 04762 | 2.2 | 3.0 | 57.0 | 16.0 |
| MXDSRM0225A | 04764 | 2.25 | 3.0 | 57.0 | 17.0 |
| MXDSRM0230A | 04766 | 2.3 | 3.0 | 57.0 | 17.0 |
| MXDSRM0235A | 04768 | 2.35 | 3.0 | 57.0 | 17.0 |
| MXDSRM0240A | 04770 | 2.4 | 3.0 | 57.0 | 18.0 |
| MXDSRM0245A | 04772 | 2.45 | 3.0 | 57.0 | 18.0 |
| MXDSRM0250A | 04774 | 2.5 | 3.0 | 57.0 | 18.0 |
| MXDSRM0255A | 04776 | 2.55 | 3.0 | 57.0 | 19.0 |
| MXDSRM0260A | 04778 | 2.6 | 3.0 | 57.0 | 19.0 |
| MXDSRM0265A | 04780 | 2.65 | 3.0 | 57.0 | 19.0 |
| MXDSRM0270A | 04782 | 2.7 | 3.0 | 57.0 | 20.0 |
| MXDSRM0275A | 04784 | 2.75 | 3.0 | 57.0 | 20.0 |
| MXDSRM0280A | 04786 | 2.8 | 3.0 | 57.0 | 20.0 |
| MXDSRM0285A | 04788 | 2.85 | 3.0 | 57.0 | 21.0 |
| MXDSRM0290A | 04790 | 2.9 | 3.0 | 57.0 | 21.0 |
| MXDSRM0295A | 04792 | 2.95 | 3.0 | 57.0 | 22.0 |

| Metric (mm) | |
|---|---|
| D1 | Tolerance (h7) |
| 0.5 - 2.95 | +0/-0.010 |

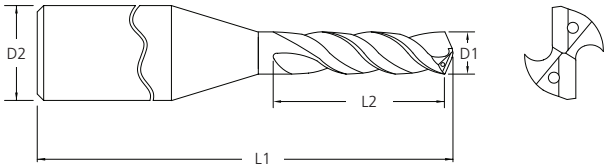
| Metric (mm) | |
|---|---|
| D2 | Tolerance (h6) |
| 3.0 | +0/-0.006 |

P146

# Twister® Micro XD Series MXDCR






| ALtima® | | Drill Dimensions | | | |
|---|---|---|---|---|---|
| Tool No. | EDP | Ø D1 | Ø D2 | L1 | L2 |
| MXDCRM0100A | 04794 | 1.0 | 3.0 | 57.0 | 8.0 |
| MXDCRM0105A | 04795 | 1.05 | 3.0 | 57.0 | 8.0 |
| MXDCRM0110A | 04796 | 1.1 | 3.0 | 57.0 | 8.0 |
| MXDCRM0115A | 04797 | 1.15 | 3.0 | 57.0 | 9.0 |
| MXDCRM0120A | 04798 | 1.2 | 3.0 | 57.0 | 9.0 |
| MXDCRM0125A | 04799 | 1.25 | 3.0 | 57.0 | 9.0 |
| MXDCRM0130A | 04800 | 1.3 | 3.0 | 57.0 | 10.0 |
| MXDCRM0135A | 04801 | 1.35 | 3.0 | 57.0 | 10.0 |
| MXDCRM0140A | 04802 | 1.4 | 3.0 | 57.0 | 10.0 |
| MXDCRM0145A | 04803 | 1.45 | 3.0 | 57.0 | 11.0 |
| MXDCRM0150A | 04804 | 1.5 | 3.0 | 57.0 | 11.0 |
| MXDCRM0155A | 04805 | 1.55 | 3.0 | 57.0 | 12.0 |
| MXDCRM0160A | 04806 | 1.6 | 3.0 | 57.0 | 12.0 |
| MXDCRM0165A | 04807 | 1.65 | 3.0 | 57.0 | 12.0 |
| MXDCRM0170A | 04808 | 1.7 | 3.0 | 57.0 | 13.0 |
| MXDCRM0175A | 04809 | 1.75 | 3.0 | 57.0 | 13.0 |
| MXDCRM0180A | 04810 | 1.8 | 3.0 | 57.0 | 13.0 |
| MXDCRM0185A | 04811 | 1.85 | 3.0 | 57.0 | 14.0 |
| MXDCRM0190A | 04812 | 1.9 | 3.0 | 57.0 | 14.0 |
| MXDCRM0195A | 04813 | 1.95 | 3.0 | 57.0 | 14.0 |

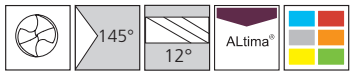
| ALtima® | | Drill Dimensions | | | |
|---|---|---|---|---|---|
| Tool No. | EDP | Ø D1 | Ø D2 | L1 | L2 |
| MXDCRM0200A | 04814 | 2.0 | 3.0 | 57.0 | 15.0 |
| MXDCRM0205A | 04815 | 2.05 | 3.0 | 60.0 | 15.0 |
| MXDCRM0210A | 04816 | 2.1 | 3.0 | 60.0 | 15.0 |
| MXDCRM0215A | 04817 | 2.15 | 3.0 | 60.0 | 16.0 |
| MXDCRM0220A | 04818 | 2.2 | 3.0 | 60.0 | 16.0 |
| MXDCRM0225A | 04819 | 2.25 | 3.0 | 60.0 | 17.0 |
| MXDCRM0230A | 04820 | 2.3 | 3.0 | 60.0 | 17.0 |
| MXDCRM0235A | 04821 | 2.35 | 3.0 | 60.0 | 17.0 |
| MXDCRM0240A | 04822 | 2.4 | 3.0 | 60.0 | 18.0 |
| MXDCRM0245A | 04823 | 2.45 | 3.0 | 60.0 | 18.0 |
| MXDCRM0250A | 04824 | 2.5 | 3.0 | 60.0 | 18.0 |
| MXDCRM0255A | 04825 | 2.55 | 3.0 | 60.0 | 19.0 |
| MXDCRM0260A | 04826 | 2.6 | 3.0 | 60.0 | 19.0 |
| MXDCRM0265A | 04827 | 2.65 | 3.0 | 60.0 | 19.0 |
| MXDCRM0270A | 04828 | 2.7 | 3.0 | 60.0 | 20.0 |
| MXDCRM0275A | 04829 | 2.75 | 3.0 | 60.0 | 20.0 |
| MXDCRM0280A | 04830 | 2.8 | 3.0 | 60.0 | 20.0 |
| MXDCRM0285A | 04831 | 2.85 | 3.0 | 60.0 | 21.0 |
| MXDCRM0290A | 04832 | 2.9 | 3.0 | 60.0 | 21.0 |
| MXDCRM0295A | 04833 | 2.95 | 3.0 | 60.0 | 22.0 |

| Metric (mm) | |
|---|---|
| D1 | Tolerance (h7) |
| 1.00 - 2.95 | +0/-0.010 |

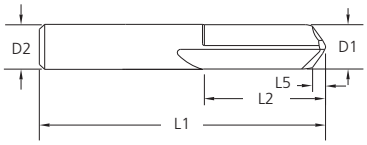
| Metric (mm) | |
|---|---|
| D2 | Tolerance (h6) |
| 3.00 | +0/-0.006 |

P149

# Twister® XD Spot Drill Series 200S





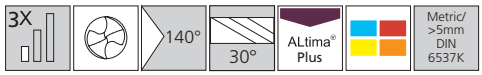

| Series 200S | Drill Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L5 |
| 200S 0300A | 3.0 | 3.0 | 38.0 | 16.0 | 0.4 |
| 200S 0600A | 6.0 | 6.0 | 51.0 | 19.0 | 0.8 |
| 200S 0800A | 8.0 | 8.0 | 64.0 | 19.0 | 1.1 |
| 200S 1000A | 10.0 | 10.0 | 70.0 | 25.0 | 1.4 |
| 200S 1200A | 12.0 | 12.0 | 76.0 | 25.0 | 1.7 |
| 200S 1600A | 16.0 | 16.0 | 89.0 | 32.0 | 2.2 |

P146

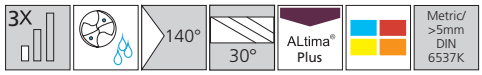


# cyclone CXD High Performance Drill - 3xD Series CXDSS & CXDCS

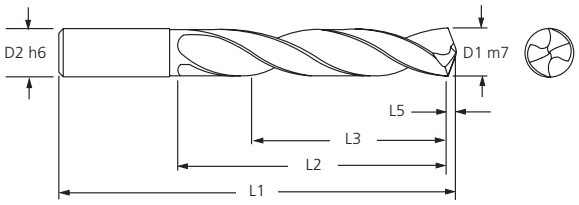
Series **CXDSS**




Series **CXDCS**



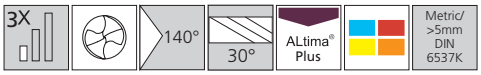


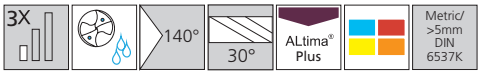

| Tool No. | | Drill Dimensions (mm) | | | | | |
|---|---|---|---|---|---|---|---|
| CXDSS | CXDCS | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| CXDSS 0300AP | CXDCS 0300AP | 3.0 | 3.0 | 62.0 | 20.0 | 14.0 | 0.46 |
| CXDSS 0310AP | CXDCS 0310AP | 3.1 | 4.0 | 62.0 | 20.0 | 14.0 | 0.48 |
| CXDSS 0320AP | CXDCS 0320AP | 3.2 | 4.0 | 62.0 | 20.0 | 14.0 | 0.5 |
| CXDSS 0330AP | CXDCS 0330AP | 3.3 | 4.0 | 62.0 | 20.0 | 14.0 | 0.51 |
| CXDSS 0340AP | CXDCS 0340AP | 3.4 | 4.0 | 62.0 | 20.0 | 14.0 | 0.53 |
| CXDSS 0350AP | CXDCS 0350AP | 3.5 | 4.0 | 62.0 | 20.0 | 14.0 | 0.54 |
| CXDSS 0360AP | CXDCS 0360AP | 3.6 | 4.0 | 62.0 | 20.0 | 14.0 | 0.56 |
| CXDSS 0370AP | CXDCS 0370AP | 3.7 | 4.0 | 62.0 | 20.0 | 14.0 | 0.57 |
| CXDSS 0380AP | CXDCS 0380AP | 3.8 | 4.0 | 66.0 | 24.0 | 17.0 | 0.59 |
| CXDSS 0390AP | CXDCS 0390AP | 3.9 | 4.0 | 66.0 | 24.0 | 17.0 | 0.6 |
| CXDSS 0400AP | CXDCS 0400AP | 4.0 | 4.0 | 66.0 | 24.0 | 17.0 | 0.62 |
| CXDSS 0410AP | CXDCS 0410AP | 4.1 | 5.0 | 66.0 | 24.0 | 17.0 | 0.64 |
| CXDSS 0420AP | CXDCS 0420AP | 4.2 | 5.0 | 66.0 | 24.0 | 17.0 | 0.65 |
| CXDSS 0430AP | CXDCS 0430AP | 4.3 | 5.0 | 66.0 | 24.0 | 17.0 | 0.67 |
| CXDSS 0440AP | CXDCS 0440AP | 4.4 | 5.0 | 66.0 | 24.0 | 17.0 | 0.68 |
| CXDSS 0450AP | CXDCS 0450AP | 4.5 | 5.0 | 66.0 | 24.0 | 17.0 | 0.7 |
| CXDSS 0460AP | CXDCS 0460AP | 4.6 | 5.0 | 66.0 | 24.0 | 17.0 | 0.71 |
| CXDSS 0470AP | CXDCS 0470AP | 4.7 | 5.0 | 66.0 | 24.0 | 17.0 | 0.73 |

# cyclone CXD High Performance Drill - 3xD Series CXDSS & CXDCS

Series **CXDSS**

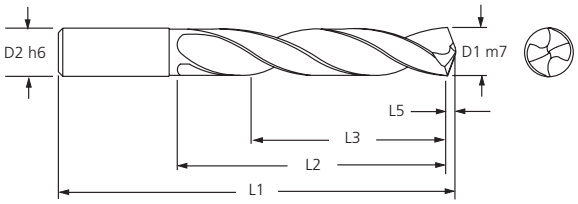



Series **CXDCS**





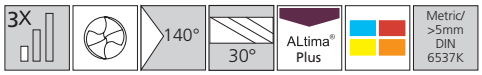


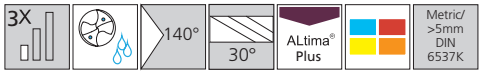

| Tool No. | | Drill Dimensions (mm) | | | | | |
|---|---|---|---|---|---|---|---|
| CXDSS | CXDCS | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| CXDSS 0480AP | CXDCS 0480AP | 4.8 | 5.0 | 66.0 | 28.0 | 20.0 | 0.74 |
| CXDSS 0490AP | CXDCS 0490AP | 4.9 | 5.0 | 66.0 | 28.0 | 20.0 | 0.76 |
| CXDSS 0500AP | CXDCS 0500AP | 5.0 | 5.0 | 66.0 | 28.0 | 20.0 | 0.77 |
| CXDSS 0510AP | CXDCS 0510AP | 5.1 | 6.0 | 66.0 | 28.0 | 20.0 | 0.79 |
| CXDSS 0520AP | CXDCS 0520AP | 5.2 | 6.0 | 66.0 | 28.0 | 20.0 | 0.81 |
| CXDSS 0530AP | CXDCS 0530AP | 5.3 | 6.0 | 66.0 | 28.0 | 20.0 | 0.82 |
| CXDSS 0540AP | CXDCS 0540AP | 5.4 | 6.0 | 66.0 | 28.0 | 20.0 | 0.84 |
| CXDSS 0550AP | CXDCS 0550AP | 5.5 | 6.0 | 66.0 | 28.0 | 20.0 | 0.85 |
| CXDSS 0560AP | CXDCS 0560AP | 5.6 | 6.0 | 66.0 | 28.0 | 20.0 | 0.86 |
| CXDSS 0570AP | CXDCS 0570AP | 5.7 | 6.0 | 66.0 | 28.0 | 20.0 | 0.88 |
| CXDSS 0580AP | CXDCS 0580AP | 5.8 | 6.0 | 66.0 | 28.0 | 20.0 | 0.9 |
| CXDSS 0590AP | CXDCS 0590AP | 5.9 | 6.0 | 66.0 | 28.0 | 20.0 | 0.91 |
| CXDSS 0600AP | CXDCS 0600AP | 6.0 | 6.0 | 66.0 | 28.0 | 20.0 | 0.93 |
| CXDSS 0610AP | CXDCS 0610AP | 6.1 | 8.0 | 79.0 | 34.0 | 24.0 | 0.95 |
| CXDSS 0620AP | CXDCS 0620AP | 6.2 | 8.0 | 79.0 | 34.0 | 24.0 | 0.96 |
| CXDSS 0630AP | CXDCS 0630AP | 6.3 | 8.0 | 79.0 | 34.0 | 24.0 | 0.98 |
| CXDSS 0640AP | CXDCS 0640AP | 6.4 | 8.0 | 79.0 | 34.0 | 24.0 | 0.99 |
| CXDSS 0650AP | CXDCS 0650AP | 6.5 | 8.0 | 79.0 | 34.0 | 24.0 | 1.01 |
| CXDSS 0660AP | CXDCS 0660AP | 6.6 | 8.0 | 79.0 | 34.0 | 24.0 | 1.03 |
| CXDSS 0670AP | CXDCS 0670AP | 6.7 | 8.0 | 79.0 | 34.0 | 24.0 | 1.04 |
| CXDSS 0680AP | CXDCS 0680AP | 6.8 | 8.0 | 79.0 | 34.0 | 24.0 | 1.05 |
| CXDSS 0690AP | CXDCS 0690AP | 6.9 | 8.0 | 79.0 | 34.0 | 24.0 | 1.07 |
| CXDSS 0700AP | CXDCS 0700AP | 7.0 | 8.0 | 79.0 | 34.0 | 24.0 | 1.08 |
| CXDSS 0710AP | CXDCS 0710AP | 7.1 | 8.0 | 79.0 | 41.0 | 29.0 | 1.1 |
| CXDSS 0720AP | CXDCS 0720AP | 7.2 | 8.0 | 79.0 | 41.0 | 29.0 | 1.12 |
| CXDSS 0730AP | CXDCS 0730AP | 7.3 | 8.0 | 79.0 | 41.0 | 29.0 | 1.13 |
| CXDSS 0740AP | CXDCS 0740AP | 7.4 | 8.0 | 79.0 | 41.0 | 29.0 | 1.15 |
| CXDSS 0750AP | CXDCS 0750AP | 7.5 | 8.0 | 79.0 | 41.0 | 29.0 | 1.16 |
| CXDSS 0760AP | CXDCS 0760AP | 7.6 | 8.0 | 79.0 | 41.0 | 29.0 | 1.18 |
| CXDSS 0770AP | CXDCS 0770AP | 7.7 | 8.0 | 79.0 | 41.0 | 29.0 | 1.19 |
| CXDSS 0780AP | CXDCS 0780AP | 7.8 | 8.0 | 79.0 | 41.0 | 29.0 | 1.21 |
| CXDSS 0790AP | CXDCS 0790AP | 7.9 | 8.0 | 79.0 | 41.0 | 29.0 | 1.22 |
| CXDSS 0800AP | CXDCS 0800AP | 8.0 | 8.0 | 79.0 | 41.0 | 29.0 | 1.24 |
| CXDSS 0810AP | CXDCS 0810AP | 8.1 | 10.0 | 89.0 | 47.0 | 35.0 | 1.26 |
| CXDSS 0820AP | CXDCS 0820AP | 8.2 | 10.0 | 89.0 | 47.0 | 35.0 | 1.27 |
| CXDSS 0830AP | CXDCS 0830AP | 8.3 | 10.0 | 89.0 | 47.0 | 35.0 | 1.29 |
| CXDSS 0840AP | CXDCS 0840AP | 8.4 | 10.0 | 89.0 | 47.0 | 35.0 | 1.31 |
| CXDSS 0850AP | CXDCS 0850AP | 8.5 | 10.0 | 89.0 | 47.0 | 35.0 | 1.32 |
| CXDSS 0860AP | CXDCS 0860AP | 8.6 | 10.0 | 89.0 | 47.0 | 35.0 | 1.33 |
| CXDSS 0870AP | CXDCS 0870AP | 8.7 | 10.0 | 89.0 | 47.0 | 35.0 | 1.35 |
| CXDSS 0880AP | CXDCS 0880AP | 8.8 | 10.0 | 89.0 | 47.0 | 35.0 | 1.36 |

# cyclone CXD High Performance Drill - 3xD Series CXDSS & CXDCS

Series **CXDSS**

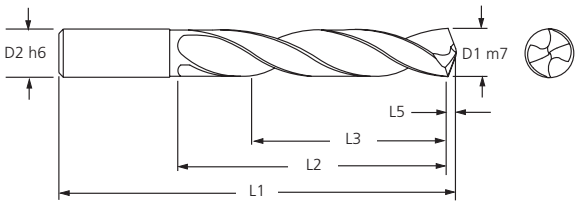



Series **CXDCS**





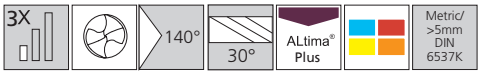


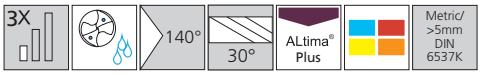

| Tool No. | | Drill Dimensions (mm) | | | | | |
|---|---|---|---|---|---|---|---|
| CXDSS | CXDCS | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| CXDSS 0890AP | CXDCS 0890AP | 8.9 | 10.0 | 89.0 | 47.0 | 35.0 | 1.38 |
| CXDSS 0900AP | CXDCS 0900AP | 9.0 | 10.0 | 89.0 | 47.0 | 35.0 | 1.39 |
| CXDSS 0910AP | CXDCS 0910AP | 9.1 | 10.0 | 89.0 | 47.0 | 35.0 | 1.41 |
| CXDSS 0920AP | CXDCS 0920AP | 9.2 | 10.0 | 89.0 | 47.0 | 35.0 | 1.43 |
| CXDSS 0925AP | CXDCS 0925AP | 9.25 | 10.0 | 89.0 | 47.0 | 35.0 | 1.43 |
| CXDSS 0930AP | CXDCS 0930AP | 9.3 | 10.0 | 89.0 | 47.0 | 35.0 | 1.44 |
| CXDSS 0940AP | CXDCS 0940AP | 9.4 | 10.0 | 89.0 | 47.0 | 35.0 | 1.46 |
| CXDSS 0950AP | CXDCS 0950AP | 9.5 | 10.0 | 89.0 | 47.0 | 35.0 | 1.47 |
| CXDSS 0960AP | CXDCS 0960AP | 9.6 | 10.0 | 89.0 | 47.0 | 35.0 | 1.49 |
| CXDSS 0970AP | CXDCS 0970AP | 9.7 | 10.0 | 89.0 | 47.0 | 35.0 | 1.5 |
| CXDSS 0980AP | CXDCS 0980AP | 9.8 | 10.0 | 89.0 | 47.0 | 35.0 | 1.52 |
| CXDSS 0990AP | CXDCS 0990AP | 9.9 | 10.0 | 89.0 | 47.0 | 35.0 | 1.53 |
| CXDSS 1000AP | CXDCS 1000AP | 10.0 | 10.0 | 89.0 | 47.0 | 35.0 | 1.55 |
| CXDSS 1010AP | CXDCS 1010AP | 10.1 | 12.0 | 102.0 | 55.0 | 40.0 | 1.56 |
| CXDSS 1020AP | CXDCS 1020AP | 10.2 | 12.0 | 102.0 | 55.0 | 40.0 | 1.58 |
| CXDSS 1030AP | CXDCS 1030AP | 10.3 | 12.0 | 102.0 | 55.0 | 40.0 | 1.6 |
| CXDSS 1040AP | CXDCS 1040AP | 10.4 | 12.0 | 102.0 | 55.0 | 40.0 | 1.61 |
| CXDSS 1050AP | CXDCS 1050AP | 10.5 | 12.0 | 102.0 | 55.0 | 40.0 | 1.63 |
| CXDSS 1060AP | CXDCS 1060AP | 10.6 | 12.0 | 102.0 | 55.0 | 40.0 | 1.64 |
| CXDSS 1070AP | CXDCS 1070AP | 10.7 | 12.0 | 102.0 | 55.0 | 40.0 | 1.66 |
| CXDSS 1080AP | CXDCS 1080AP | 10.8 | 12.0 | 102.0 | 55.0 | 40.0 | 1.67 |
| CXDSS 1090AP | CXDCS 1090AP | 10.9 | 12.0 | 102.0 | 55.0 | 40.0 | 1.69 |
| CXDSS 1100AP | CXDCS 1100AP | 11.0 | 12.0 | 102.0 | 55.0 | 40.0 | 1.7 |
| CXDSS 1110AP | CXDCS 1110AP | 11.1 | 12.0 | 102.0 | 55.0 | 40.0 | 1.72 |
| CXDSS 1120AP | CXDCS 1120AP | 11.2 | 12.0 | 102.0 | 55.0 | 40.0 | 1.74 |
| CXDSS 1130AP | CXDCS 1130AP | 11.3 | 12.0 | 102.0 | 55.0 | 40.0 | 1.75 |
| CXDSS 1140AP | CXDCS 1140AP | 11.4 | 12.0 | 102.0 | 55.0 | 40.0 | 1.77 |
| CXDSS 1150AP | CXDCS 1150AP | 11.5 | 12.0 | 102.0 | 55.0 | 40.0 | 1.78 |
| CXDSS 1160AP | CXDCS 1160AP | 11.6 | 12.0 | 102.0 | 55.0 | 40.0 | 1.8 |
| CXDSS 1170AP | CXDCS 1170AP | 11.7 | 12.0 | 102.0 | 55.0 | 40.0 | 1.81 |

# cyclone CXD High Performance Drill - 3xD Series CXDSS & CXDCS

Series **CXDSS**

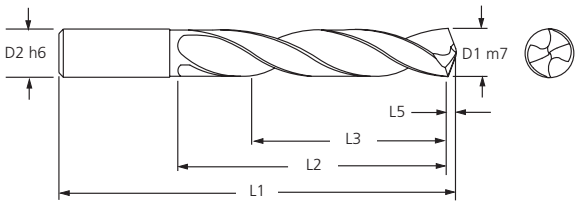



Series **CXDCS**








| Tool No. | | Drill Dimensions (mm) | | | | | |
|---|---|---|---|---|---|---|---|
| CXDSS | CXDCS | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| CXDSS 1180AP | CXDCS 1180AP | 11.8 | 12.0 | 102.0 | 55.0 | 40.0 | 1.83 |
| CXDSS 1190AP | CXDCS 1190AP | 11.9 | 12.0 | 102.0 | 55.0 | 40.0 | 1.84 |
| CXDSS 1200AP | CXDCS 1200AP | 12.0 | 12.0 | 102.0 | 55.0 | 40.0 | 1.86 |
| CXDSS 1210AP | CXDCS 1210AP | 12.1 | 14.0 | 107.0 | 60.0 | 43.0 | 1.87 |
| CXDSS 1250AP | CXDCS 1250AP | 12.5 | 14.0 | 107.0 | 60.0 | 43.0 | 1.94 |
| CXDSS 1280AP | CXDCS 1280AP | 12.8 | 14.0 | 107.0 | 60.0 | 43.0 | 1.98 |
| CXDSS 1283AP | CXDCS 1283AP | 12.83 | 14.0 | 107.0 | 60.0 | 43.0 | 1.99 |
| CXDSS 1290AP | CXDCS 1290AP | 12.9 | 14.0 | 107.0 | 60.0 | 43.0 | 2.0 |
| CXDSS 1300AP | CXDCS 1300AP | 13.0 | 14.0 | 107.0 | 60.0 | 43.0 | 2.01 |
| CXDSS 1350AP | CXDCS 1350AP | 13.5 | 14.0 | 107.0 | 60.0 | 43.0 | 2.09 |
| CXDSS 1370AP | CXDCS 1370AP | 13.7 | 14.0 | 107.0 | 60.0 | 43.0 | 2.12 |
| CXDSS 1400AP | CXDCS 1400AP | 14.0 | 14.0 | 107.0 | 60.0 | 43.0 | 2.17 |
| CXDSS 1450AP | CXDCS 1450AP | 14.5 | 16.0 | 115.0 | 65.0 | 45.0 | 2.25 |
| CXDSS 1470AP | CXDCS 1470AP | 14.7 | 16.0 | 115.0 | 65.0 | 45.0 | 2.28 |
| CXDSS 1500AP | CXDCS 1500AP | 15.0 | 16.0 | 115.0 | 65.0 | 45.0 | 2.32 |
| CXDSS 1530AP | CXDCS 1530AP | 15.3 | 16.0 | 115.0 | 65.0 | 45.0 | 2.37 |
| CXDSS 1550AP | CXDCS 1550AP | 15.5 | 16.0 | 115.0 | 65.0 | 45.0 | 2.4 |
| CXDSS 1570AP | CXDCS 1570AP | 15.7 | 16.0 | 115.0 | 65.0 | 45.0 | 2.43 |
| CXDSS 1600AP | CXDCS 1600AP | 16.0 | 16.0 | 115.0 | 65.0 | 45.0 | 2.48 |
| CXDSS 1608AP | - | 16.08 | 18.0 | 123.0 | 73.0 | 51.0 | 2.49 |
| CXDSS 1630AP | - | 16.3 | 18.0 | 123.0 | 73.0 | 51.0 | 2.53 |
| CXDSS 1650AP | - | 16.5 | 18.0 | 123.0 | 73.0 | 51.0 | 2.56 |
| CXDSS 1700AP | - | 17.0 | 18.0 | 123.0 | 73.0 | 51.0 | 2.63 |
| CXDSS 1750AP | - | 17.5 | 18.0 | 123.0 | 73.0 | 51.0 | 2.71 |
| CXDSS 1800AP | - | 18.0 | 18.0 | 123.0 | 73.0 | 51.0 | 2.79 |
| CXDSS 1850AP | - | 18.5 | 20.0 | 131.0 | 79.0 | 55.0 | 2.87 |
| CXDSS 1916AP | - | 19.16 | 20.0 | 131.0 | 79.0 | 55.0 | 2.97 |
| CXDSS 1925AP | - | 19.25 | 20.0 | 131.0 | 79.0 | 55.0 | 2.98 |
| CXDSS 1930AP | - | 19.3 | 20.0 | 131.0 | 79.0 | 55.0 | 2.99 |
| CXDSS 1950AP | - | 19.5 | 20.0 | 131.0 | 79.0 | 55.0 | 3.02 |
| CXDSS 2000AP | - | 20.0 | 20.0 | 131.0 | 79.0 | 55.0 | 3.1 |

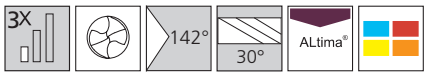
| D1 | Tolerance (m7) |
|---|---|
| 0 - 3.0 | +0.002/+0.012 |
| 3.01 - 6.0 | +0.004/+0.016 |
| 6.01 - 10.0 | +0.006/+0.021 |
| 10.01 - 18.0 | +0.007/+0.025 |
| 18.01 - 20.0 | +0.008/+0.029 |

| D2 | Tolerance (h6) |
|---|---|
| 0 - 3.0 | +0/-0.006 |
| 3.01 - 6.0 | +0/-0.008 |
| 6.01 - 10.0 | +0/-0.009 |
| 10.01 - 18.0 | +0/-0.011 |
| 18.01 - 20.0 | +0/-0.013 |

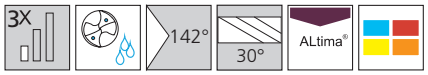
P154

# Twister® XD High Performance Drill - 3xD Series XDSSM & XDCSM

Series **XD SSM**

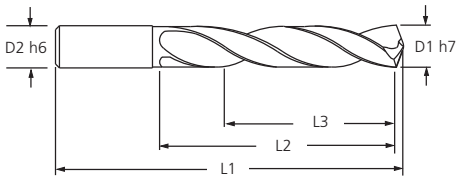



Series **XD CSM**





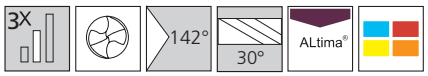


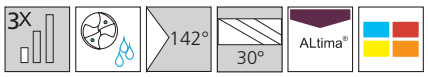

| Series 2XDSSM | Drill Dimensions XD SSM | | | | | Series 2XDCSM | Drill Dimensions XD CSM | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 | Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| 2XDSSM0250A | 2.5 | 2.5 | 43.0 | 14.0 | 11.0 | - | - | - | - | - | - |
| 2XDSSM0290A | 2.9 | 2.9 | 46.0 | 16.0 | 12.0 | - | - | - | - | - | - |
| 2XDSSM0300A | 3.0 | 3.0 | 57.0 | 16.0 | 13.0 | 2XDCSM0300A | 3.0 | 3.0 | 57.0 | 16.0 | 13.0 |
| 2XDSSM0310A | 3.1 | 4.0 | 63.0 | 22.0 | 18.0 | 2XDCSM0310A | 3.1 | 4.0 | 63.0 | 22.0 | 18.0 |
| 2XDSSM0320A | 3.2 | 4.0 | 63.0 | 22.0 | 18.0 | 2XDCSM0320A | 3.2 | 4.0 | 63.0 | 22.0 | 18.0 |
| 2XDSSM0330A | 3.3 | 4.0 | 63.0 | 22.0 | 18.0 | 2XDCSM0330A | 3.3 | 4.0 | 63.0 | 22.0 | 18.0 |
| 2XDSSM0340A | 3.4 | 4.0 | 63.0 | 22.0 | 18.0 | 2XDCSM0340A | 3.4 | 4.0 | 63.0 | 22.0 | 18.0 |
| 2XDSSM0350A | 3.5 | 4.0 | 63.0 | 22.0 | 18.0 | 2XDCSM0350A | 3.5 | 4.0 | 63.0 | 22.0 | 18.0 |
| 2XDSSM0360A | 3.6 | 4.0 | 63.0 | 22.0 | 18.0 | 2XDCSM0360A | 3.6 | 4.0 | 63.0 | 22.0 | 18.0 |
| 2XDSSM0370A | 3.7 | 4.0 | 63.0 | 22.0 | 18.0 | 2XDCSM0370A | 3.7 | 4.0 | 63.0 | 22.0 | 18.0 |
| 2XDSSM0380A | 3.8 | 4.0 | 63.0 | 22.0 | 18.0 | 2XDCSM0380A | 3.8 | 4.0 | 63.0 | 22.0 | 18.0 |
| 2XDSSM0390A | 3.9 | 4.0 | 63.0 | 22.0 | 18.0 | 2XDCSM0390A | 3.9 | 4.0 | 63.0 | 22.0 | 18.0 |
| 2XDSSM0400A | 4.0 | 4.0 | 63.0 | 22.0 | 18.0 | 2XDCSM0400A | 4.0 | 4.0 | 63.0 | 22.0 | 18.0 |
| 2XDSSM0410A | 4.1 | 5.0 | 63.0 | 26.0 | 21.0 | 2XDCSM0410A | 4.1 | 5.0 | 63.0 | 26.0 | 21.0 |
| 2XDSSM0420A | 4.2 | 5.0 | 63.0 | 26.0 | 21.0 | 2XDCSM0420A | 4.2 | 5.0 | 63.0 | 26.0 | 21.0 |
| 2XDSSM0430A | 4.3 | 5.0 | 63.0 | 26.0 | 21.0 | 2XDCSM0430A | 4.3 | 5.0 | 63.0 | 26.0 | 21.0 |
| 2XDSSM0440A | 4.4 | 5.0 | 63.0 | 26.0 | 21.0 | 2XDCSM0440A | 4.4 | 5.0 | 63.0 | 26.0 | 21.0 |
| 2XDSSM0450A | 4.5 | 5.0 | 63.0 | 26.0 | 21.0 | 2XDCSM0450A | 4.5 | 5.0 | 63.0 | 26.0 | 21.0 |
| 2XDSSM0460A | 4.6 | 5.0 | 63.0 | 26.0 | 21.0 | 2XDCSM0460A | 4.6 | 5.0 | 63.0 | 26.0 | 21.0 |
| 2XDSSM0470A | 4.7 | 5.0 | 63.0 | 26.0 | 21.0 | 2XDCSM0470A | 4.7 | 5.0 | 63.0 | 26.0 | 21.0 |
| 2XDSSM0480A | 4.8 | 5.0 | 63.0 | 26.0 | 21.0 | 2XDCSM0480A | 4.8 | 5.0 | 63.0 | 26.0 | 21.0 |
| 2XDSSM0490A | 4.9 | 5.0 | 63.0 | 26.0 | 21.0 | 2XDCSM0490A | 4.9 | 5.0 | 63.0 | 26.0 | 21.0 |
| 2XDSSM0500A | 5.0 | 5.0 | 63.0 | 26.0 | 21.0 | 2XDCSM0500A | 5.0 | 5.0 | 63.0 | 26.0 | 21.0 |
| 2XDSSM0510A | 5.1 | 6.0 | 76.0 | 30.0 | 24.0 | 2XDCSM0510A | 5.1 | 6.0 | 66.0 | 28.0 | 20.0 |
| 2XDSSM0520A | 5.2 | 6.0 | 76.0 | 30.0 | 24.0 | 2XDCSM0520A | 5.2 | 6.0 | 66.0 | 28.0 | 20.0 |
| 2XDSSM0530A | 5.3 | 6.0 | 76.0 | 30.0 | 24.0 | 2XDCSM0530A | 5.3 | 6.0 | 66.0 | 28.0 | 20.0 |
| 2XDSSM0540A | 5.4 | 6.0 | 76.0 | 30.0 | 24.0 | 2XDCSM0540A | 5.4 | 6.0 | 66.0 | 28.0 | 20.0 |
| 2XDSSM0550A | 5.5 | 6.0 | 76.0 | 30.0 | 24.0 | 2XDCSM0550A | 5.5 | 6.0 | 66.0 | 28.0 | 20.0 |
| 2XDSSM0570A | 5.7 | 6.0 | 76.0 | 30.0 | 24.0 | 2XDCSM0570A | 5.7 | 6.0 | 66.0 | 28.0 | 20.0 |
| 2XDSSM0580A | 5.8 | 6.0 | 76.0 | 30.0 | 24.0 | 2XDCSM0580A | 5.8 | 6.0 | 66.0 | 28.0 | 20.0 |
| 2XDSSM0590A | 5.9 | 6.0 | 76.0 | 30.0 | 24.0 | 2XDCSM0590A | 5.9 | 6.0 | 66.0 | 28.0 | 20.0 |
| 2XDSSM0600A | 6.0 | 6.0 | 76.0 | 30.0 | 24.0 | 2XDCSM0600A | 6.0 | 6.0 | 66.0 | 28.0 | 20.0 |
| 2XDSSM0610A | 6.1 | 8.0 | 82.0 | 35.0 | 28.0 | 2XDCSM0610A | 6.1 | 8.0 | 79.0 | 34.0 | 24.0 |
| 2XDSSM0620A | 6.2 | 8.0 | 82.0 | 35.0 | 28.0 | 2XDCSM0620A | 6.2 | 8.0 | 79.0 | 34.0 | 24.0 |
| 2XDSSM0630A | 6.3 | 8.0 | 82.0 | 35.0 | 28.0 | 2XDCSM0630A | 6.3 | 8.0 | 79.0 | 34.0 | 24.0 |
| 2XDSSM0640A | 6.4 | 8.0 | 82.0 | 35.0 | 28.0 | 2XDCSM0640A | 6.4 | 8.0 | 79.0 | 34.0 | 24.0 |
| 2XDSSM0650A | 6.5 | 8.0 | 82.0 | 35.0 | 28.0 | 2XDCSM0650A | 6.5 | 8.0 | 79.0 | 34.0 | 24.0 |
| 2XDSSM0660A | 6.6 | 8.0 | 82.0 | 35.0 | 28.0 | 2XDCSM0660A | 6.6 | 8.0 | 79.0 | 34.0 | 24.0 |
| 2XDSSM0670A | 6.7 | 8.0 | 82.0 | 35.0 | 28.0 | 2XDCSM0670A | 6.7 | 8.0 | 79.0 | 34.0 | 24.0 |
| 2XDSSM0680A | 6.8 | 8.0 | 82.0 | 35.0 | 28.0 | 2XDCSM0680A | 6.8 | 8.0 | 79.0 | 34.0 | 24.0 |
| 2XDSSM0690A | 6.9 | 8.0 | 82.0 | 35.0 | 28.0 | 2XDCSM0690A | 6.9 | 8.0 | 79.0 | 34.0 | 24.0 |
| 2XDSSM0700A | 7.0 | 8.0 | 82.0 | 35.0 | 28.0 | 2XDCSM0700A | 7.0 | 8.0 | 79.0 | 34.0 | 24.0 |

# Twister® XD High Performance Drill - 3xD Series XDSSM & XDCSM

Series **XD SSM**

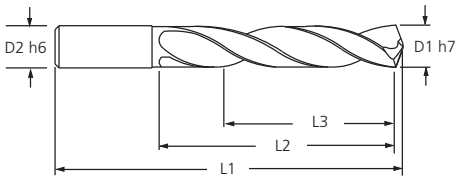



Series **XD CSM**





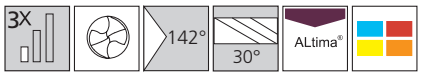


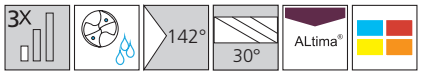

| Series 2XDSSM | Drill Dimensions XD SSM | | | | | Series 2XDCSM | Drill Dimensions XD CSM | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 | Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| 2XDSSM0710A | 7.1 | 8.0 | 82.0 | 38.0 | 31.0 | 2XDCSM0710A | 7.1 | 8.0 | 79.0 | 41.0 | 29.0 |
| 2XDSSM0720A | 7.2 | 8.0 | 82.0 | 38.0 | 31.0 | 2XDCSM0720A | 7.2 | 8.0 | 79.0 | 41.0 | 29.0 |
| 2XDSSM0730A | 7.3 | 8.0 | 82.0 | 38.0 | 31.0 | 2XDCSM0730A | 7.3 | 8.0 | 79.0 | 41.0 | 29.0 |
| 2XDSSM0740A | 7.4 | 8.0 | 82.0 | 38.0 | 31.0 | 2XDCSM0740A | 7.4 | 8.0 | 79.0 | 41.0 | 29.0 |
| 2XDSSM0750A | 7.5 | 8.0 | 82.0 | 38.0 | 31.0 | 2XDCSM0750A | 7.5 | 8.0 | 79.0 | 41.0 | 29.0 |
| 2XDSSM0760A | 7.6 | 8.0 | 82.0 | 38.0 | 31.0 | 2XDCSM0760A | 7.6 | 8.0 | 79.0 | 41.0 | 29.0 |
| 2XDSSM0770A | 7.7 | 8.0 | 82.0 | 38.0 | 31.0 | 2XDCSM0770A | 7.7 | 8.0 | 79.0 | 41.0 | 29.0 |
| 2XDSSM0780A | 7.8 | 8.0 | 82.0 | 38.0 | 31.0 | 2XDCSM0780A | 7.8 | 8.0 | 79.0 | 41.0 | 29.0 |
| 2XDSSM0790A | 7.9 | 8.0 | 82.0 | 38.0 | 31.0 | 2XDCSM0790A | 7.9 | 8.0 | 79.0 | 41.0 | 29.0 |
| 2XDSSM0800A | 8.0 | 8.0 | 82.0 | 38.0 | 31.0 | 2XDCSM0800A | 8.0 | 8.0 | 79.0 | 41.0 | 29.0 |
| 2XDSSM0810A | 8.1 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0810A | 8.1 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0820A | 8.2 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0820A | 8.2 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0830A | 8.3 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0830A | 8.3 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0840A | 8.4 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0840A | 8.4 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0850A | 8.5 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0850A | 8.5 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0860A | 8.6 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0860A | 8.6 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0870A | 8.7 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0870A | 8.7 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0880A | 8.8 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0880A | 8.8 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0890A | 8.9 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0890A | 8.9 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0900A | 9.0 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0900A | 9.0 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0910A | 9.1 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0910A | 9.1 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0920A | 9.2 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0920A | 9.2 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0925A | 9.25 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0925A | 9.25 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0930A | 9.3 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0930A | 9.3 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0940A | 9.4 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0940A | 9.4 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0950A | 9.5 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0950A | 9.5 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0960A | 9.6 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0960A | 9.6 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0970A | 9.7 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0970A | 9.7 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0980A | 9.8 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0980A | 9.8 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM0990A | 9.9 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM0990A | 9.9 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM1000A | 10.0 | 10.0 | 89.0 | 43.0 | 35.0 | 2XDCSM1000A | 10.0 | 10.0 | 89.0 | 47.0 | 35.0 |
| 2XDSSM1010A | 10.1 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1010A | 10.1 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1020A | 10.2 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1020A | 10.2 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1030A | 10.3 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1030A | 10.3 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1040A | 10.4 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1040A | 10.4 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1050A | 10.5 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1050A | 10.5 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1060A | 10.6 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1060A | 10.6 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1070A | 10.7 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1070A | 10.7 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1080A | 10.8 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1080A | 10.8 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1090A | 10.9 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1090A | 10.9 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1100A | 11.0 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1100A | 11.0 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1110A | 11.1 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1110A | 11.1 | 12.0 | 102.0 | 55.0 | 40.0 |

# Twister® XD High Performance Drill - 3xD Series XDSSM & XDCSM

Series **XD SSM**

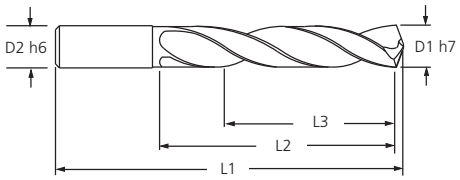



Series **XD CSM**







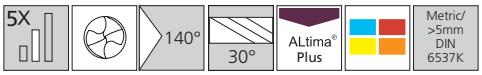




| Series 2XDSSM | Drill Dimensions XD SSM | | | | | Series 2XDCSM | Drill Dimensions XD CSM | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 | Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| 2XDSSM1120A | 11.2 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1120A | 11.2 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1130A | 11.3 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1130A | 11.3 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1140A | 11.4 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1140A | 11.4 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1150A | 11.5 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1150A | 11.5 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1160A | 11.6 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1160A | 11.6 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1170A | 11.7 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1170A | 11.7 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1180A | 11.8 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1180A | 11.8 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1190A | 11.9 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1190A | 11.9 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1200A | 12.0 | 12.0 | 101.0 | 51.0 | 41.0 | 2XDCSM1200A | 12.0 | 12.0 | 102.0 | 55.0 | 40.0 |
| 2XDSSM1210A | 12.1 | 14.0 | 107.0 | 54.0 | 43.0 | 2XDCSM1210A | 12.1 | 14.0 | 107.0 | 60.0 | 43.0 |
| 2XDSSM1250A | 12.5 | 14.0 | 107.0 | 54.0 | 43.0 | 2XDCSM1250A | 12.5 | 14.0 | 107.0 | 60.0 | 43.0 |
| 2XDSSM1280A | 12.8 | 14.0 | 107.0 | 54.0 | 43.0 | 2XDCSM1280A | 12.8 | 14.0 | 107.0 | 60.0 | 43.0 |
| 2XDSSM1283A | 12.83 | 14.0 | 107.0 | 54.0 | 43.0 | 2XDCSM1283A | 12.83 | 14.0 | 107.0 | 60.0 | 43.0 |
| 2XDSSM1290A | 12.9 | 14.0 | 107.0 | 54.0 | 43.0 | 2XDCSM1290A | 12.9 | 14.0 | 107.0 | 60.0 | 43.0 |
| 2XDSSM1300A | 13.0 | 14.0 | 107.0 | 54.0 | 43.0 | 2XDCSM1300A | 13.0 | 14.0 | 107.0 | 60.0 | 43.0 |
| 2XDSSM1350A | 13.5 | 14.0 | 107.0 | 54.0 | 43.0 | 2XDCSM1350A | 13.5 | 14.0 | 107.0 | 60.0 | 43.0 |
| 2XDSSM1370A | 13.7 | 14.0 | 107.0 | 54.0 | 43.0 | 2XDCSM1370A | 13.7 | 14.0 | 107.0 | 60.0 | 43.0 |
| 2XDSSM1400A | 14.0 | 14.0 | 107.0 | 54.0 | 43.0 | 2XDCSM1400A | 14.0 | 14.0 | 107.0 | 60.0 | 43.0 |
| 2XDSSM1450A | 14.5 | 16.0 | 117.0 | 60.0 | 48.0 | 2XDCSM1450A | 14.5 | 16.0 | 115.0 | 65.0 | 45.0 |
| 2XDSSM1470A | 14.7 | 16.0 | 117.0 | 60.0 | 48.0 | 2XDCSM1470A | 14.7 | 16.0 | 115.0 | 65.0 | 45.0 |
| 2XDSSM1500A | 15.0 | 16.0 | 117.0 | 60.0 | 48.0 | 2XDCSM1500A | 15.0 | 16.0 | 115.0 | 65.0 | 45.0 |
| 2XDSSM1530A | 15.3 | 16.0 | 117.0 | 60.0 | 48.0 | 2XDCSM1530A | 15.3 | 16.0 | 115.0 | 65.0 | 45.0 |
| 2XDSSM1550A | 15.5 | 16.0 | 117.0 | 60.0 | 48.0 | 2XDCSM1550A | 15.5 | 16.0 | 115.0 | 65.0 | 45.0 |
| 2XDSSM1570A | 15.7 | 16.0 | 117.0 | 60.0 | 48.0 | 2XDCSM1570A | 15.7 | 16.0 | 115.0 | 65.0 | 45.0 |
| 2XDSSM1600A | 16.0 | 16.0 | 117.0 | 60.0 | 48.0 | 2XDCSM1600A | 16.0 | 16.0 | 115.0 | 65.0 | 45.0 |
| 2XDSSM1608A | 16.08 | 18.0 | 122.0 | 63.0 | 51.0 | | | | | | |
| 2XDSSM1630A | 16.3 | 18.0 | 122.0 | 63.0 | 51.0 | | | | | | |
| 2XDSSM1650A | 16.5 | 18.0 | 122.0 | 63.0 | 51.0 | | | | | | |
| 2XDSSM1700A | 17.0 | 18.0 | 122.0 | 63.0 | 51.0 | | | | | | |
| 2XDSSM1750A | 17.5 | 18.0 | 122.0 | 63.0 | 51.0 | | | | | | |
| 2XDSSM1800A | 18.0 | 18.0 | 122.0 | 63.0 | 51.0 | | | | | | |
| 2XDSSM1850A | 18.5 | 20.0 | 133.0 | 70.0 | 56.0 | | | | | | |
| 2XDSSM1916A | 19.16 | 20.0 | 133.0 | 70.0 | 56.0 | | | | | | |
| 2XDSSM1925A | 19.25 | 20.0 | 133.0 | 70.0 | 56.0 | | | | | | |
| 2XDSSM1930A | 19.3 | 20.0 | 133.0 | 70.0 | 56.0 | | | | | | |
| 2XDSSM1950A | 19.5 | 20.0 | 133.0 | 70.0 | 56.0 | | | | | | |
| 2XDSSM2000A | 20.0 | 20.0 | 133.0 | 70.0 | 56.0 | | | | | | |

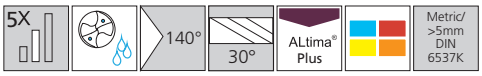
147

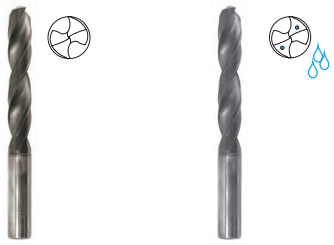
# cyclone CXD High Performance Drill - 5xD Series CXDSR & CXDCR

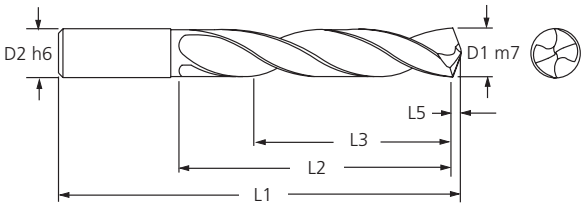
Series **CXDSR**




Series **CXDCR**



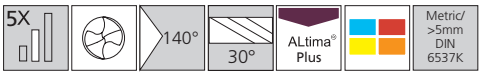





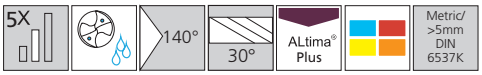

| Tool No. | | Drill Dimensions (mm) | | | | | |
|---|---|---|---|---|---|---|---|
| CXDSR | CXDCR | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| CXDSR 0300AP | CXDCR 0300AP | 3.0 | 3.0 | 66.0 | 28.0 | 23.0 | 0.46 |
| CXDSR 0310AP | CXDCR 0310AP | 3.1 | 4.0 | 66.0 | 28.0 | 23.0 | 0.48 |
| CXDSR 0320AP | CXDCR 0320AP | 3.2 | 4.0 | 66.0 | 28.0 | 23.0 | 0.5 |
| CXDSR 0330AP | CXDCR 0330AP | 3.3 | 4.0 | 66.0 | 28.0 | 23.0 | 0.51 |
| CXDSR 0340AP | CXDCR 0340AP | 3.4 | 4.0 | 66.0 | 28.0 | 23.0 | 0.53 |
| CXDSR 0350AP | CXDCR 0350AP | 3.5 | 4.0 | 66.0 | 28.0 | 23.0 | 0.54 |
| CXDSR 0360AP | CXDCR 0360AP | 3.6 | 4.0 | 66.0 | 28.0 | 23.0 | 0.56 |
| CXDSR 0370AP | CXDCR 0370AP | 3.7 | 4.0 | 66.0 | 28.0 | 23.0 | 0.57 |
| CXDSR 0380AP | CXDCR 0380AP | 3.8 | 4.0 | 74.0 | 36.0 | 29.0 | 0.59 |
| CXDSR 0390AP | CXDCR 0390AP | 3.9 | 4.0 | 74.0 | 36.0 | 29.0 | 0.6 |
| CXDSR 0400AP | CXDCR 0400AP | 4.0 | 4.0 | 74.0 | 36.0 | 29.0 | 0.62 |
| CXDSR 0410AP | CXDCR 0410AP | 4.1 | 5.0 | 74.0 | 36.0 | 29.0 | 0.64 |
| CXDSR 0420AP | CXDCR 0420AP | 4.2 | 5.0 | 74.0 | 36.0 | 29.0 | 0.65 |
| CXDSR 0430AP | CXDCR 0430AP | 4.3 | 5.0 | 74.0 | 36.0 | 29.0 | 0.67 |
| CXDSR 0440AP | CXDCR 0440AP | 4.4 | 5.0 | 74.0 | 36.0 | 29.0 | 0.68 |
| CXDSR 0450AP | CXDCR 0450AP | 4.5 | 5.0 | 74.0 | 36.0 | 29.0 | 0.7 |
| CXDSR 0460AP | CXDCR 0460AP | 4.6 | 5.0 | 74.0 | 36.0 | 29.0 | 0.71 |
| CXDSR 0470AP | CXDCR 0470AP | 4.7 | 5.0 | 74.0 | 36.0 | 29.0 | 0.73 |
| CXDSR 0480AP | CXDCR 0480AP | 4.8 | 5.0 | 82.0 | 44.0 | 35.0 | 0.74 |
| CXDSR 0490AP | CXDCR 0490AP | 4.9 | 5.0 | 82.0 | 44.0 | 35.0 | 0.76 |
| CXDSR 0500AP | CXDCR 0500AP | 5.0 | 5.0 | 82.0 | 44.0 | 35.0 | 0.77 |
| CXDSR 0510AP | CXDCR 0510AP | 5.1 | 6.0 | 82.0 | 44.0 | 35.0 | 0.79 |
| CXDSR 0520AP | CXDCR 0520AP | 5.2 | 6.0 | 82.0 | 44.0 | 35.0 | 0.81 |
| CXDSR 0530AP | CXDCR 0530AP | 5.3 | 6.0 | 82.0 | 44.0 | 35.0 | 0.82 |
| CXDSR 0540AP | CXDCR 0540AP | 5.4 | 6.0 | 82.0 | 44.0 | 35.0 | 0.84 |
| CXDSR 0550AP | CXDCR 0550AP | 5.5 | 6.0 | 82.0 | 44.0 | 35.0 | 0.85 |
| CXDSR 0560AP | CXDCR 0560AP | 5.6 | 6.0 | 82.0 | 44.0 | 35.0 | 0.86 |
| CXDSR 0570AP | CXDCR 0570AP | 5.7 | 6.0 | 82.0 | 44.0 | 35.0 | 0.88 |
| CXDSR 0580AP | CXDCR 0580AP | 5.8 | 6.0 | 82.0 | 44.0 | 35.0 | 0.9 |
| CXDSR 0590AP | CXDCR 0590AP | 5.9 | 6.0 | 82.0 | 44.0 | 35.0 | 0.91 |
| CXDSR 0600AP | CXDCR 0600AP | 6.0 | 6.0 | 82.0 | 44.0 | 35.0 | 0.93 |
| CXDSR 0610AP | CXDCR 0610AP | 6.1 | 8.0 | 91.0 | 53.0 | 43.0 | 0.95 |
| CXDSR 0620AP | CXDCR 0620AP | 6.2 | 8.0 | 91.0 | 53.0 | 43.0 | 0.96 |
| CXDSR 0630AP | CXDCR 0630AP | 6.3 | 8.0 | 91.0 | 53.0 | 43.0 | 0.98 |
| CXDSR 0640AP | CXDCR 0640AP | 6.4 | 8.0 | 91.0 | 53.0 | 43.0 | 0.99 |
| CXDSR 0650AP | CXDCR 0650AP | 6.5 | 8.0 | 91.0 | 53.0 | 43.0 | 1.01 |
| CXDSR 0660AP | CXDCR 0660AP | 6.6 | 8.0 | 91.0 | 53.0 | 43.0 | 1.03 |
| CXDSR 0670AP | CXDCR 0670AP | 6.7 | 8.0 | 91.0 | 53.0 | 43.0 | 1.04 |
| CXDSR 0680AP | CXDCR 0680AP | 6.8 | 8.0 | 91.0 | 53.0 | 43.0 | 1.05 |
| CXDSR 0690AP | CXDCR 0690AP | 6.9 | 8.0 | 91.0 | 53.0 | 43.0 | 1.07 |

# cyclone CXD High Performance Drill - 5xD Series CXDSR & CXDCR

Series **CXDSR**

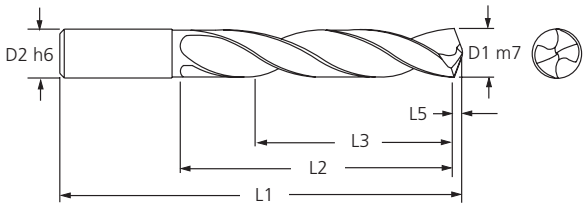



Series **CXDCR**





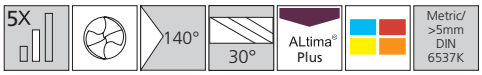


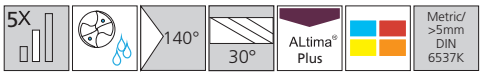

| Tool No. | | Drill Dimensions (mm) | | | | | |
|---|---|---|---|---|---|---|---|
| CXDSR | CXDCR | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| CXDSR 0700AP | CXDCR 0700AP | 7.0 | 8.0 | 91.0 | 53.0 | 43.0 | 1.08 |
| CXDSR 0710AP | CXDCR 0710AP | 7.1 | 8.0 | 91.0 | 53.0 | 43.0 | 1.1 |
| CXDSR 0720AP | CXDCR 0720AP | 7.2 | 8.0 | 91.0 | 53.0 | 43.0 | 1.12 |
| CXDSR 0730AP | CXDCR 0730AP | 7.3 | 8.0 | 91.0 | 53.0 | 43.0 | 1.13 |
| CXDSR 0740AP | CXDCR 0740AP | 7.4 | 8.0 | 91.0 | 53.0 | 43.0 | 1.15 |
| CXDSR 0750AP | CXDCR 0750AP | 7.5 | 8.0 | 91.0 | 53.0 | 43.0 | 1.16 |
| CXDSR 0760AP | CXDCR 0760AP | 7.6 | 8.0 | 91.0 | 53.0 | 43.0 | 1.18 |
| CXDSR 0770AP | CXDCR 0770AP | 7.7 | 8.0 | 91.0 | 53.0 | 43.0 | 1.19 |
| CXDSR 0780AP | CXDCR 0780AP | 7.8 | 8.0 | 91.0 | 53.0 | 43.0 | 1.21 |
| CXDSR 0790AP | CXDCR 0790AP | 7.9 | 8.0 | 91.0 | 53.0 | 43.0 | 1.22 |
| CXDSR 0800AP | CXDCR 0800AP | 8.0 | 8.0 | 91.0 | 53.0 | 43.0 | 1.24 |
| CXDSR 0810AP | CXDCR 0810AP | 8.1 | 10.0 | 103.0 | 61.0 | 49.0 | 1.26 |
| CXDSR 0820AP | CXDCR 0820AP | 8.2 | 10.0 | 103.0 | 61.0 | 49.0 | 1.27 |
| CXDSR 0830AP | CXDCR 0830AP | 8.3 | 10.0 | 103.0 | 61.0 | 49.0 | 1.29 |
| CXDSR 0840AP | CXDCR 0840AP | 8.4 | 10.0 | 103.0 | 61.0 | 49.0 | 1.31 |
| CXDSR 0850AP | CXDCR 0850AP | 8.5 | 10.0 | 103.0 | 61.0 | 49.0 | 1.32 |
| CXDSR 0860AP | CXDCR 0860AP | 8.6 | 10.0 | 103.0 | 61.0 | 49.0 | 1.33 |
| CXDSR 0870AP | CXDCR 0870AP | 8.7 | 10.0 | 103.0 | 61.0 | 49.0 | 1.35 |
| CXDSR 0880AP | CXDCR 0880AP | 8.8 | 10.0 | 103.0 | 61.0 | 49.0 | 1.36 |
| CXDSR 0890AP | CXDCR 0890AP | 8.9 | 10.0 | 103.0 | 61.0 | 49.0 | 1.38 |
| CXDSR 0900AP | CXDCR 0900AP | 9.0 | 10.0 | 103.0 | 61.0 | 49.0 | 1.39 |
| CXDSR 0910AP | CXDCR 0910AP | 9.1 | 10.0 | 103.0 | 61.0 | 49.0 | 1.41 |
| CXDSR 0920AP | CXDCR 0920AP | 9.2 | 10.0 | 103.0 | 61.0 | 49.0 | 1.43 |
| CXDSR 0925AP | CXDCR 0925AP | 9.3 | 10.0 | 103.0 | 61.0 | 49.0 | 1.43 |
| CXDSR 0930AP | CXDCR 0930AP | 9.3 | 10.0 | 103.0 | 61.0 | 49.0 | 1.44 |
| CXDSR 0940AP | CXDCR 0940AP | 9.4 | 10.0 | 103.0 | 61.0 | 49.0 | 1.46 |
| CXDSR 0950AP | CXDCR 0950AP | 9.5 | 10.0 | 103.0 | 61.0 | 49.0 | 1.47 |
| CXDSR 0960AP | CXDCR 0960AP | 9.6 | 10.0 | 103.0 | 61.0 | 49.0 | 1.49 |
| CXDSR 0970AP | CXDCR 0970AP | 9.7 | 10.0 | 103.0 | 61.0 | 49.0 | 1.5 |
| CXDSR 0980AP | CXDCR 0980AP | 9.8 | 10.0 | 103.0 | 61.0 | 49.0 | 1.52 |
| CXDSR 0990AP | CXDCR 0990AP | 9.9 | 10.0 | 103.0 | 61.0 | 49.0 | 1.53 |
| CXDSR 1000AP | CXDCR 1000AP | 10.0 | 10.0 | 103.0 | 61.0 | 49.0 | 1.55 |
| CXDSR 1010AP | CXDCR 1010AP | 10.1 | 12.0 | 118.0 | 71.0 | 56.0 | 1.56 |
| CXDSR 1020AP | CXDCR 1020AP | 10.2 | 12.0 | 118.0 | 71.0 | 56.0 | 1.58 |
| CXDSR 1030AP | CXDCR 1030AP | 10.3 | 12.0 | 118.0 | 71.0 | 56.0 | 1.6 |
| CXDSR 1040AP | CXDCR 1040AP | 10.4 | 12.0 | 118.0 | 71.0 | 56.0 | 1.61 |
| CXDSR 1050AP | CXDCR 1050AP | 10.5 | 12.0 | 118.0 | 71.0 | 56.0 | 1.63 |
| CXDSR 1060AP | CXDCR 1060AP | 10.6 | 12.0 | 118.0 | 71.0 | 56.0 | 1.64 |
| CXDSR 1070AP | CXDCR 1070AP | 10.7 | 12.0 | 118.0 | 71.0 | 56.0 | 1.66 |
| CXDSR 1080AP | CXDCR 1080AP | 10.8 | 12.0 | 118.0 | 71.0 | 56.0 | 1.67 |

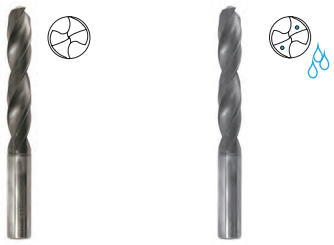
# cyclone CXD High Performance Drill - 5xD Series CXDSR & CXDCR

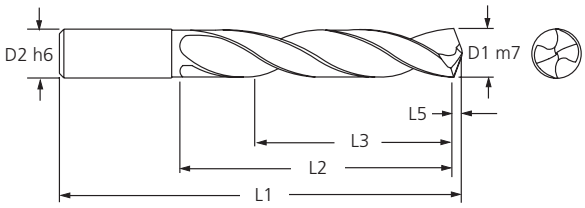
Series **CXDSR**




Series **CXDCR**



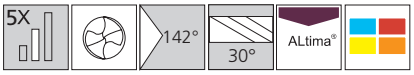



| Tool No. | | Drill Dimensions (mm) | | | | | |
|---|---|---|---|---|---|---|---|
| CXDSR | CXDCR | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| CXDSR 1090AP | CXDCR 1090AP | 10.9 | 12.0 | 118.0 | 71.0 | 56.0 | 1.69 |
| CXDSR 1100AP | CXDCR 1100AP | 11.0 | 12.0 | 118.0 | 71.0 | 56.0 | 1.7 |
| CXDSR 1110AP | CXDCR 1110AP | 11.1 | 12.0 | 118.0 | 71.0 | 56.0 | 1.72 |
| CXDSR 1120AP | CXDCR 1120AP | 11.2 | 12.0 | 118.0 | 71.0 | 56.0 | 1.74 |
| CXDSR 1130AP | CXDCR 1130AP | 11.3 | 12.0 | 118.0 | 71.0 | 56.0 | 1.75 |
| CXDSR 1140AP | CXDCR 1140AP | 11.4 | 12.0 | 118.0 | 71.0 | 56.0 | 1.77 |
| CXDSR 1150AP | CXDCR 1150AP | 11.5 | 12.0 | 118.0 | 71.0 | 56.0 | 1.78 |
| CXDSR 1160AP | CXDCR 1160AP | 11.6 | 12.0 | 118.0 | 71.0 | 56.0 | 1.8 |
| CXDSR 1170AP | CXDCR 1170AP | 11.7 | 12.0 | 118.0 | 71.0 | 56.0 | 1.81 |
| CXDSR 1180AP | CXDCR 1180AP | 11.8 | 12.0 | 118.0 | 71.0 | 56.0 | 1.83 |
| CXDSR 1190AP | CXDCR 1190AP | 11.9 | 12.0 | 118.0 | 71.0 | 56.0 | 1.84 |
| CXDSR 1200AP | CXDCR 1200AP | 12.0 | 12.0 | 118.0 | 71.0 | 56.0 | 1.86 |
| CXDSR 1210AP | CXDCR 1210AP | 12.1 | 14.0 | 124.0 | 77.0 | 60.0 | 1.87 |
| CXDSR 1250AP | CXDCR 1250AP | 12.5 | 14.0 | 124.0 | 77.0 | 60.0 | 1.94 |
| CXDSR 1280AP | CXDCR 1280AP | 12.8 | 14.0 | 124.0 | 77.0 | 60.0 | 1.98 |
| CXDSR 1283AP | CXDCR 1283AP | 12.8 | 14.0 | 124.0 | 77.0 | 60.0 | 1.99 |
| CXDSR 1290AP | CXDCR 1290AP | 12.9 | 14.0 | 124.0 | 77.0 | 60.0 | 2.0 |
| CXDSR 1300AP | CXDCR 1300AP | 13.0 | 14.0 | 124.0 | 77.0 | 60.0 | 2.01 |
| CXDSR 1350AP | CXDCR 1350AP | 13.5 | 14.0 | 124.0 | 77.0 | 60.0 | 2.09 |
| CXDSR 1370AP | CXDCR 1370AP | 13.7 | 14.0 | 124.0 | 77.0 | 60.0 | 2.12 |
| CXDSR 1400AP | CXDCR 1400AP | 14.0 | 14.0 | 124.0 | 77.0 | 60.0 | 2.17 |
| CXDSR 1450AP | CXDCR 1450AP | 14.5 | 16.0 | 133.0 | 83.0 | 63.0 | 2.25 |
| CXDSR 1470AP | CXDCR 1470AP | 14.7 | 16.0 | 133.0 | 83.0 | 63.0 | 2.28 |
| CXDSR 1500AP | CXDCR 1500AP | 15.0 | 16.0 | 133.0 | 83.0 | 63.0 | 2.32 |
| CXDSR 1530AP | CXDCR 1530AP | 15.3 | 16.0 | 133.0 | 83.0 | 63.0 | 2.37 |
| CXDSR 1550AP | CXDCR 1550AP | 15.5 | 16.0 | 133.0 | 83.0 | 63.0 | 2.4 |
| CXDSR 1570AP | CXDCR 1570AP | 15.7 | 16.0 | 133.0 | 83.0 | 63.0 | 2.43 |
| CXDSR 1600AP | CXDCR 1600AP | 16.0 | 16.0 | 133.0 | 83.0 | 63.0 | 2.48 |
| - | CXDCR 1608AP | 16.08 | 18.0 | 143.0 | 93.0 | 71.0 | 2.49 |
| - | CXDCR 1630AP | 16.3 | 18.0 | 143.0 | 93.0 | 71.0 | 2.53 |
| - | CXDCR 1650AP | 16.5 | 18.0 | 143.0 | 93.0 | 71.0 | 2.56 |
| - | CXDCR 1700AP | 17.0 | 18.0 | 143.0 | 93.0 | 71.0 | 2.63 |
| - | CXDCR 1750AP | 17.5 | 18.0 | 143.0 | 93.0 | 71.0 | 2.71 |
| - | CXDCR 1800AP | 18.0 | 18.0 | 143.0 | 93.0 | 71.0 | 2.79 |
| - | CXDCR 1850AP | 18.5 | 20.0 | 153.0 | 101.0 | 79.0 | 2.87 |
| - | CXDCR 1916AP | 19.16 | 20.0 | 153.0 | 101.0 | 79.0 | 2.97 |
| - | CXDCR 1925AP | 19.25 | 20.0 | 153.0 | 101.0 | 79.0 | 2.98 |
| - | CXDCR 1930AP | 19.3 | 20.0 | 153.0 | 101.0 | 79.0 | 2.99 |
| - | CXDCR 1950AP | 19.5 | 20.0 | 153.0 | 101.0 | 79.0 | 3.02 |
| - | CXDCR 2000AP | 20.0 | 20.0 | 153.0 | 101.0 | 79.0 | 3.1 |

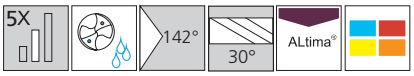
APG
Drills
Forets
Bohrer
Punte
Wiertła
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# Twister® XD High Performance Drill - 5xD Series XDSRM & XDCRM

Series **XD SRM**

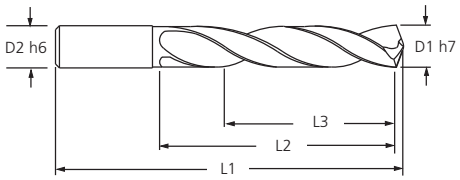



Series **XD CRM**





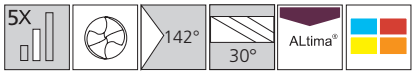


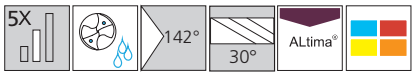

| Series 2XDSRM | Drill Dimensions XD SRM | | | | | Series 2XDCRM | Drill Dimensions XD CRM | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 | Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| 2XDSRM0050A | 0.5 | 0.5 | 26.0 | 6.0 | 5.0 | - | - | - | - | - | - |
| 2XDSRM0060A | 0.6 | 0.6 | 26.0 | 7.0 | 5.0 | - | - | - | - | - | - |
| 2XDSRM0065A | 0.65 | 0.65 | 26.0 | 8.0 | 6.0 | - | - | - | - | - | - |
| 2XDSRM0095A | 0.95 | 0.95 | 32.0 | 11.0 | 8.0 | - | - | - | - | - | - |
| 2XDSRM0100A | 1.0 | 1.0 | 34.0 | 12.0 | 9.0 | - | - | - | - | - | - |
| 2XDSRM0105A | 1.05 | 1.05 | 34.0 | 12.0 | 9.0 | - | - | - | - | - | - |
| 2XDSRM0125A | 1.25 | 1.25 | 38.0 | 16.0 | 12.0 | - | - | - | - | - | - |
| 2XDSRM0150A | 1.5 | 1.5 | 40.0 | 18.0 | 14.0 | - | - | - | - | - | - |
| 2XDSRM0160A | 1.6 | 1.6 | 43.0 | 20.0 | 15.0 | - | - | - | - | - | - |
| 2XDSRM0180A | 1.8 | 1.8 | 46.0 | 22.0 | 17.0 | - | - | - | - | - | - |
| 2XDSRM0190A | 1.9 | 1.9 | 46.0 | 22.0 | 17.0 | - | - | - | - | - | - |
| 2XDSRM0200A | 2.0 | 2.0 | 49.0 | 24.0 | 18.0 | - | - | - | - | - | - |
| 2XDSRM0205A | 2.05 | 2.05 | 49.0 | 24.0 | 18.0 | - | - | - | - | - | - |
| 2XDSRM0230A | 2.3 | 2.3 | 53.0 | 27.0 | 20.0 | - | - | - | - | - | - |
| 2XDSRM0240A | 2.4 | 2.4 | 57.0 | 30.0 | 23.0 | - | - | - | - | - | - |
| 2XDSRM0250A | 2.5 | 2.5 | 57.0 | 30.0 | 23.0 | - | - | - | - | - | - |
| 2XDSRM0290A | 2.9 | 2.9 | 61.0 | 33.0 | 25.0 | - | - | - | - | - | - |
| 2XDSRM0300A | 3.0 | 3.0 | 63.0 | 24.0 | 19.0 | 2XDCRM0300A | 3.0 | 3.0 | 75.0 | 24.0 | 19.0 |
| 2XDSRM0310A | 3.1 | 4.0 | 69.0 | 32.0 | 26.0 | 2XDCRM0310A | 3.1 | 4.0 | 80.0 | 32.0 | 26.0 |
| 2XDSRM0320A | 3.2 | 4.0 | 69.0 | 32.0 | 26.0 | 2XDCRM0320A | 3.2 | 4.0 | 80.0 | 32.0 | 26.0 |
| 2XDSRM0330A | 3.3 | 4.0 | 69.0 | 32.0 | 26.0 | 2XDCRM0330A | 3.3 | 4.0 | 80.0 | 32.0 | 26.0 |
| 2XDSRM0340A | 3.4 | 4.0 | 69.0 | 32.0 | 26.0 | 2XDCRM0340A | 3.4 | 4.0 | 80.0 | 32.0 | 26.0 |
| 2XDSRM0350A | 3.5 | 4.0 | 69.0 | 32.0 | 26.0 | 2XDCRM0350A | 3.5 | 4.0 | 80.0 | 32.0 | 26.0 |
| 2XDSRM0360A | 3.6 | 4.0 | 69.0 | 32.0 | 26.0 | 2XDCRM0360A | 3.6 | 4.0 | 80.0 | 32.0 | 26.0 |
| 2XDSRM0370A | 3.7 | 4.0 | 69.0 | 32.0 | 26.0 | 2XDCRM0370A | 3.7 | 4.0 | 80.0 | 32.0 | 26.0 |
| 2XDSRM0380A | 3.8 | 4.0 | 69.0 | 32.0 | 26.0 | 2XDCRM0380A | 3.8 | 4.0 | 80.0 | 32.0 | 26.0 |
| 2XDSRM0390A | 3.9 | 4.0 | 69.0 | 32.0 | 26.0 | 2XDCRM0390A | 3.9 | 4.0 | 80.0 | 32.0 | 26.0 |
| 2XDSRM0400A | 4.0 | 4.0 | 69.0 | 32.0 | 26.0 | 2XDCRM0400A | 4.0 | 4.0 | 80.0 | 32.0 | 26.0 |
| 2XDSRM0410A | 4.1 | 5.0 | 80.0 | 38.0 | 30.0 | 2XDCRM0410A | 4.1 | 5.0 | 82.0 | 38.0 | 30.0 |
| 2XDSRM0420A | 4.2 | 5.0 | 80.0 | 38.0 | 30.0 | 2XDCRM0420A | 4.2 | 5.0 | 82.0 | 38.0 | 30.0 |
| 2XDSRM0430A | 4.3 | 5.0 | 80.0 | 38.0 | 30.0 | 2XDCRM0430A | 4.3 | 5.0 | 82.0 | 38.0 | 30.0 |
| 2XDSRM0440A | 4.4 | 5.0 | 80.0 | 38.0 | 30.0 | 2XDCRM0440A | 4.4 | 5.0 | 82.0 | 38.0 | 30.0 |
| 2XDSRM0450A | 4.5 | 5.0 | 80.0 | 38.0 | 30.0 | 2XDCRM0450A | 4.5 | 5.0 | 82.0 | 38.0 | 30.0 |
| 2XDSRM0460A | 4.6 | 5.0 | 80.0 | 38.0 | 30.0 | 2XDCRM0460A | 4.6 | 5.0 | 82.0 | 38.0 | 30.0 |
| 2XDSRM0470A | 4.7 | 5.0 | 80.0 | 38.0 | 30.0 | 2XDCRM0470A | 4.7 | 5.0 | 82.0 | 38.0 | 30.0 |
| 2XDSRM0480A | 4.8 | 5.0 | 80.0 | 38.0 | 30.0 | 2XDCRM0480A | 4.8 | 5.0 | 82.0 | 38.0 | 30.0 |
| 2XDSRM0490A | 4.9 | 5.0 | 80.0 | 38.0 | 30.0 | 2XDCRM0490A | 4.9 | 5.0 | 82.0 | 38.0 | 30.0 |
| 2XDSRM0500A | 5.0 | 5.0 | 80.0 | 38.0 | 30.0 | 2XDCRM0500A | 5.0 | 5.0 | 82.0 | 38.0 | 30.0 |
| 2XDSRM0510A | 5.1 | 6.0 | 82.0 | 40.0 | 32.0 | 2XDCRM0510A | 5.1 | 6.0 | 82.0 | 40.0 | 32.0 |
| 2XDSRM0520A | 5.2 | 6.0 | 82.0 | 40.0 | 32.0 | 2XDCRM0520A | 5.2 | 6.0 | 82.0 | 40.0 | 32.0 |
| 2XDSRM0530A | 5.3 | 6.0 | 82.0 | 40.0 | 32.0 | 2XDCRM0530A | 5.3 | 6.0 | 82.0 | 40.0 | 32.0 |
| 2XDSRM0540A | 5.4 | 6.0 | 82.0 | 40.0 | 32.0 | 2XDCRM0540A | 5.4 | 6.0 | 82.0 | 40.0 | 32.0 |
| 2XDSRM0550A | 5.5 | 6.0 | 82.0 | 40.0 | 32.0 | 2XDCRM0550A | 5.5 | 6.0 | 82.0 | 40.0 | 32.0 |

# Twister® XD High Performance Drill - 5xD Series XDSRM & XDCRM

Series **XD SRM**

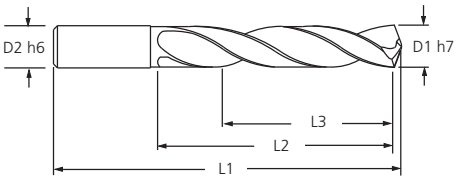



Series **XD CRM**





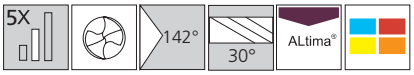


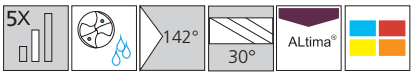

| Series 2XDSRM | Drill Dimensions XD SRM | | | | | Series 2XDCRM | Drill Dimensions XD CRM | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 | Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| 2XDSRM0570A | 5.7 | 6.0 | 82.0 | 40.0 | 32.0 | 2XDCRM0570A | 5.7 | 6.0 | 82.0 | 40.0 | 32.0 |
| 2XDSRM0580A | 5.8 | 6.0 | 82.0 | 40.0 | 32.0 | 2XDCRM0580A | 5.8 | 6.0 | 82.0 | 40.0 | 32.0 |
| 2XDSRM0590A | 5.9 | 6.0 | 82.0 | 40.0 | 32.0 | 2XDCRM0590A | 5.9 | 6.0 | 82.0 | 40.0 | 32.0 |
| 2XDSRM0600A | 6.0 | 6.0 | 82.0 | 40.0 | 32.0 | 2XDCRM0600A | 6.0 | 6.0 | 82.0 | 40.0 | 32.0 |
| 2XDSRM0610A | 6.1 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0610A | 6.1 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0620A | 6.2 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0620A | 6.2 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0630A | 6.3 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0630A | 6.3 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0640A | 6.4 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0640A | 6.4 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0650A | 6.5 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0650A | 6.5 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0660A | 6.6 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0660A | 6.6 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0670A | 6.7 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0670A | 6.7 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0680A | 6.8 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0680A | 6.8 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0690A | 6.9 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0690A | 6.9 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0700A | 7.0 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0700A | 7.0 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0710A | 7.1 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0710A | 7.1 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0720A | 7.2 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0720A | 7.2 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0730A | 7.3 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0730A | 7.3 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0740A | 7.4 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0740A | 7.4 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0750A | 7.5 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0750A | 7.5 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0760A | 7.6 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0760A | 7.6 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0770A | 7.7 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0770A | 7.7 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0780A | 7.8 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0780A | 7.8 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0790A | 7.9 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0790A | 7.9 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0800A | 8.0 | 8.0 | 91.0 | 48.0 | 38.0 | 2XDCRM0800A | 8.0 | 8.0 | 91.0 | 48.0 | 38.0 |
| 2XDSRM0810A | 8.1 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0810A | 8.1 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0820A | 8.2 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0820A | 8.2 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0830A | 8.3 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0830A | 8.3 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0840A | 8.4 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0840A | 8.4 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0850A | 8.5 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0850A | 8.5 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0860A | 8.6 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0860A | 8.6 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0870A | 8.7 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0870A | 8.7 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0880A | 8.8 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0880A | 8.8 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0890A | 8.9 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0890A | 8.9 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0900A | 9.0 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0900A | 9.0 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0910A | 9.1 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0910A | 9.1 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0920A | 9.2 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0920A | 9.2 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0925A | 9.25 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0925A | 9.25 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0930A | 9.3 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0930A | 9.3 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0940A | 9.4 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0940A | 9.4 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0950A | 9.5 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0950A | 9.5 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0960A | 9.6 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0960A | 9.6 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0970A | 9.7 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0970A | 9.7 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM0980A | 9.8 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0980A | 9.8 | 10.0 | 103.0 | 55.0 | 44.0 |

# Twister® XD High Performance Drill - 5xD Series XDSRM & XDCRM

Series **XD SRM**

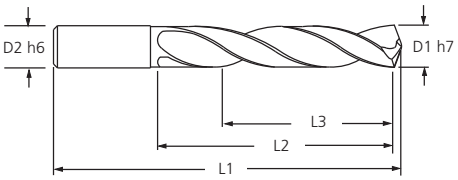



Series **XD CRM**





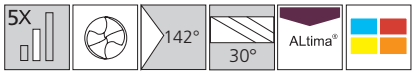


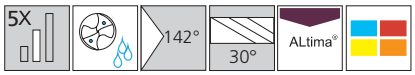

| Series 2XDSRM | Drill Dimensions XD SRM | | | | | Series 2XDCRM | Drill Dimensions XD CRM | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 | Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| 2XDSRM0990A | 9.9 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM0990A | 9.9 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM1000A | 10.0 | 10.0 | 103.0 | 55.0 | 44.0 | 2XDCRM1000A | 10.0 | 10.0 | 103.0 | 55.0 | 44.0 |
| 2XDSRM1010A | 10.1 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1010A | 10.1 | 12.0 | 120.0 | 60.0 | 48.0 |
| 2XDSRM1020A | 10.2 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1020A | 10.2 | 12.0 | 120.0 | 60.0 | 48.0 |
| 2XDSRM1030A | 10.3 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1030A | 10.3 | 12.0 | 120.0 | 60.0 | 48.0 |
| 2XDSRM1040A | 10.4 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1040A | 10.4 | 12.0 | 120.0 | 60.0 | 48.0 |
| 2XDSRM1050A | 10.5 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1050A | 10.5 | 12.0 | 120.0 | 60.0 | 48.0 |
| 2XDSRM1060A | 10.6 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1060A | 10.6 | 12.0 | 120.0 | 60.0 | 48.0 |
| 2XDSRM1070A | 10.7 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1070A | 10.7 | 12.0 | 120.0 | 60.0 | 48.0 |
| 2XDSRM1080A | 10.8 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1080A | 10.8 | 12.0 | 120.0 | 60.0 | 48.0 |
| 2XDSRM1090A | 10.9 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1090A | 10.9 | 12.0 | 120.0 | 60.0 | 48.0 |
| 2XDSRM1100A | 11.0 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1100A | 11.0 | 12.0 | 120.0 | 60.0 | 48.0 |
| 2XDSRM1110A | 11.1 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1110A | 11.1 | 12.0 | 120.0 | 66.0 | 53.0 |
| 2XDSRM1120A | 11.2 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1120A | 11.2 | 12.0 | 120.0 | 66.0 | 53.0 |
| 2XDSRM1130A | 11.3 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1130A | 11.3 | 12.0 | 120.0 | 66.0 | 53.0 |
| 2XDSRM1140A | 11.4 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1140A | 11.4 | 12.0 | 120.0 | 66.0 | 53.0 |
| 2XDSRM1150A | 11.5 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1150A | 11.5 | 12.0 | 120.0 | 66.0 | 53.0 |
| 2XDSRM1160A | 11.6 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1160A | 11.6 | 12.0 | 120.0 | 66.0 | 53.0 |
| 2XDSRM1170A | 11.7 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1170A | 11.7 | 12.0 | 120.0 | 66.0 | 53.0 |
| 2XDSRM1180A | 11.8 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1180A | 11.8 | 12.0 | 120.0 | 66.0 | 53.0 |
| 2XDSRM1190A | 11.9 | 12.0 | 120.0 | 60.0 | 48.0 | 2XDCRM1190A | 11.9 | 12.0 | 120.0 | 66.0 | 53.0 |
| 2XDSRM1200A | 12.0 | 12.0 | 120.0 | 66.0 | 53.0 | 2XDCRM1200A | 12.0 | 12.0 | 120.0 | 66.0 | 53.0 |
| 2XDSRM1210A | 12.1 | 14.0 | 126.0 | 72.0 | 58.0 | 2XDCRM1210A | 12.1 | 14.0 | 126.0 | 72.0 | 58.0 |
| 2XDSRM1250A | 12.5 | 14.0 | 126.0 | 72.0 | 58.0 | 2XDCRM1250A | 12.5 | 14.0 | 126.0 | 72.0 | 58.0 |
| 2XDSRM1280A | 12.8 | 14.0 | 126.0 | 72.0 | 58.0 | 2XDCRM1280A | 12.8 | 14.0 | 126.0 | 72.0 | 58.0 |
| 2XDSRM1290A | 12.9 | 14.0 | 126.0 | 72.0 | 58.0 | 2XDCRM1290A | 12.9 | 14.0 | 126.0 | 72.0 | 58.0 |
| 2XDSRM1300A | 13.0 | 14.0 | 126.0 | 72.0 | 58.0 | 2XDCRM1300A | 13.0 | 14.0 | 126.0 | 72.0 | 58.0 |
| 2XDSRM1350A | 13.5 | 14.0 | 134.0 | 77.0 | 62.0 | 2XDCRM1350A | 13.5 | 14.0 | 134.0 | 77.0 | 62.0 |
| 2XDSRM1370A | 13.7 | 14.0 | 134.0 | 77.0 | 62.0 | 2XDCRM1370A | 13.7 | 14.0 | 134.0 | 77.0 | 62.0 |
| 2XDSRM1400A | 14.0 | 14.0 | 134.0 | 77.0 | 62.0 | 2XDCRM1400A | 14.0 | 14.0 | 134.0 | 77.0 | 62.0 |
| 2XDSRM1450A | 14.5 | 16.0 | 140.0 | 80.0 | 64.0 | 2XDCRM1450A | 14.5 | 16.0 | 140.0 | 80.0 | 64.0 |
| 2XDSRM1470A | 14.7 | 16.0 | 140.0 | 80.0 | 64.0 | 2XDCRM1470A | 14.7 | 16.0 | 140.0 | 80.0 | 64.0 |
| 2XDSRM1500A | 15.0 | 16.0 | 140.0 | 80.0 | 64.0 | 2XDCRM1500A | 15.0 | 16.0 | 140.0 | 80.0 | 64.0 |
| 2XDSRM1530A | 15.3 | 16.0 | 146.0 | 82.0 | 66.0 | 2XDCRM1530A | 15.3 | 16.0 | 146.0 | 82.0 | 66.0 |
| 2XDSRM1550A | 15.5 | 16.0 | 146.0 | 82.0 | 66.0 | 2XDCRM1550A | 15.5 | 16.0 | 146.0 | 82.0 | 66.0 |
| 2XDSRM1570A | 15.7 | 16.0z | 146.0 | 82.0 | 66.0 | 2XDCRM1570A | 15.7 | 16.0 | 146.0 | 82.0 | 66.0 |
| 2XDSRM1600A | 16.0 | 16.0 | 146.0 | 82.0 | 66.0 | 2XDCRM1600A | 16.0 | 16.0 | 146.0 | 82.0 | 66.0 |
| - | - | - | - | - | - | 2XDCRM1608A | 16.08 | 18.0 | 158.0 | 90.0 | 72.0 |
| - | - | - | - | - | - | 2XDCRM1630A | 16.3 | 18.0 | 158.0 | 90.0 | 72.0 |
| - | - | - | - | - | - | 2XDCRM1650A | 16.5 | 18.0 | 158.0 | 90.0 | 72.0 |
| - | - | - | - | - | - | 2XDCRM1700A | 17.0 | 18.0 | 158.0 | 90.0 | 72.0 |
| - | - | - | - | - | - | 2XDCRM1750A | 17.5 | 18.0 | 158.0 | 95.0 | 76.0 |
| - | - | - | - | - | - | 2XDCRM1800A | 18.0 | 18.0 | 158.0 | 95.0 | 76.0 |

# Twister® XD High Performance Drill - 5xD Series XDSRM & XDCRM

Series **XD SRM**

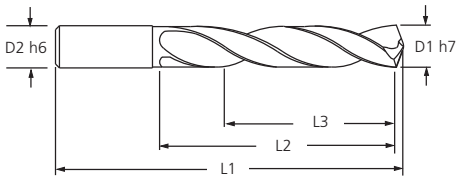



Series **XD CRM**





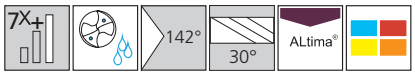


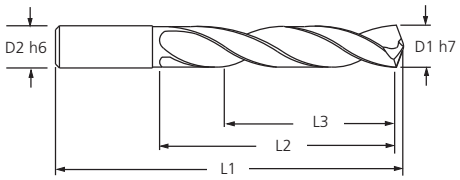

| Series 2XDSRM | Drill Dimensions XD SRM | | | | | Series 2XDCRM | Drill Dimensions XD CRM | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 | Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| - | - | - | - | - | - | 2XDCRM1850A | 18.5 | 20.0 | 160.0 | 100.0 | 80.0 |
| - | - | - | - | - | - | 2XDCRM1916A | 19.16 | 20.0 | 160.0 | 100.0 | 80.0 |
| - | - | - | - | - | - | 2XDCRM1925A | 19.25 | 20.0 | 160.0 | 100.0 | 80.0 |
| - | - | - | - | - | - | 2XDCRM1930A | 19.3 | 20.0 | 160.0 | 100.0 | 80.0 |
| - | - | - | - | - | - | 2XDCRM1950A | 19.5 | 20.0 | 160.0 | 100.0 | 80.0 |
| - | - | - | - | - | - | 2XDCRM2000A | 20.0 | 20.0 | 160.0 | 100.0 | 80.0 |

P147

# Twister® XD High Performance Drill - 7⁺xD Series XDCLM

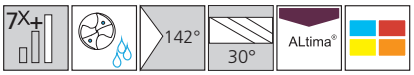




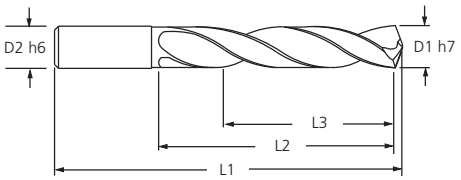




| Series 2XDCLM | Drill Dimensions XD CLM | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| 2XDCLM0300A | 3.0 | 3.0 | 81.0 | 33.0 | 26.0 |
| 2XDCLM0310A | 3.1 | 4.0 | 92.0 | 44.0 | 35.0 |
| 2XDCLM0320A | 3.2 | 4.0 | 92.0 | 44.0 | 35.0 |
| 2XDCLM0330A | 3.3 | 4.0 | 92.0 | 44.0 | 35.0 |
| 2XDCLM0340A | 3.4 | 4.0 | 92.0 | 44.0 | 35.0 |
| 2XDCLM0350A | 3.5 | 4.0 | 92.0 | 44.0 | 35.0 |
| 2XDCLM0360A | 3.6 | 4.0 | 92.0 | 44.0 | 35.0 |
| 2XDCLM0370A | 3.7 | 4.0 | 92.0 | 44.0 | 35.0 |
| 2XDCLM0380A | 3.8 | 4.0 | 92.0 | 44.0 | 35.0 |
| 2XDCLM0390A | 3.9 | 4.0 | 92.0 | 44.0 | 35.0 |
| 2XDCLM0400A | 4.0 | 4.0 | 92.0 | 44.0 | 35.0 |
| 2XDCLM0410A | 4.1 | 5.0 | 100.0 | 45.0 | 36.0 |
| 2XDCLM0420A | 4.2 | 5.0 | 100.0 | 45.0 | 36.0 |
| 2XDCLM0430A | 4.3 | 5.0 | 100.0 | 45.0 | 36.0 |
| 2XDCLM0440A | 4.4 | 5.0 | 100.0 | 45.0 | 36.0 |
| 2XDCLM0450A | 4.5 | 5.0 | 100.0 | 45.0 | 36.0 |
| 2XDCLM0460A | 4.6 | 5.0 | 100.0 | 45.0 | 36.0 |
| 2XDCLM0470A | 4.7 | 5.0 | 100.0 | 45.0 | 36.0 |
| 2XDCLM0480A | 4.8 | 5.0 | 100.0 | 45.0 | 36.0 |
| 2XDCLM0490A | 4.9 | 5.0 | 100.0 | 45.0 | 36.0 |
| 2XDCLM0500A | 5.0 | 5.0 | 100.0 | 45.0 | 36.0 |

# Twister® XD High Performance Drill - 7+xD Series XDCLM

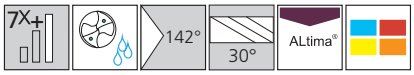




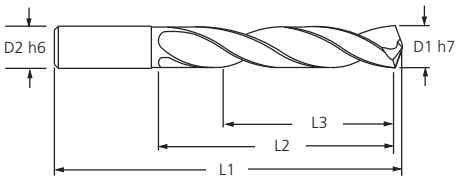




| Series 2XDCLM | Drill Dimensions XD CLM | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| 2XDCLM0510A | 5.1 | 6.0 | 100.0 | 51.0 | 41.0 |
| 2XDCLM0520A | 5.2 | 6.0 | 100.0 | 51.0 | 41.0 |
| 2XDCLM0530A | 5.3 | 6.0 | 100.0 | 51.0 | 41.0 |
| 2XDCLM0540A | 5.4 | 6.0 | 100.0 | 51.0 | 41.0 |
| 2XDCLM0550A | 5.5 | 6.0 | 100.0 | 51.0 | 41.0 |
| 2XDCLM0570A | 5.7 | 6.0 | 100.0 | 51.0 | 41.0 |
| 2XDCLM0580A | 5.8 | 6.0 | 100.0 | 51.0 | 41.0 |
| 2XDCLM0590A | 5.9 | 6.0 | 100.0 | 51.0 | 41.0 |
| 2XDCLM0600A | 6.0 | 6.0 | 100.0 | 51.0 | 41.0 |
| 2XDCLM0610A | 6.1 | 8.0 | 109.0 | 60.0 | 48.0 |
| 2XDCLM0620A | 6.2 | 8.0 | 109.0 | 60.0 | 48.0 |
| 2XDCLM0630A | 6.3 | 8.0 | 109.0 | 60.0 | 48.0 |
| 2XDCLM0640A | 6.4 | 8.0 | 109.0 | 60.0 | 48.0 |
| 2XDCLM0650A | 6.5 | 8.0 | 109.0 | 60.0 | 48.0 |
| 2XDCLM0660A | 6.6 | 8.0 | 109.0 | 60.0 | 48.0 |
| 2XDCLM0670A | 6.7 | 8.0 | 109.0 | 60.0 | 48.0 |
| 2XDCLM0680A | 6.8 | 8.0 | 109.0 | 60.0 | 48.0 |
| 2XDCLM0690A | 6.9 | 8.0 | 109.0 | 60.0 | 48.0 |
| 2XDCLM0700A | 7.0 | 8.0 | 109.0 | 60.0 | 48.0 |
| 2XDCLM0710A | 7.1 | 8.0 | 118.0 | 70.0 | 56.0 |
| 2XDCLM0720A | 7.2 | 8.0 | 118.0 | 70.0 | 56.0 |
| 2XDCLM0730A | 7.3 | 8.0 | 118.0 | 70.0 | 56.0 |
| 2XDCLM0740A | 7.4 | 8.0 | 118.0 | 70.0 | 56.0 |
| 2XDCLM0750A | 7.5 | 8.0 | 118.0 | 70.0 | 56.0 |
| 2XDCLM0760A | 7.6 | 8.0 | 118.0 | 70.0 | 56.0 |
| 2XDCLM0770A | 7.7 | 8.0 | 118.0 | 70.0 | 56.0 |
| 2XDCLM0780A | 7.8 | 8.0 | 118.0 | 70.0 | 56.0 |
| 2XDCLM0790A | 7.9 | 8.0 | 118.0 | 70.0 | 56.0 |
| 2XDCLM0800A | 8.0 | 8.0 | 118.0 | 70.0 | 56.0 |
| 2XDCLM0810A | 8.1 | 10.0 | 127.0 | 80.0 | 64.0 |
| 2XDCLM0820A | 8.2 | 10.0 | 127.0 | 80.0 | 64.0 |
| 2XDCLM0830A | 8.3 | 10.0 | 127.0 | 80.0 | 64.0 |
| 2XDCLM0840A | 8.4 | 10.0 | 127.0 | 80.0 | 64.0 |
| 2XDCLM0850A | 8.5 | 10.0 | 127.0 | 80.0 | 64.0 |
| 2XDCLM0860A | 8.6 | 10.0 | 127.0 | 80.0 | 64.0 |
| 2XDCLM0870A | 8.7 | 10.0 | 127.0 | 80.0 | 64.0 |
| 2XDCLM0880A | 8.8 | 10.0 | 127.0 | 80.0 | 64.0 |
| 2XDCLM0890A | 8.9 | 10.0 | 127.0 | 80.0 | 64.0 |
| 2XDCLM0900A | 9.0 | 10.0 | 127.0 | 80.0 | 64.0 |
| 2XDCLM0910A | 9.1 | 10.0 | 136.0 | 85.0 | 68.0 |
| 2XDCLM0920A | 9.2 | 10.0 | 136.0 | 85.0 | 68.0 |
| 2XDCLM0925A | 9.25 | 10.0 | 136.0 | 85.0 | 68.0 |
| 2XDCLM0930A | 9.3 | 10.0 | 136.0 | 85.0 | 68.0 |
| 2XDCLM0940A | 9.4 | 10.0 | 136.0 | 85.0 | 68.0 |
| 2XDCLM0950A | 9.5 | 10.0 | 136.0 | 85.0 | 68.0 |
| 2XDCLM0960A | 9.6 | 10.0 | 136.0 | 85.0 | 68.0 |
| 2XDCLM0970A | 9.7 | 10.0 | 136.0 | 85.0 | 68.0 |
| 2XDCLM0980A | 9.8 | 10.0 | 136.0 | 85.0 | 68.0 |
| 2XDCLM0990A | 9.9 | 10.0 | 136.0 | 85.0 | 68.0 |
| 2XDCLM1000A | 10.0 | 10.0 | 136.0 | 85.0 | 68.0 |
| 2XDCLM1010A | 10.1 | 12.0 | 149.0 | 93.0 | 74.0 |
| 2XDCLM1020A | 10.2 | 12.0 | 149.0 | 93.0 | 74.0 |
| 2XDCLM1030A | 10.3 | 12.0 | 149.0 | 93.0 | 74.0 |
| 2XDCLM1040A | 10.4 | 12.0 | 149.0 | 93.0 | 74.0 |
| 2XDCLM1050A | 10.5 | 12.0 | 149.0 | 93.0 | 74.0 |

# Twister® XD High Performance Drill - 7⁺xD Series XDCLM



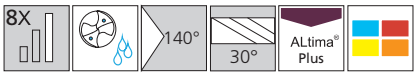


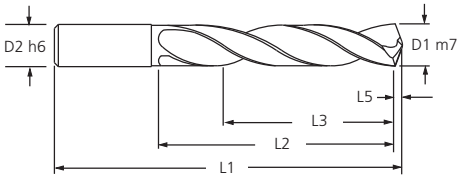

| Series 2XDCLM | Drill Dimensions XD CLM | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| 2XDCLM1060A | 10.6 | 12.0 | 149.0 | 93.0 | 74.0 |
| 2XDCLM1070A | 10.7 | 12.0 | 149.0 | 93.0 | 74.0 |
| 2XDCLM1080A | 10.8 | 12.0 | 149.0 | 93.0 | 74.0 |
| 2XDCLM1090A | 10.9 | 12.0 | 149.0 | 93.0 | 74.0 |
| 2XDCLM1100A | 11.0 | 12.0 | 149.0 | 93.0 | 74.0 |
| 2XDCLM1110A | 11.1 | 12.0 | 155.0 | 102.0 | 82.0 |
| 2XDCLM1120A | 11.2 | 12.0 | 155.0 | 102.0 | 82.0 |
| 2XDCLM1130A | 11.3 | 12.0 | 155.0 | 102.0 | 82.0 |
| 2XDCLM1140A | 11.4 | 12.0 | 155.0 | 102.0 | 82.0 |
| 2XDCLM1150A | 11.5 | 12.0 | 155.0 | 102.0 | 82.0 |
| 2XDCLM1160A | 11.6 | 12.0 | 155.0 | 102.0 | 82.0 |
| 2XDCLM1170A | 11.7 | 12.0 | 155.0 | 102.0 | 82.0 |
| 2XDCLM1180A | 11.8 | 12.0 | 155.0 | 102.0 | 82.0 |
| 2XDCLM1190A | 11.9 | 12.0 | 155.0 | 102.0 | 82.0 |
| 2XDCLM1200A | 12.0 | 12.0 | 155.0 | 102.0 | 82.0 |

P147

# cyclone CXD High Performance Drill - 8xD Series CXDCLM

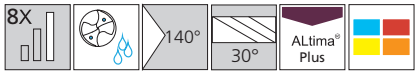




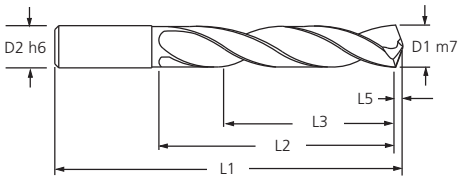




| Tool Number | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
|---|---|---|---|---|---|---|
| CXDCLM0300AP | 3.0 | 3.0 | 81.0 | 33.0 | 25.0 | 0.46 |
| CXDCL1200AP | 3.05 | 4.0 | 92.0 | 44.0 | 33.0 | 0.48 |
| CXDCLM0310AP | 3.1 | 4.0 | 92.0 | 44.0 | 33.0 | 0.48 |
| CXDCL1250AP | 3.18 | 4.0 | 92.0 | 44.0 | 33.0 | 0.48 |
| CXDCLM0320AP | 3.2 | 4.0 | 92.0 | 44.0 | 33.0 | 0.5 |
| CXDCLM0325AP | 3.25 | 4.0 | 92.0 | 44.0 | 33.0 | 0.51 |
| CXDCL1285AP | 3.26 | 4.0 | 92.0 | 44.0 | 33.0 | 0.51 |
| CXDCLM0330AP | 3.3 | 4.0 | 92.0 | 44.0 | 33.0 | 0.51 |
| CXDCLM0340AP | 3.4 | 4.0 | 92.0 | 44.0 | 33.0 | 0.53 |
| CXDCL1360AP | 3.45 | 4.0 | 92.0 | 44.0 | 33.0 | 0.53 |
| CXDCLM0350AP | 3.5 | 4.0 | 92.0 | 44.0 | 33.0 | 0.54 |
| CXDCL1406AP | 3.57 | 4.0 | 92.0 | 44.0 | 33.0 | 0.56 |
| CXDCLM0360AP | 3.6 | 4.0 | 92.0 | 44.0 | 33.0 | 0.56 |
| CXDCLM0370AP | 3.7 | 4.0 | 92.0 | 44.0 | 33.0 | 0.57 |
| CXDCL1496AP | 3.8 | 4.0 | 92.0 | 44.0 | 33.0 | 0.59 |
| CXDCL1520AP | 3.86 | 4.0 | 92.0 | 44.0 | 33.0 | 0.6 |
| CXDCLM0390AP | 3.9 | 4.0 | 92.0 | 44.0 | 33.0 | 0.6 |
| CXDCL1562AP | 3.97 | 4.0 | 92.0 | 44.0 | 33.0 | 0.61 |

# cyclone CXD High Performance Drill - 8xD Series CXDCLM

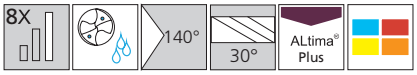




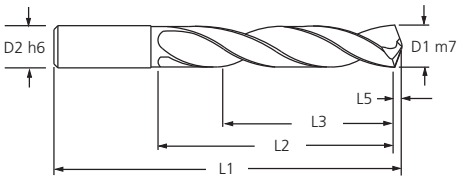




| Tool Number | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
|---|---|---|---|---|---|---|
| CXDCLM0400AP | 4.0 | 4.0 | 92.0 | 44.0 | 33.0 | 0.62 |
| CXDCL1590AP | 4.04 | 5.0 | 100.0 | 45.0 | 34.0 | 0.63 |
| CXDCLM0410AP | 4.1 | 5.0 | 100.0 | 45.0 | 34.0 | 0.64 |
| CXDCLM0420AP | 4.2 | 5.0 | 100.0 | 45.0 | 34.0 | 0.65 |
| CXDCLM0430AP | 4.3 | 5.0 | 100.0 | 45.0 | 34.0 | 0.67 |
| CXDCL1719AP | 4.37 | 5.0 | 100.0 | 45.0 | 34.0 | 0.68 |
| CXDCLM0440AP | 4.4 | 5.0 | 100.0 | 45.0 | 34.0 | 0.68 |
| CXDCLM0450AP | 4.5 | 5.0 | 100.0 | 45.0 | 34.0 | 0.7 |
| CXDCLM0460AP | 4.6 | 5.0 | 100.0 | 45.0 | 34.0 | 0.71 |
| CXDCLM0465AP | 4.65 | 5.0 | 100.0 | 45.0 | 34.0 | 0.72 |
| CXDCLM0470AP | 4.7 | 5.0 | 100.0 | 45.0 | 34.0 | 0.73 |
| CXDCL1875AP | 4.76 | 5.0 | 100.0 | 45.0 | 34.0 | 0.74 |
| CXDCLM0480AP | 4.8 | 5.0 | 100.0 | 45.0 | 34.0 | 0.74 |
| CXDCLM0490AP | 4.9 | 5.0 | 100.0 | 45.0 | 34.0 | 0.76 |
| CXDCLM0500AP | 5.0 | 5.0 | 100.0 | 45.0 | 34.0 | 0.77 |
| CXDCLM0510AP | 5.1 | 6.0 | 100.0 | 57.0 | 43.0 | 0.79 |
| CXDCL2031AP | 5.16 | 6.0 | 100.0 | 57.0 | 43.0 | 0.79 |
| CXDCLM0520AP | 5.2 | 6.0 | 100.0 | 57.0 | 43.0 | 0.81 |
| CXDCLM0530AP | 5.3 | 6.0 | 100.0 | 57.0 | 43.0 | 0.82 |
| CXDCLM0540AP | 5.4 | 6.0 | 100.0 | 57.0 | 43.0 | 0.84 |
| CXDCLM0550AP | 5.5 | 6.0 | 100.0 | 57.0 | 43.0 | 0.85 |
| CXDCL2187AP | 5.56 | 6.0 | 100.0 | 57.0 | 43.0 | 0.86 |
| CXDCLM0560AP | 5.6 | 6.0 | 100.0 | 57.0 | 43.0 | 0.86 |
| CXDCL2210AP | 5.61 | 6.0 | 100.0 | 57.0 | 43.0 | 0.86 |
| CXDCLM0570AP | 5.7 | 6.0 | 100.0 | 57.0 | 43.0 | 0.88 |
| CXDCLM0580AP | 5.8 | 6.0 | 100.0 | 57.0 | 43.0 | 0.9 |
| CXDCLM0590AP | 5.9 | 6.0 | 100.0 | 57.0 | 43.0 | 0.91 |
| CXDCL2344AP | 5.95 | 6.0 | 100.0 | 57.0 | 43.0 | 0.91 |
| CXDCLM0600AP | 6.0 | 6.0 | 100.0 | 57.0 | 43.0 | 0.93 |
| CXDCLM0610AP | 6.1 | 8.0 | 118.0 | 76.0 | 57.0 | 0.95 |
| CXDCL2420AP | 6.15 | 8.0 | 118.0 | 76.0 | 57.0 | 0.95 |
| CXDCLM0620AP | 6.2 | 8.0 | 118.0 | 76.0 | 57.0 | 0.96 |
| CXDCL2460AP | 6.25 | 8.0 | 118.0 | 76.0 | 57.0 | 0.97 |
| CXDCLM0630AP | 6.3 | 8.0 | 118.0 | 76.0 | 57.0 | 0.98 |
| CXDCL2500AP | 6.35 | 8.0 | 118.0 | 76.0 | 57.0 | 0.99 |
| CXDCLM0640AP | 6.4 | 8.0 | 118.0 | 76.0 | 57.0 | 0.99 |
| CXDCLM0650AP | 6.5 | 8.0 | 118.0 | 76.0 | 57.0 | 1.01 |
| CXDCL2570AP | 6.53 | 8.0 | 118.0 | 76.0 | 57.0 | 1.03 |
| CXDCLM0660AP | 6.6 | 8.0 | 118.0 | 76.0 | 57.0 | 1.03 |
| CXDCL2610AP | 6.63 | 8.0 | 118.0 | 76.0 | 57.0 | 1.03 |
| CXDCLM0670AP | 6.7 | 8.0 | 118.0 | 76.0 | 57.0 | 1.04 |
| CXDCL2656AP | 6.75 | 8.0 | 118.0 | 76.0 | 57.0 | 1.04 |
| CXDCLM0680AP | 6.8 | 8.0 | 118.0 | 76.0 | 57.0 | 1.05 |
| CXDCLM0690AP | 6.9 | 8.0 | 118.0 | 76.0 | 57.0 | 1.07 |
| CXDCLM0700AP | 7.0 | 8.0 | 118.0 | 76.0 | 57.0 | 1.08 |
| CXDCLM0710AP | 7.1 | 8.0 | 118.0 | 76.0 | 57.0 | 1.1 |

# cyclone CXD High Performance Drill - 8xD Series CXDCLM

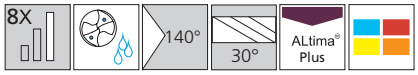




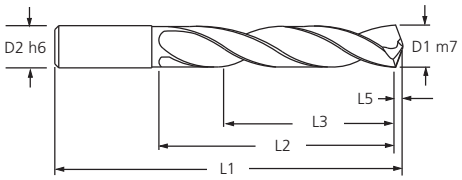




| Tool Number | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
|---|---|---|---|---|---|---|
| CXDCL2812AP | 7.14 | 8.0 | 118.0 | 76.0 | 57.0 | 1.12 |
| CXDCLM0720AP | 7.2 | 8.0 | 118.0 | 76.0 | 57.0 | 1.12 |
| CXDCLM0730AP | 7.3 | 8.0 | 118.0 | 76.0 | 57.0 | 1.13 |
| CXDCLM0740AP | 7.4 | 8.0 | 118.0 | 76.0 | 57.0 | 1.15 |
| CXDCLM0750AP | 7.5 | 8.0 | 118.0 | 76.0 | 57.0 | 1.16 |
| CXDCL2969AP | 7.54 | 8.0 | 118.0 | 76.0 | 57.0 | 1.17 |
| CXDCLM0760AP | 7.6 | 8.0 | 118.0 | 76.0 | 57.0 | 1.18 |
| CXDCLM0770AP | 7.7 | 8.0 | 118.0 | 76.0 | 57.0 | 1.19 |
| CXDCLM0780AP | 7.8 | 8.0 | 118.0 | 76.0 | 57.0 | 1.21 |
| CXDCLM0790AP | 7.9 | 8.0 | 118.0 | 76.0 | 57.0 | 1.22 |
| CXDCL3125AP | 7.94 | 8.0 | 118.0 | 76.0 | 57.0 | 1.22 |
| CXDCLM0800AP | 8.0 | 8.0 | 118.0 | 76.0 | 57.0 | 1.24 |
| CXDCLM0810AP | 8.1 | 10.0 | 139.0 | 87.0 | 65.0 | 1.26 |
| CXDCLM0820AP | 8.2 | 10.0 | 139.0 | 87.0 | 65.0 | 1.27 |
| CXDCLM0830AP | 8.3 | 10.0 | 139.0 | 87.0 | 65.0 | 1.29 |
| CXDCL3281AP | 8.33 | 10.0 | 139.0 | 87.0 | 65.0 | 1.3 |
| CXDCLM0840AP | 8.4 | 10.0 | 139.0 | 87.0 | 65.0 | 1.31 |
| CXDCL3320AP | 8.43 | 10.0 | 139.0 | 87.0 | 65.0 | 1.31 |
| CXDCLM0850AP | 8.5 | 10.0 | 139.0 | 87.0 | 65.0 | 1.32 |
| CXDCLM0860AP | 8.6 | 10.0 | 139.0 | 87.0 | 65.0 | 1.33 |
| CXDCLM0870AP | 8.7 | 10.0 | 139.0 | 87.0 | 65.0 | 1.35 |
| CXDCL3438AP | 8.73 | 10.0 | 139.0 | 87.0 | 65.0 | 1.35 |
| CXDCLM0880AP | 8.8 | 10.0 | 139.0 | 87.0 | 65.0 | 1.36 |
| CXDCLM0890AP | 8.9 | 10.0 | 139.0 | 87.0 | 65.0 | 1.38 |
| CXDCLM0900AP | 9.0 | 10.0 | 139.0 | 87.0 | 65.0 | 1.39 |
| CXDCLM0910AP | 9.1 | 10.0 | 139.0 | 95.0 | 71.0 | 1.41 |
| CXDCL3594AP | 9.13 | 10.0 | 139.0 | 95.0 | 71.0 | 1.42 |
| CXDCLM0920AP | 9.2 | 10.0 | 139.0 | 95.0 | 71.0 | 1.43 |
| CXDCLM0925AP | 9.25 | 10.0 | 139.0 | 95.0 | 71.0 | 1.43 |
| CXDCLM0930AP | 9.3 | 10.0 | 139.0 | 95.0 | 71.0 | 1.44 |
| CXDCL3680AP | 9.35 | 10.0 | 139.0 | 95.0 | 71.0 | 1.45 |
| CXDCLM0940AP | 9.4 | 10.0 | 139.0 | 95.0 | 71.0 | 1.46 |
| CXDCLM0950AP | 9.5 | 10.0 | 139.0 | 95.0 | 71.0 | 1.47 |
| CXDCL3750AP | 9.52 | 10.0 | 139.0 | 95.0 | 71.0 | 1.47 |
| CXDCLM0960AP | 9.6 | 10.0 | 139.0 | 95.0 | 71.0 | 1.49 |
| CXDCLM0970AP | 9.7 | 10.0 | 139.0 | 95.0 | 71.0 | 1.5 |
| CXDCL3858AP | 9.8 | 10.0 | 139.0 | 95.0 | 71.0 | 1.52 |
| CXDCLM0990AP | 9.9 | 10.0 | 139.0 | 95.0 | 71.0 | 1.53 |
| CXDCL3906AP | 9.92 | 10.0 | 139.0 | 95.0 | 71.0 | 1.55 |
| CXDCLM1000AP | 10.0 | 10.0 | 139.0 | 95.0 | 71.0 | 1.55 |
| CXDCLM1010AP | 10.1 | 12.0 | 155.0 | 106.0 | 80.0 | 1.56 |
| CXDCLM1020AP | 10.2 | 12.0 | 155.0 | 106.0 | 80.0 | 1.58 |
| CXDCLM1030AP | 10.3 | 12.0 | 155.0 | 106.0 | 80.0 | 1.6 |
| CXDCL4062AP | 10.32 | 12.0 | 155.0 | 106.0 | 80.0 | 1.6 |
| CXDCLM1040AP | 10.4 | 12.0 | 155.0 | 106.0 | 80.0 | 1.61 |
| CXDCLM1050AP | 10.5 | 12.0 | 155.0 | 106.0 | 80.0 | 1.63 |

# cyclone CXD High Performance Drill - 8xD Series CXDCLM



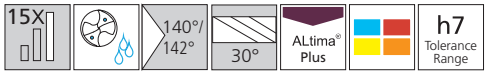


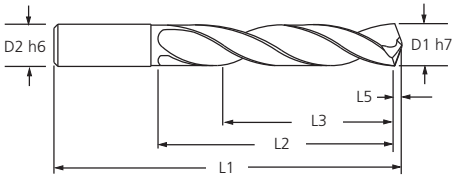

| Tool Number | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
|---|---|---|---|---|---|---|
| CXDCLM1060AP | 10.6 | 12.0 | 155.0 | 106.0 | 80.0 | 1.64 |
| CXDCLM1070AP | 10.7 | 12.0 | 155.0 | 106.0 | 80.0 | 1.66 |
| CXDCL4219AP | 10.72 | 12.0 | 155.0 | 106.0 | 80.0 | 1.65 |
| CXDCLM1080AP | 10.8 | 12.0 | 155.0 | 106.0 | 80.0 | 1.67 |
| CXDCLM1090AP | 10.9 | 12.0 | 155.0 | 106.0 | 80.0 | 1.69 |
| CXDCLM1100AP | 11.0 | 12.0 | 155.0 | 106.0 | 80.0 | 1.7 |
| CXDCLM1110AP | 11.1 | 12.0 | 163.0 | 114.0 | 86.0 | 1.72 |
| CXDCL4375AP | 11.11 | 12.0 | 163.0 | 114.0 | 86.0 | 1.73 |
| CXDCLM1120AP | 11.2 | 12.0 | 163.0 | 114.0 | 86.0 | 1.74 |
| CXDCLM1130AP | 11.3 | 12.0 | 163.0 | 114.0 | 86.0 | 1.75 |
| CXDCLM1140AP | 11.4 | 12.0 | 163.0 | 114.0 | 86.0 | 1.77 |
| CXDCLM1150AP | 11.5 | 12.0 | 163.0 | 114.0 | 86.0 | 1.78 |
| CXDCLM1160AP | 11.6 | 12.0 | 163.0 | 114.0 | 86.0 | 1.8 |
| CXDCLM1170AP | 11.7 | 12.0 | 163.0. | 114.0 | 86.0 | 1.81 |
| CXDCLM1180AP | 11.8 | 12.0 | 163.0 | 114.0 | 86.0 | 1.83 |
| CXDCLM1190AP | 11.9 | 12.0 | 163.0 | 114.0 | 86.0 | 1.84 |
| CXDCL4688AP | 11.91 | 12.0 | 163.0 | 114.0 | 86.0 | 1.85 |
| CXDCLM1200AP | 12.0 | 12.0 | 163.0 | 114.0 | 86.0 | 1.86 |
| CXDCLM1210AP | 12.1 | 14.0 | 182.0 | 133.0 | 112.0 | 1.87 |
| CXDCL4844AP | 12.3 | 14.0 | 182.0 | 133.0 | 100.0 | 1.91 |
| CXDCLM1250AP | 12.5 | 14.0 | 182.0 | 133.0 | 112.0 | 1.93 |
| CXDCL5000AP | 12.7 | 14.0 | 182.0 | 133.0 | 100.0 | 1.95 |
| CXDCLM1280AP | 12.8 | 14.0 | 182.0 | 133.0 | 112.0 | 1.98 |
| CXDCLM1290AP | 12.9 | 14.0 | 182.0 | 133.0 | 112.0 | 1.99 |
| CXDCLM1300AP | 13.0 | 14.0 | 182.0 | 133.0 | 112.0 | 2.01 |
| CXDCL5156AP | 13.09 | 14.0 | 182.0 | 133.0 | 112.0 | 2.03 |
| CXDCL5312AP | 13.49 | 14.0 | 182.0 | 133.0 | 112.0 | 2.08 |
| CXDCLM1350AP | 13.5 | 14.0 | 182.0 | 133.0 | 112.0 | 2.09 |
| CXDCLM1370AP | 13.7 | 14.0 | 182.0 | 133.0 | 112.0 | 2.12 |
| CXDCL5469AP | 13.89 | 14.0 | 182.0 | 133.0 | 112.0 | 2.16 |
| CXDCLM1400AP | 14.0 | 14.0 | 182.0 | 133.0 | 112.0 | 2.16 |
| CXDCL5625AP | 14.29 | 16.0 | 204.0 | 152.0 | 128.0 | 2.21 |
| CXDCLM1450AP | 14.5 | 16.0 | 204.0 | 152.0 | 128.0 | 2.24 |
| CXDCLM1470AP | 14.7 | 16.0 | 204.0 | 152.0 | 128.0 | 2.27 |
| CXDCLM1500AP | 15.0 | 16.0 | 204.0 | 152.0 | 128.0 | 2.32 |
| CXDCL5938AP | 15.08 | 16.0 | 204.0 | 152.0 | 128.0 | 2.33 |
| CXDCLM1530AP | 15.3 | 16.0 | 204.0 | 152.0 | 128.0 | 2.36 |
| CXDCLM1550AP | 15.5 | 16.0 | 204.0 | 152.0 | 128.0 | 2.39 |
| CXDCLM1570AP | 15.7 | 16.0 | 204.0 | 152.0 | 128.0 | 2.43 |
| CXDCL6250AP | 15.87 | 16.0 | 204.0 | 152.0 | 128.0 | 2.46 |
| CXDCLM1600AP | 16.0 | 16.0 | 204.0 | 152.0 | 128.0 | 2.47 |

P154

# cyclone CXD High Performance Drill - 15xD Series CXDCEM



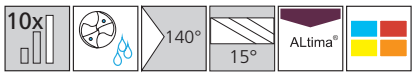


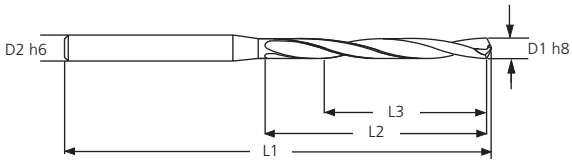

| Tool Number | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
|---|---|---|---|---|---|---|
| CXDCEM0300AP | 3.0 | 3.0 | 105.0 | 56.0 | 45.0 | 0.46 |
| CXDCEM0350AP | 3.5 | 4.0 | 120.0 | 66.0 | 53.0 | 0.54 |
| CXDCEM0400AP | 4.0 | 4.0 | 120.0 | 75.0 | 60.0 | 0.62 |
| CXDCEM0420AP | 4.2 | 5.0 | 143.0 | 79.0 | 63.0 | 0.65 |
| CXDCEM0430AP | 4.3 | 5.0 | 143.0 | 81.0 | 65.0 | 0.67 |
| CXDCEM0440AP | 4.4 | 5.0 | 143.0 | 83.0 | 66.0 | 0.68 |
| CXDCEM0450AP | 4.5 | 5.0 | 143.0 | 84.0 | 68.0 | 0.7 |
| CXDCEM0480AP | 4.8 | 5.0 | 143.0 | 90.0 | 72.0 | 0.74 |
| CXDCEM0490AP | 4.9 | 5.0 | 143.0 | 92.0 | 74.0 | 0.76 |
| CXDCEM0500AP | 5.0 | 5.0 | 143.0 | 94.0 | 75.0 | 0.77 |
| CXDCEM0520AP | 5.2 | 6.0 | 162.0 | 98.0 | 78.0 | 0.81 |
| CXDCEM0540AP | 5.4 | 6.0 | 162.0 | 101.0 | 81.0 | 0.84 |
| CXDCEM0550AP | 5.5 | 6.0 | 162.0 | 103.0 | 83.0 | 0.85 |
| CXDCEM0560AP | 5.6 | 6.0 | 162.0 | 105.0 | 84.0 | 0.86 |
| CXDCEM0580AP | 5.8 | 6.0 | 162.0 | 109.0 | 87.0 | 0.9 |
| CXDCEM0600AP | 6.0 | 6.0 | 162.0 | 113.0 | 90.0 | 0.93 |
| CXDCEM0610AP | 6.1 | 8.0 | 200.0 | 114.0 | 92.0 | 0.95 |
| CXDCEM0620AP | 6.2 | 8.0 | 200.0 | 116.0 | 93.0 | 0.96 |
| CXDCEM0630AP | 6.3 | 8.0 | 200.0 | 118.0 | 95.0 | 0.98 |
| CXDCEM0650AP | 6.5 | 8.0 | 200.0 | 122.0 | 98.0 | 1.01 |
| CXDCEM0680AP | 6.8 | 8.0 | 200.0 | 128.0 | 102.0 | 1.05 |
| CXDCEM0700AP | 7.0 | 8.0 | 200.0 | 131.0 | 105.0 | 1.08 |
| CXDCEM0740AP | 7.4 | 8.0 | 200.0 | 139.0 | 111.0 | 1.15 |
| CXDCEM0750AP | 7.5 | 8.0 | 200.0 | 141.0 | 113.0 | 1.16 |
| CXDCEM0760AP | 7.6 | 8.0 | 200.0 | 143.0 | 114.0 | 1.18 |
| CXDCEM0780AP | 7.8 | 8.0 | 200.0 | 146.0 | 117.0 | 1.21 |
| CXDCEM0800AP | 8.0 | 8.0 | 200.0 | 150.0 | 120.0 | 1.24 |
| CXDCEM0820AP | 8.2 | 10.0 | 240.0 | 154.0 | 123.0 | 1.27 |
| CXDCEM0830AP | 8.3 | 10.0 | 240.0 | 156.0 | 125.0 | 1.29 |
| CXDCEM0840AP | 8.4 | 10.0 | 240.0 | 158.0 | 126.0 | 1.3 |
| CXDCEM0850AP | 8.5 | 10.0 | 240.0 | 159.0 | 128.0 | 1.32 |
| CXDCEM0870AP | 8.7 | 10.0 | 240.0 | 163.0 | 131.0 | 1.35 |
| CXDCEM0900AP | 9.0 | 10.0 | 240.0 | 169.0 | 135.0 | 1.39 |
| CXDCEM0940AP | 9.4 | 10.0 | 240.0 | 176.0 | 141.0 | 1.46 |
| CXDCEM0980AP | 9.8 | 10.0 | 240.0 | 184.0 | 147.0 | 1.52 |
| CXDCEM1000AP | 10.0 | 10.0 | 240.0 | 188.0 | 150.0 | 1.55 |
| CXDCEM1020AP | 10.2 | 12.0 | 283.0 | 191.0 | 153.0 | 1.58 |
| CXDCEM1030AP | 10.3 | 12.0 | 283.0 | 193.0 | 155.0 | 1.6 |
| CXDCEM1050AP | 10.5 | 12.0 | 283.0 | 197.0 | 158.0 | 1.63 |
| CXDCEM1080AP | 10.8 | 12.0 | 283.0 | 203.0 | 162.0 | 1.67 |
| CXDCEM1100AP | 11.0 | 12.0 | 283.0 | 206.0 | 165.0 | 1.7 |
| CXDCEM1150AP | 11.5 | 12.0 | 283.0 | 216.0 | 173.0 | 1.78 |
| CXDCEM1180AP | 11.8 | 12.0 | 283.0 | 221.0 | 177.0 | 1.83 |
| CXDCEM1200AP | 12.0 | 12.0 | 283.0 | 225.0 | 180.0 | 1.86 |

P153

# Twister® XD High Performance Micro Drill - 10xD Series MDCLM






| Series 2MDCLM | Drill Dimensions MD CLM | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| 2MDCLM0200A | 2.0 | 3.0 | 68.0 | 24.0 | 18.0 |
| 2MDCLM0205A | 2.05 | 3.0 | 74.0 | 28.0 | 21.0 |
| 2MDCLM0210A | 2.1 | 3.0 | 74.0 | 28.0 | 21.0 |
| 2MDCLM0215A | 2.15 | 3.0 | 74.0 | 28.0 | 21.0 |
| 2MDCLM0220A | 2.2 | 3.0 | 74.0 | 28.0 | 21.0 |
| 2MDCLM0225A | 2.25 | 3.0 | 74.0 | 28.0 | 21.0 |
| 2MDCLM0230A | 2.3 | 3.0 | 74.0 | 28.0 | 21.0 |
| 2MDCLM0235A | 2.35 | 3.0 | 74.0 | 28.0 | 21.0 |
| 2MDCLM0240A | 2.4 | 3.0 | 74.0 | 28.0 | 21.0 |
| 2MDCLM0245A | 2.45 | 3.0 | 74.0 | 28.0 | 21.0 |
| 2MDCLM0250A | 2.5 | 3.0 | 74.0 | 28.0 | 21.0 |
| 2MDCLM0255A | 2.55 | 3.0 | 81.0 | 34.0 | 25.5 |
| 2MDCLM0260A | 2.6 | 3.0 | 81.0 | 34.0 | 25.5 |
| 2MDCLM0265A | 2.65 | 3.0 | 81.0 | 34.0 | 25.5 |
| 2MDCLM0270A | 2.7 | 3.0 | 81.0 | 34.0 | 25.5 |
| 2MDCLM0275A | 2.75 | 3.0 | 81.0 | 34.0 | 25.5 |
| 2MDCLM0280A | 2.8 | 3.0 | 81.0 | 34.0 | 25.5 |
| 2MDCLM0285A | 2.85 | 3.0 | 81.0 | 34.0 | 25.5 |
| 2MDCLM0290A | 2.9 | 3.0 | 81.0 | 34.0 | 25.5 |
| 2MDCLM0295A | 2.95 | 3.0 | 81.0 | 34.0 | 25.5 |

P147



## Tolerances

| Drill Dia. (h8) | Tolerance |
|---|---|
| 2.0 - 2.95 | +0/-0.014 |

| Shank Dia. (h6) | Tolerance |
|---|---|
| 3.0 | +0/-0.006 |

**Machine Requirements**
High Pressure Pump System (1000 psi)
Coolant filtration of 10 microns or better
Machine runout of .0004" (.01mm) Max.

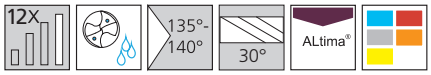
**Estimated Peck Depths**

| | |
|---|---|
| For hole depths up to 6x diameter | No pecks |
| For hole depths up to 10x diameter | 0-2 pecks |
| For hole depths up to 15x diameter | 2-4 pecks |

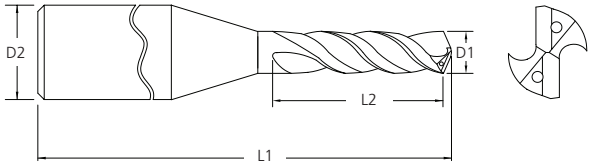
M.A. Ford® does not recommend full retraction of the body of the drill from the hole during the peck cycle. It is recommended to leave the drill point within the hole.

For hole depths deeper than 4x the diameter, M.A. Ford® recommends using a "soft start" program that drills to .5x diameter deep at 2/3 of the speed and feed.

# Twister® High Performance Micro Drill - 12xD Series MXDCL






| ALtima® | | Drill Dimensions | | | |
|---|---|---|---|---|---|
| Tool No. | EDP | Ø D1 | Ø D2 | L1 | L2 |
| MXDCLM0100A | 04834 | 1.0 | 3.0 | 60.0 | 16.0 |
| MXDCLM0105A | 04835 | 1.05 | 3.0 | 60.0 | 17.0 |
| MXDCLM0110A | 04836 | 1.1 | 3.0 | 60.0 | 18.0 |
| MXDCLM0115A | 04837 | 1.15 | 3.0 | 60.0 | 19.0 |
| MXDCLM0120A | 04838 | 1.2 | 3.0 | 65.0 | 20.0 |
| MXDCLM0125A | 04839 | 1.25 | 3.0 | 65.0 | 20.0 |
| MXDCLM0130A | 04840 | 1.3 | 3.0 | 65.0 | 21.0 |
| MXDCLM0135A | 04841 | 1.35 | 3.0 | 65.0 | 22.0 |
| MXDCLM0140A | 04842 | 1.4 | 3.0 | 65.0 | 23.0 |
| MXDCLM0145A | 04843 | 1.45 | 3.0 | 65.0 | 24.0 |
| MXDCLM0150A | 04844 | 1.5 | 3.0 | 65.0 | 24.0 |
| MXDCLM0155A | 04845 | 1.55 | 3.0 | 65.0 | 25.0 |
| MXDCLM0160A | 04846 | 1.6 | 3.0 | 70.0 | 26.0 |
| MXDCLM0165A | 04847 | 1.65 | 3.0 | 70.0 | 27.0 |
| MXDCLM0170A | 04848 | 1.7 | 3.0 | 70.0 | 28.0 |
| MXDCLM0175A | 04849 | 1.75 | 3.0 | 70.0 | 28.0 |
| MXDCLM0180A | 04850 | 1.8 | 3.0 | 70.0 | 29.0 |
| MXDCLM0185A | 04851 | 1.85 | 3.0 | 70.0 | 30.0 |
| MXDCLM0190A | 04852 | 1.9 | 3.0 | 75.0 | 31.0 |
| MXDCLM0195A | 04853 | 1.95 | 3.0 | 75.0 | 32.0 |

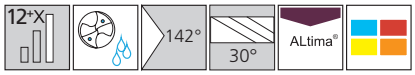
| ALtima® | | Drill Dimensions | | | |
|---|---|---|---|---|---|
| Tool No. | EDP | Ø D1 | Ø D2 | L1 | L2 |
| MXDCLM0200A | 04854 | 2.00 | 3.0 | 75.0 | 32.0 |
| MXDCLM0205A | 04855 | 2.05 | 3.0 | 75.0 | 33.0 |
| MXDCLM0210A | 04856 | 2.10 | 3.0 | 75.0 | 34.0 |
| MXDCLM0215A | 04857 | 2.15 | 3.0 | 75.0 | 35.0 |
| MXDCLM0220A | 04858 | 2.20 | 3.0 | 75.0 | 36.0 |
| MXDCLM0225A | 04859 | 2.25 | 3.0 | 75.0 | 36.0 |
| MXDCLM0230A | 04860 | 2.30 | 3.0 | 75.0 | 37.0 |
| MXDCLM0235A | 04861 | 2.35 | 3.0 | 75.0 | 38.0 |
| MXDCLM0240A | 04862 | 2.40 | 3.0 | 75.0 | 39.0 |
| MXDCLM0245A | 04863 | 2.45 | 3.0 | 75.0 | 40.0 |
| MXDCLM0250A | 04864 | 2.50 | 3.0 | 75.0 | 40.0 |
| MXDCLM0255A | 04865 | 2.55 | 3.0 | 80.0 | 41.0 |
| MXDCLM0260A | 04866 | 2.60 | 3.0 | 80.0 | 42.0 |
| MXDCLM0265A | 04867 | 2.65 | 3.0 | 80.0 | 43.0 |
| MXDCLM0270A | 04868 | 2.70 | 3.0 | 80.0 | 44.0 |
| MXDCLM0275A | 04869 | 2.75 | 3.0 | 80.0 | 44.0 |
| MXDCLM0280A | 04870 | 2.80 | 3.0 | 80.0 | 45.0 |
| MXDCLM0285A | 04871 | 2.85 | 3.0 | 80.0 | 46.0 |
| MXDCLM0290A | 04872 | 2.90 | 3.0 | 85.0 | 47.0 |
| MXDCLM0295A | 04873 | 2.95 | 3.0 | 85.0 | 48.0 |

P149

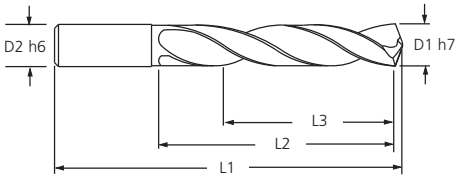
| Metric (mm) | |
|---|---|
| D1 | Tolerance (h7) |
| 1.00 - 2.95 | +0/-0.010 |

| Metric (mm) | |
|---|---|
| D2 | Tolerance (h6) |
| 3.0 | +0/-0.006 |

# Twister® XD High Performance Drill - 12⁺xD Series XDCEM



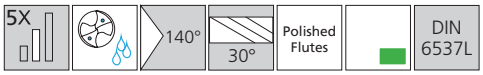


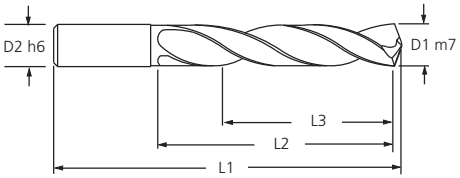

| Series 2XDCEM | Drill Dimensions | | | | | | |
|---|---|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 | L2 / D1 (D1 x Ø) | L3 / D1 (D1 x Ø) |
| 2XDCEM0400A | 4.0 | 4.0 | 163.0 | 100.0 | 80.0 | 25.0 | 20.0 |
| 2XDCEM0500A | 5.0 | 5.0 | 163.0 | 105.0 | 84.0 | 21.0 | 17.0 |
| 2XDCEM0520A | 5.2 | 6.0 | 163.0 | 110.0 | 88.0 | 21.0 | 17.0 |
| 2XDCEM0540A | 5.4 | 6.0 | 163.0 | 110.0 | 88.0 | 20.0 | 16.0 |
| 2XDCEM0560A | 5.6 | 6.0 | 163.0 | 110.0 | 88.0 | 20.0 | 16.0 |
| 2XDCEM0580A | 5.8 | 6.0 | 163.0 | 110.0 | 88.0 | 19.0 | 15.0 |
| 2XDCEM0600A | 6.0 | 6.0 | 163.0 | 110.0 | 88.0 | 18.0 | 15.0 |
| 2XDCEM0620A | 6.2 | 8.0 | 163.0 | 110.0 | 88.0 | 18.0 | 14.0 |
| 2XDCEM0630A | 6.3 | 8.0 | 163.0 | 110.0 | 88.0 | 17.0 | 14.0 |
| 2XDCEM0635A | 6.35 | 8.0 | 163.0 | 110.0 | 88.0 | 17.0 | 14.0 |
| 2XDCEM0680A | 6.8 | 8.0 | 163.0 | 110.0 | 88.0 | 16.0 | 13.0 |
| 2XDCEM0700A | 7.0 | 8.0 | 163.0 | 110.0 | 88.0 | 16.0 | 13.0 |
| 2XDCEM0760A | 7.6 | 8.0 | 163.0 | 120.0 | 96.0 | 16.0 | 13.0 |
| 2XDCEM0780A | 7.8 | 8.0 | 163.0 | 120.0 | 96.0 | 15.0 | 12.0 |
| 2XDCEM0794A | 7.94 | 8.0 | 163.0 | 120.0 | 96.0 | 15.0 | 12.0 |
| 2XDCEM0800A | 8.0 | 8.0 | 163.0 | 120.0 | 96.0 | 15.0 | 12.0 |
| 2XDCEM0820A | 8.2 | 10.0 | 180.0 | 135.0 | 108.0 | 16.0 | 13.0 |
| 2XDCEM0850A | 8.5 | 10.0 | 180.0 | 135.0 | 108.0 | 16.0 | 13.0 |
| 2XDCEM0870A | 8.7 | 10.0 | 180.0 | 135.0 | 108.0 | 16.0 | 12.0 |
| 2XDCEM0900A | 9.0 | 10.0 | 180.0 | 135.0 | 108.0 | 15.0 | 12.0 |
| 2XDCEM0940A | 9.4 | 10.0 | 195.0 | 150.0 | 120.0 | 16.0 | 13.0 |
| 2XDCEM0953A | 9.53 | 10.0 | 195.0 | 150.0 | 120.0 | 16.0 | 13.0 |
| 2XDCEM0980A | 9.8 | 10.0 | 195.0 | 150.0 | 120.0 | 15.0 | 12.0 |
| 2XDCEM1000A | 10.0 | 10.0 | 195.0 | 150.0 | 120.0 | 15.0 | 12.0 |
| 2XDCEM1030A | 10.3 | 12.0 | 210.0 | 160.0 | 128.0 | 16.0 | 12.0 |
| 2XDCEM1050A | 10.5 | 12.0 | 210.0 | 160.0 | 128.0 | 15.0 | 12.0 |
| 2XDCEM1080A | 10.8 | 12.0 | 210.0 | 160.0 | 128.0 | 15.0 | 12.0 |
| 2XDCEM1100A | 11.0 | 12.0 | 210.0 | 160.0 | 128.0 | 15.0 | 12.0 |
| 2XDCEM1111A | 11.11 | 12.0 | 210.0 | 160.0 | 128.0 | 14.0 | 12.0 |
| 2XDCEM1150A | 11.5 | 12.0 | 210.0 | 160.0 | 128.0 | 14.0 | 12.0 |
| 2XDCEM1180A | 11.8 | 12.0 | 210.0 | 160.0 | 128.0 | 14.0 | 12.0 |
| 2XDCEM1200A | 12.0 | 12.0 | 210.0 | 160.0 | 128.0 | 13.0 | 12.0 |
| 2XDCEM1270A | 12.7 | 14.0 | 230.0 | 180.0 | 144.0 | 14.0 | 12.0 |

P150

# cyclone CDA High Performance Aluminium Drill - 5xD Series CDACRM

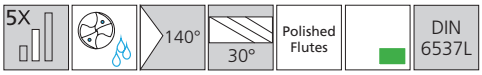




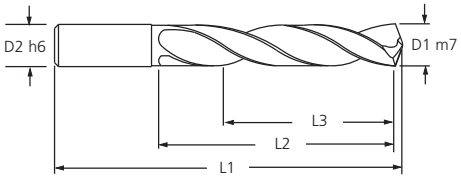

| Tool Number | Ø D1 | Ø D2 | L1 | L2 (max) | L3 (Ref) |
|---|---|---|---|---|---|
| CDACRM0300 | 3.0 | 6.0 | 66.0 | 28.0 | 23.0 |
| CDACRM0310 | 3.1 | 6.0 | 66.0 | 28.0 | 23.0 |
| CDACRM0320 | 3.2 | 6.0 | 66.0 | 28.0 | 23.0 |
| CDACRM0330 | 3.3 | 6.0 | 66.0 | 28.0 | 23.0 |
| CDACRM0340 | 3.4 | 6.0 | 66.0 | 28.0 | 23.0 |
| CDACRM0350 | 3.5 | 6.0 | 66.0 | 28.0 | 23.0 |
| CDACRM0360 | 3.6 | 6.0 | 66.0 | 28.0 | 23.0 |
| CDACRM0370 | 3.7 | 6.0 | 66.0 | 28.0 | 23.0 |
| CDACRM0380 | 3.8 | 6.0 | 74.0 | 36.0 | 29.0 |
| CDACRM0390 | 3.9 | 6.0 | 74.0 | 36.0 | 29.0 |
| CDACRM0400 | 4.0 | 6.0 | 74.0 | 36.0 | 29.0 |
| CDACRM0410 | 4.1 | 6.0 | 74.0 | 36.0 | 29.0 |
| CDACRM0420 | 4.2 | 6.0 | 74.0 | 36.0 | 29.0 |
| CDACRM0430 | 4.3 | 6.0 | 74.0 | 36.0 | 29.0 |
| CDACRM0440 | 4.4 | 6.0 | 74.0 | 36.0 | 29.0 |
| CDACRM0450 | 4.5 | 6.0 | 74.0 | 36.0 | 29.0 |
| CDACRM0460 | 4.6 | 6.0 | 74.0 | 36.0 | 29.0 |
| CDACRM0470 | 4.7 | 6.0 | 74.0 | 36.0 | 29.0 |
| CDACRM0480 | 4.8 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0490 | 4.9 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0500 | 5.0 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0510 | 5.1 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0520 | 5.2 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0530 | 5.3 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0540 | 5.4 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0550 | 5.5 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0560 | 5.6 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0570 | 5.7 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0580 | 5.8 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0590 | 5.9 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0600 | 6.0 | 6.0 | 82.0 | 44.0 | 35.0 |
| CDACRM0610 | 6.1 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0620 | 6.2 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0630 | 6.3 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0640 | 6.4 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0650 | 6.5 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0660 | 6.6 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0670 | 6.7 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0680 | 6.8 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0690 | 6.9 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0700 | 7.0 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0710 | 7.1 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0720 | 7.2 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0730 | 7.3 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0740 | 7.4 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0750 | 7.5 | 8.0 | 91.0 | 53.0 | 43.0 |

# cyclone CDA High Performance Aluminium Drill - 5xD Series CDACRM








| Tool Number | Ø D1 | Ø D2 | L1 | L2 (max) | L3 (Ref) |
|---|---|---|---|---|---|
| CDACRM0760 | 7.6 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0770 | 7.7 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0780 | 7.8 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0790 | 7.9 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0800 | 8.0 | 8.0 | 91.0 | 53.0 | 43.0 |
| CDACRM0810 | 8.1 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0820 | 8.2 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0830 | 8.3 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0840 | 8.4 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0850 | 8.5 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0860 | 8.6 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0870 | 8.7 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0880 | 8.8 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0890 | 8.9 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0900 | 9.0 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0910 | 9.1 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0920 | 9.2 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0930 | 9.3 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0940 | 9.4 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0950 | 9.5 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0960 | 9.6 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0970 | 9.7 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0980 | 9.8 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM0990 | 9.9 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM1000 | 10.0 | 10.0 | 103.0 | 61.0 | 49.0 |
| CDACRM1010 | 10.0 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1020 | 10.2 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1030 | 10.3 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1040 | 10.4 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1050 | 10.5 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1060 | 10.6 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1070 | 10.7 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1080 | 10.8 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1090 | 10.9 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1100 | 11.0 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1110 | 11.1 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1120 | 11.2 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1130 | 11.3 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1140 | 11.4 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1150 | 11.5 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1160 | 11.6 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1170 | 11.7 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1180 | 11.8 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1190 | 11.9 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1200 | 12.0 | 12.0 | 118.0 | 71.0 | 56.0 |
| CDACRM1250 | 12.5 | 14.0 | 124.0 | 77.0 | 60.0 |

P152

# Twister® Micro-Tuff™ Drill

## Series 305M 305AM Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)

| Recommended Speeds By Material Group | | | Vc (m/min) | |
|---|---|---|---|---|
| Material Groups | | Material Type | 305M | 305AM |
| | | | Uncoated | Altima® Micro Coated |
| Steels | P | Low Carbon | 30 - 40 | 40 - 50 |
| | | Alloy Steel (≤ 35 Rc) | 20 - 30 | 35 - 45 |
| | | Alloy Steel (36-45 Rc) | 20 - 30 | 35 - 45 |
| Stainless Steels | M | Free Machining | 30 - 40 | 40 - 50 |
| | | Austenitic | 20 - 30 | 35 - 45 |
| | | Ferritic/Martensitic | 20 - 30 | 30 - 40 |
| | | PH Stainless | 10 - 20 | 15 - 25 |
| Cast Irons | K | Grey Cast Iron | 30 - 40 | 40 - 50 |
| | | Ductile Cast Iron | 30 - 40 | 40 - 50 |
| Special Alloys | S | Titanium Alloys (Ti6AL4v) | 10 - 20 | 15 - 25 |
| | | High Temp Alloys (Inconel, Nimonic, Hastelloy) | 10 - 20 | 15 - 25 |
| Hardened Steels | H | 45 - 55 Rc Steel | 5 - 15 | 10 - 20 |
| Non-Ferrous | N | Aluminium Alloys (< 10% Si) | 50 - 60 | - |
| | | Plastics | | |

RPM Formula For Metric Drills Only - RPM = (Vc x 318.0) ÷ Drill Ø D¹

## Series 305M 305AM Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)

| Recommended Feedrates By Material Group | | | Drill Diameter (mm) | | | | |
|---|---|---|---|---|---|---|---|
| Material Groups | | Material Type | 0.5 | 1.0 | 1.5 | 2.0 | 3.0 |
| | | | Feed (mm/rev) | | | | |
| Steels | P | Low Carbon | 0.01 | 0.02 | 0.04 | 0.06 | 0.075 |
| | | Alloy Steel (≤ 35 Rc) | | | | | |
| | | Alloy Steel (36-45 Rc) | | | | | |
| Stainless Steels | M | Free Machining | 0.01 | 0.02 | 0.04 | 0.06 | 0.075 |
| | | Austenitic | | | | | |
| | | Ferritic/Martensitic | | | | | |
| | | PH Stainless | 0.005 | 0.01 | 0.02 | 0.03 | 0.035 |
| Cast Irons | K | Grey Cast Iron | 0.01 | 0.02 | 0.04 | 0.06 | 0.075 |
| | | Ductile Cast Iron | | | | | |
| Special Alloys | S | Titanium Alloys (Ti6AL4v) | 0.01 | 0.02 | 0.04 | 0.06 | 0.075 |
| | | High Temp Alloys (Inconel, Nimonic, Hastelloy) | 0.005 | 0.01 | 0.02 | 0.025 | 0.035 |
| Hardened Steels | H | 45 - 55 Rc Steel | 0.005 | 0.01 | 0.02 | 0.025 | 0.035 |
| Non-Ferrous | N | Aluminium Alloys (< 10% Si) | 0.015 | 0.025 | 0.05 | 0.075 | 0.10 |
| | | Plastics | | | | | |

Feedrate Formula For Metric Drills - Feed = RPM x mm/rev

Recommended Pecking Depths By Drill Diameter* (Ø D¹)

| Diameter Ø D¹ | Pecking Depth |
|---|---|
| 0.50 | 0.5 x Ø D¹ |
| 1.00 | 1 x Ø D¹ |
| 1.50 | 1.5 x Ø D¹ |
| 2.00 | 2 x Ø D¹ |
| 3.00 | 3 x Ø D¹ |

* Pecking depths can vary by material type

# Twister® XD High Performance Drills

## Series MXDSR Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)

| Material Groups | ISO | Hardness | vc - m/ min | Drill Diameter (mm) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 2.95 |
| | | | | Feed (mm/rev) | | | | | |
| Free Machining & Low Carbon Steels | P | up to 28 Rc | 45 | .010 | .020 | .030 | .040 | .060 | .075 |
| Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels | P | 28 to 38 Rc | 40 | .010 | .020 | .030 | .040 | .060 | .075 |
| Tool Steels & Die Steel | P | 28 to 44 Rc | 40 | .010 | .020 | .030 | .040 | .060 | .075 |
| Free Machining Stainless | M | up to 28 Rc | 45 | .010 | .020 | .030 | .040 | .060 | .075 |
| Stainless Steel - Austenitic 304 / 316 | M | up to 28 Rc | 40 | .010 | .020 | .030 | .040 | .060 | .075 |
| Stainless Steel - Ferritic / Martensitic | M | up to 28 Rc | 35 | .010 | .020 | .030 | .040 | .060 | .075 |
| Stainless Steel - Moderately Difficult | M | over 28 Rc | 20 | .010 | .020 | .030 | .040 | .060 | .075 |
| Cast Iron - Gray CG | K | up to 240 HB | 45 | .010 | .020 | .030 | .040 | .060 | .075 |
| Cast Iron - Ductile & Malleable CGI | K | over 240 HB | 45 | .010 | .020 | .030 | .040 | .060 | .075 |
| Titanium | S | up to 40 Rc | 20 | .010 | .020 | .030 | .040 | .060 | .075 |
| High Temp Alloys Inconel / Hastelloy / Waspeloy / Nickel Based Alloys-Monel | S | | 20 | .005 | .010 | .015 | .020 | .025 | .075 |
| Hardened Steels | H | 55 Rc | 15 | .005 | .010 | .015 | .020 | .025 | .035 |
| Aluminum (<10% Si) | N | | 55 | .015 | .025 | .040 | .050 | .075 | .100 |
| Plastics | N | | | .015 | .025 | .040 | .050 | .075 | .100 |

# Twister® XD Spot Drill

## Series 200S Spot Drill Recommended Feed

Avance recommandée | Empfohlener Vorschub | Avanzamento consigliato | Zalecany Posuw

| Materials | Vc (m/min) | Drill Diameter (mm) | | | | |
|---|---|---|---|---|---|---|
| | | 6 | 8 | 10 | 12 | 16 |
| | | Feed (mm/rev) | | | | |
| Low Carbon Steel <0.3%C | 100 | 0.076 | 0.1 | 0.13 | 0.16 | 0.16 |
| Medium Carbon Steel | 80 | 0.076 | 0.1 | 0.13 | 0.16 | 0.16 |
| Alloy Steel ≤ 35hrc | 70 | 0.076 | 0.1 | 0.13 | 0.16 | 0.16 |
| Alloy Steel 36- 45hrc | 45 | 0.076 | 0.1 | 0.13 | 0.16 | 0.16 |
| Alloy Steel 45-50hrc | 40 | 0.076 | 0.1 | 0.13 | 0.16 | 0.16 |
| Grey Cast Iron | 110 | 0.076 | 0.1 | 0.13 | 0.16 | 0.16 |
| Ductile Cast Iron | 80 | 0.076 | 0.1 | 0.13 | 0.16 | 0.16 |
| Austenitic Stainless | 45 | 0.076 | 0.1 | 0.13 | 0.16 | 0.16 |
| Ph Stainless | 30 | 0.076 | 0.1 | 0.13 | 0.16 | 0.16 |
| High Temp Alloys | 20 | 0.076 | 0.1 | 0.13 | 0.16 | 0.16 |
| Titanium Alloys | 55 | 0.076 | 0.1 | 0.13 | 0.16 | 0.16 |

RPM Formula For Metric Drills Only - RPM = (Vc x 318.0) ÷ Drill Ø D¹
Feedrate Formula For Metric Drills - Feed = RPM x mm/rev

# Twister® XD High Performance Drills

## Recommended Speed - XD/MD Drills

Vitesse Recommandée | Empfohlene Drehzahl | Velocità di taglio raccomandata | Zalecane prędkości

| Materials | Vc (m/min) | | | | | |
|---|---|---|---|---|---|---|
| | 2XDSSM 3 X D SOLID | 2XDSRM 5 X D SOLID | 2XDCSM 3 X D COOLANT | 2XDCRM 5 X D COOLANT | 2XDCLM 7 X D COOLANT | 2MDCLM 10 X D COOLANT |
| Low Carbon Steel <0.3%C | 80-120 | 75-100 | 150-200 | 150-200 | 130-145 | 80-90 |
| Medium Carbon Steel | 75-100 | 65-90 | 125-175 | 125-175 | 100-130 | 80-90 |
| Alloy Steel ≤ 35hrc | 60-75 | 50-70 | 75-105 | 75-105 | 70-90 | 80-90 |
| Alloy Steel 36- 45hrc | 45-60 | 40-55 | 45-70 | 45-70 | 40-55 | 60-80 |
| Alloy Steel 45-50hrc | 30-35 | 25-30 | 35-50 | 35-50 | 35-45 | 40-60 |
| Grey Cast Iron | 100-120 | 80-100 | 150-200 | 150-200 | 110-140 | 80-90 |
| Ductile Cast Iron | 75-90 | 65-80 | 135-150 | 135-150 | 130-145 | 60-80 |
| Austenitic Stainless | 30-45 | 25-40 | 80-150 | 80-150 | 45-65 | 60-70 |
| Ph Stainless | 20-35 | 15-30 | 50-80 | 50-80 | 30-45 | 40-50 |
| High Temp Alloys | 15-30 | 10-25 | 15-35 | 15-35 | 20-30 | 20-25 |
| Titanium Alloys | 35-45 | 30-40 | 55-70 | 55-70 | 50-65 | 40-50 |

RPM Formula For Metric Drills Only - RPM = (Vc x 318.0) ÷ Drill Ø D[1]

## Series XD Drill - Recommended Feed 0.5 - 6mm diameter

Avance recommandée pour un diamètre de 0.5 – 6mm | Empfohlener Vorschub 0,5 – 6 mm Durchmesser
Avanzamento raccomandato per diametri 0,5 - 6mm | Zalecany posuw dla średnic 0.5-6mm

| Materials | Feed (mm/rev) | | | | | |
|---|---|---|---|---|---|---|
| | 0.5 | 1.5 | 3 | 4 | 5 | 6 |
| Low Carbon Steel <0.3%C | 0.025-0.05 | 0.05-0.075 | 0.075-0.12 | 0.1-0.15 | 0.12-0.18 | 0.14-0.2 |
| Medium Carbon Steel | 0.025-0.05 | 0.05-0.075 | 0.075-0.12 | 0.1-0.15 | 0.12-0.18 | 0.14-0.2 |
| Alloy Steel ≤ 35hrc | 0.025-0.05 | 0.05-0.075 | 0.075-0.12 | 0.1-0.15 | 0.12-0.18 | 0.14-0.2 |
| Alloy Steel 36- 45hrc | 0.01-0.025 | 0.025-0.04 | 0.05-0.11 | 0.08-0.13 | 0.12-0.18 | 0.14-0.2 |
| Alloy Steel 45-50hrc | 0.01-0.02 | 0.02-0.03 | 0.035-0.075 | 0.06-0.1 | 0.08-0.12 | 0.09-0.15 |
| Grey Cast Iron | 0.025-0.05 | 0.05-0.075 | 0.075-0.12 | 0.1-0.15 | 0.12-0.18 | 0.14-0.2 |
| Ductile Cast Iron | 0.025-0.05 | 0.05-0.075 | 0.075-0.12 | 0.1-0.15 | 0.12-0.18 | 0.14-0.2 |
| Austenitic Stainless | 0.025-0.05 | 0.05-0.075 | 0.075-0.12 | 0.1-0.15 | 0.12-0.18 | 0.14-0.2 |
| Ph Stainless | 0.01-0.03 | 0.025-0.05 | 0.05-0.085 | 0.06-0.09 | 0.07-0.11 | 0.08-0.12 |
| High Temp Alloys | 0.01-0.03 | 0.025-0.05 | 0.035-0.085 | 0.04-0.09 | 0.05-0.10 | 0.06-0.11 |
| Titanium Alloys | 0.01-0.03 | 0.025-0.05 | 0.075-0.12 | 0.1-0.15 | 0.12-0.18 | 0.14-0.2 |

Feedrate Formula For Metric Drills - Feed = RPM x mm/rev

# Twister® XD High Performance Drills

## Series 2MDCL Micro Coolant Drills - Recommended Feed

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)

| Materials | Feed (mm/rev) | | |
|---|---|---|---|
| | Diameter | | |
| | 2 | 2.5 | 2.9 |
| Low Carbon Steel <0.3%C | 0.046 | 0.051 | 0.056 |
| Medium Carbon Steel | 0.046 | 0.051 | 0.056 |
| Alloy Steel ≤ 35hrc | 0.046 | 0.051 | 0.056 |
| Alloy Steel 36- 45hrc | 0.046 | 0.046 | 0.051 |
| Alloy Steel 45-50hrc | 0.025 | 0.033 | 0.046 |
| Grey Cast Iron | 0.046 | 0.051 | 0.056 |
| Ductile Cast Iron | 0.046 | 0.051 | 0.056 |
| Austenitic Stainless | 0.033 | 0.038 | 0.043 |
| Ph Stainless | 0.025 | 0.027 | 0.038 |
| High Temp Alloys | 0.025 | 0.027 | 0.036 |
| Titanium Alloys | 0.025 | 0.027 | 0.036 |

Feedrate Formula For Metric Drills - Feed = RPM x mm/rev

# Twister® XD High Performance Drills

## Series XD Drill - Recommended Feed 8 - 20mm Diameter

Avance recommandée 8 - 20mm de diamètre | Produktreihe XD-Bohrer – empfohlener Vorschub 8 – 20 mm Durchmesser
Avanzamento raccomandato per diametri 8 - 20mm | Zalecany posuw dla średnic 8 - 20mm

| Materials | Feed (mm/rev) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| Low Carbon Steel <0.3%C | 0.16-0.24 | 0.18-0.27 | 0.2-0.3 | 0.22-0.35 | 0.25-0.36 | 0.28-0.38 | 0.3-0.4 |
| Medium Carbon Steel | 0.16-0.24 | 0.18-0.27 | 0.2-0.3 | 0.22-0.35 | 0.25-0.36 | 0.28-0.38 | 0.3-0.4 |
| Alloy Steel ≤ 35hrc | 0.16-0.24 | 0.18-0.27 | 0.2-0.3 | 0.22-0.35 | 0.25-0.36 | 0.28-0.38 | 0.3-0.4 |
| Alloy Steel 36- 45hrc | 0.16-0.24 | 0.18-0.27 | 0.2-0.3 | 0.22-0.35 | 0.25-0.36 | 0.28-0.38 | 0.3-0.4 |
| Alloy Steel 45-50hrc | 0.12-0.2 | 0.13-0.23 | 0.13-0.23 | 0.15-0.26 | 0.16-0.26 | 0.18-0.28 | 0.2-0.3 |
| Grey Cast Iron | 0.16-0.24 | 0.18-0.27 | 0.2-0.3 | 0.22-0.35 | 0.25-0.36 | 0.28-0.38 | 0.3-0.4 |
| Ductile Cast Iron | 0.16-0.24 | 0.18-0.27 | 0.2-0.3 | 0.22-0.35 | 0.25-0.36 | 0.28-0.38 | 0.3-0.4 |
| Austenitic Stainless | 0.16-0.24 | 0.18-0.27 | 0.2-0.3 | 0.22-0.35 | 0.25-0.36 | 0.28-0.38 | 0.3-0.4 |
| Ph Stainless | 0.1-0.15 | 0.13-0.23 | 0.18-0.25 | 0.2-0.27 | 0.22-0.3 | 0.25-0.33 | 0.28-0.35 |
| High Temp Alloys | 0.08-0.13 | 0.1-0.15 | 0.12-0.17 | 0.14-0.19 | 0.16-0.21 | 0.18-0.25 | 0.23-0.28 |
| Titanium Alloys | 0.16-0.24 | 0.18-0.27 | 0.2-0.3 | 0.22-0.35 | 0.25-0.36 | 0.28-0.38 | 0.3-0.4 |

Feedrate Formula For Metric Drills - Feed = RPM x mm/rev

# Twister® Series MPDCS/MXDCR/MXDCL

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | ISO | Hardness | Tool Series | TYPE | DEPTH | vc- m/min. | Drill Diameter (mm) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 2.95 |
| | | | | | | | f - mm/Rev | | | | | |
| Free Machining & Low Carbon Steels,1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140, 1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330 | P | up to 28 Rc | MXDSR | | 5 | 45 | 0.013 | 0.025 | 0.038 | 0.050 | 0.063 | 0.076 |
| | | | MPDCS | | 2 | 90 | - | 0.025 | 0.038 | 0.050 | 0.063 | 0.076 |
| | | | MXDCR | | 5 | | | | | | | |
| | | | MXDCL | | 12 | | | | | | | |
| Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310 | P | 28 to 38 Rc | MXDSR | | 5 | 40 | 0.013 | 0.025 | 0.038 | 0.050 | 0.063 | 0.076 |
| | | | MPDCS | | 2 | 90 | - | 0.025 | 0.038 | 0.050 | 0.063 | 0.076 |
| | | | MXDCR | | 5 | | | | | | | |
| | | | MXDCL | | 12 | | | | | | | |
| Tool Steels & Die Steels O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, A2, A3, A6, A7, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A128, D2, D3, D4, D5, D7 | P | 28 to 44 Rc | MXDSR | | 5 | 35 | 0.013 | 0.025 | 0.038 | 0.050 | 0.063 | 0.076 |
| | | | MPDCS | | 2 | 75 | - | 0.025 | 0.038 | 0.050 | 0.063 | 0.076 |
| | | | MXDCR | | 5 | | | | | | | |
| | | | MXDCL | | 12 | | | | | | | |
| Stainless Steel - Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430 | M | up to 28 Rc | MXDSR | | 5 | 40 | 0.013 | 0.025 | 0.038 | 0.050 | 0.063 | 0.076 |
| | | | MPDCS | | 2 | 90 | - | 0.025 | 0.038 | 0.050 | 0.063 | 0.076 |
| | | | MXDCR | | 5 | | | | | | | |
| | | | MXDCL | | 12 | | | | | | | |
| Stainless Steel - Moderately Difficult 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH | M | up to 28 Rc | MXDSR | | 5 | 38 | 0.013 | 0.025 | 0.038 | 0.050 | 0.063 | 0.076 |
| | | | MPDCS | | 2 | 70 | - | 0.025 | 0.038 | 0.050 | 0.063 | 0.076 |
| | | | MXDCR | | 5 | | | | | | | |
| | | | MXDCL | | 12 | | | | | | | |
| Stainless Steel - Difficult to Machine 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics | M | over 28 Rc | MXDSR | | 5 | 18 | 0.005 | 0.010 | 0.018 | 0.023 | 0.028 | 0.036 |
| | | | MPDCS | | 2 | 18 | - | 0.010 | 0.018 | 0.023 | 0.028 | 0.036 |
| | | | MXDCR | | 5 | | | | | | | |
| | | | MXDCL | | 12 | | | | | | | |
| Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al | S | up to 40 Rc | MXDSR | | 5 | 20 | 0.013 | 0.025 | 0.038 | 0.050 | 0.063 | 0.076 |
| | | | MPDCS | | 2 | 55 | - | 0.025 | 0.038 | 0.050 | 0.063 | 0.076 |
| | | | MXDCR | | 5 | | | | | | | |
| | | | MXDCL | | 12 | | | | | | | |
| High Temp Alloys Nimonics, Inconel, Monel, Hastelloy' Waspeloy | S | up to 40 Rc | MXDSR | | 5 | 18 | 0.005 | 0.010 | 0.018 | 0.023 | 0.028 | 0.036 |
| | | | MPDCS | | 2 | 24 | - | 0.010 | 0.018 | 0.023 | 0.028 | 0.036 |
| | | | MXDCR | | 5 | | | | | | | |
| | | | MXDCL | | 12 | | | | | | | |

**Safety Note**

Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should be fully guarded.

# Twister® XD High Performance Drills - 12⁺xD

## Series 2XDCEM Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)

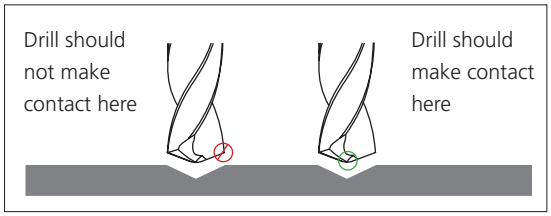
| Workpiece Material Groups | Vc (m/min) | Tool Diameter (mm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 |
| | | Feed (mm/rev) | | | | | | | | |
| Low Carbon Steel <0.3%C | 105 | 0.05 | 0.075 | 0.088 | 0.106 | 0.127 | 0.193 | 0.215 | 0.238 | 0.254 |
| Structural Steel | 120 | 0.05 | 0.075 | 0.088 | 0.106 | 0.127 | 0.193 | 0.215 | 0.238 | 0.254 |
| Medium Carbon Steel | 80 | 0.05 | 0.075 | 0.088 | 0.106 | 0.127 | 0.193 | 0.215 | 0.238 | 0.254 |
| Tool & Die Steel | 80 | 0.05 | 0.075 | 0.088 | 0.106 | 0.127 | 0.193 | 0.215 | 0.238 | 0.254 |
| Alloy Steel | 80 | 0.05 | 0.075 | 0.088 | 0.106 | 0.127 | 0.193 | 0.215 | 0.238 | 0.254 |
| Grey Cast Iron | 120 | 0.06 | 0.078 | 0.1 | 0.12 | 0.14 | 0.2 | 0.215 | 0.24 | 0.254 |
| Ductile Cast Iron | 80 | 0.06 | 0.078 | 0.1 | 0.12 | 0.14 | 0.2 | 0.215 | 0.24 | 0.254 |
| Austenitic Stainless | 55 | 0.05 | 0.071 | 0.09 | 0.105 | 0.127 | 0.193 | 0.215 | 0.238 | 0.254 |
| Ph Stainless | 40 | 0.05 | 0.071 | 0.09 | 0.105 | 0.127 | 0.193 | 0.215 | 0.238 | 0.254 |
| Martensitic Stainless | 40 | 0.05 | 0.071 | 0.09 | 0.105 | 0.127 | 0.193 | 0.215 | 0.238 | 0.254 |
| Ferritic Stainless | 75 | 0.05 | 0.071 | 0.09 | 0.105 | 0.127 | 0.193 | 0.215 | 0.238 | 0.254 |
| High Temp Alloys | 20-25 | 0.017 | 0.022 | 0.03 | 0.035 | 0.048 | 0.063 | 0.071 | 0.078 | 0.085 |
| Titanium Alloys | 45 | 0.03 | 0.04 | 0.05 | 0.06 | 0.071 | 0.12 | 0.127 | 0.14 | 0.152 |
| Hardened Steel (35-45 Hrc) | 35 | 0.012 | 0.015 | 0.02 | 0.022 | 0.027 | 0.048 | 0.053 | 0.06 | 0.066 |
| Hardened Steel (46-55 Hrc) | 25 | 0.012 | 0.015 | 0.02 | 0.022 | 0.027 | 0.048 | 0.053 | 0.06 | 0.066 |
| Non Ferrous-Al<14%Si | 150 | 0.083 | 0.11 | 0.14 | 0.17 | 0.195 | 0.28 | 0.314 | 0.35 | 0.378 |
| Non Ferrous-Al>14%Si | 105 | 0.083 | 0.11 | 0.14 | 0.17 | 0.195 | 0.28 | 0.314 | 0.35 | 0.378 |
| Non Ferrous-Brass | 120 | 0.053 | 0.071 | 0.088 | 0.106 | 0.127 | 0.279 | 0.314 | 0.35 | 0.378 |
| Cu/Cu Alloys/Magnesium | 90 | 0.053 | 0.071 | 0.088 | 0.106 | 0.127 | 0.279 | 0.314 | 0.35 | 0.378 |

RPM Formula For Metric Drills Only - RPM = (Vc x 318.0) ÷ Drill Ø D¹
Feedrate Formula For Metric Drills - Feed = RPM x mm/rev

# Twister® 2XDCEM, MXDCL & CXDCLM 15X

## Process For Successful Deep Hole Drilling:

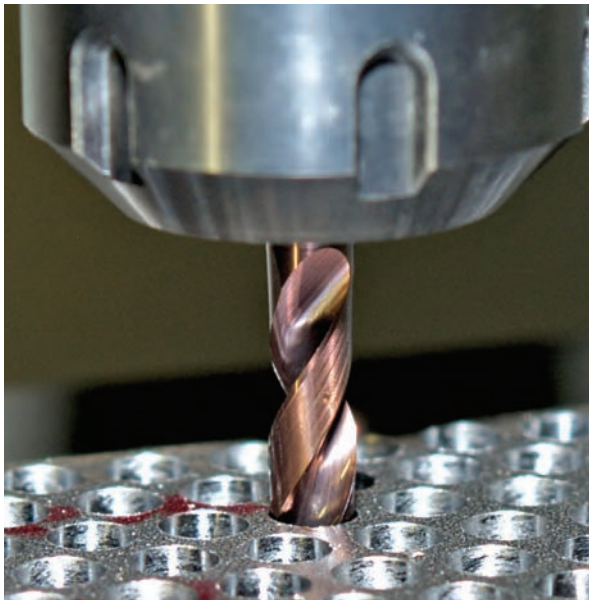
1. Start by producing a 1.5 x diameter to 3 x diameter pilot hole using a coolant or non-coolant pilot drill. Typically this tool will have a point angle the same as or greater than the deep hole drill. Run this drill at 100% of the final drill speed and 1/2 the normal IPM.
2. Retract and tool change to the final deep hole (2XDCE MA Ford® Series) drill.




3. Rapid to clearance plane and enter the pilot hole at 25% (don't exceed 400 to 500 RPM) of the final speed and 25 - 50 mm/min. This will help with true position by eliminating drill whip. Once into the hole, turn on the coolant and advance to the material start. At this point, you can add a dwell to clear any chips that have been left from the previous drill and let the spindle get to full speed. Increase the speed and feed to final drilling parameters.
4. Drill one shot to the final hole depth or through.
5. Should you experience any squeaking you may need to retract the drill and increase your feed. Chip packing is occurring and will need to be addressed.
6. Once through the material, it may be necessary to reduce the RPM to eliminate breakage of the drill due to drill whip. Then retract to the clearance plane.

## Machine Requirements

High Pressure Pump System (70 Bar)
Machine runout of 0.008mm Max.



Due to the conditions of equipment, tool holders, and conditions beyond MA Ford®'s control, your results may vary.

Should your application require more in depth discussion or a special tool, please contact M.A. Ford®'s Application Engineering Department at +44(0) 1332 267960.

**Safety Note**
Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should be fully guarded. Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

# cyclone CDA High Performance Aluminium Drill - 5xD

## Series CDACRM Aluminium Drill Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)

| Work piece Material Group | ISO | | Hardness | vc - m/min | | | Drill Diameter (mm) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Starting Value | Max | 3.0 | 4.0 | 6.0 | 8.0 | 10.0 | 12.0 |
| | | | | | | | f - mm/Rev | | | | | |
| Aluminium & Aluminium Wrought Alloys | N | 10 | 60-100 Brinell HB | 120 | 230 | 450 | 0.13-0.25 | 0.14-0.29 | 0.17-0.35 | 0.21-0.42 | 0.27-0.50 | 0.33-0.57 |
| Cast Aluminium Alloys | | 20 | 75-90 Brinell HB | 120 | 220 | 350 | 0.14-0.23 | 0.15-0.28 | 0.17-0.34 | 0.22-0.39 | 0.29-0.46 | 0.34-0.54 |
| Aluminium Alloys Cast 13-22% Si | | 30 | | 100 | 180 | 400 | 0.13-0.18 | 0.14-0.19 | 0.16-0.25 | 0.20-0.30 | 0.28-0.37 | 0.33-0.24 |
| Copper and Copper Alloys Brass, Bronze, Copper | | 40 | 90-110 Brinell HB | 100 | 130 | 300 | 0.10-0.16 | 0.12-0.18 | 0.14-0.24 | 0.16-0.28 | 0.18-0.32 | 0.20-0.36 |

# cyclone CXD High Performance Drill - Series CXDCEM 15xD

## Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane Parametry

| Workpiece Material Group | ISO | Hardness | TYPE | DEPTH | vc- m/min. | Drill Diameter (mm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 12 |
| | | | | | | f - mm/Rev | | | | | | | | |
| Free Machining & Low Carbon Steels 1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140,1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330 | P | up to 28 Rc | | 15X | 105 | .053 | .070 | .088 | .106 | .127 | .193 | .215 | .238 | .254 |
| Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310 | P | 28 to 35 Rc | | 15X | 80 | .053 | .070 | .088 | .106 | .127 | .193 | .215 | .238 | .254 |
| Tool Steels & Die Steels O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, A2, A3, A6, A7, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A128, D2, D3, D4, D5, D7 | P | 28 to 35 Rc | | 15X | 80 | .053 | .070 | .088 | .106 | .127 | .193 | .215 | .238 | .254 |
| Hardened Steels | H | 35-45 Rc | | 15X | 35 | .012 | .016 | .020 | .022 | .027 | .046 | .053 | .060 | .066 |
| Hardened Steels | | 45-55 Rc | | | 25 | | | | | | | | | |
| Stainless Steel - Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430 | M | up to 28 Rc | | 15X | 90 | .053 | .070 | .090 | .105 | .127 | .193 | .215 | .238 | .254 |
| Stainless Steel - Moderately Difficult 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH | M | up to 28 Rc | | 15X | 55 | .053 | .070 | .090 | .105 | .127 | .193 | .215 | .238 | .254 |
| Stainless Steel - Difficult to Machine 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics | M | over 28 Rc | | 15X | 40 | .053 | .070 | .090 | .105 | .127 | .193 | .215 | .238 | .254 |
| High Temp Alloys Nimonics, Inconel, Monel, Hastelloy | S | up to 42 Rc | | 15X | 20-25 | .015 | .020 | .030 | .035 | .048 | .051 | .071 | .078 | .085 |
| Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al | S | up to 42 Rc | | 15X | 45 | .025 | .033 | .050 | .060 | .071 | .098 | .127 | .140 | .152 |
| Cast Iron - Gray CG, ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40 | K | up to 240 HB | | 15X | 120 | .053 | .070 | .100 | .120 | .140 | .200 | .215 | .240 | .254 |
| Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450 | K | over 240 HB | | 15X | 80 | .053 | .070 | .100 | .120 | .140 | .200 | .215 | .240 | .254 |

**Safety Note**

Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should be fully guarded.

Please use corresponding diameter CXD drill for creating 1.5 to 3 x diameter pilot hole, prior to deep hole drilling with the CXDCEM drill.

cyclone

## Recommended Cutting Data CXD ≤ 6mm - Metric

Conditions de coupe recommandées CXD ≤ 6mm - Métrique
Empfohlene Schnittdaten CXD ≤ 6 mm – metrisch
Dati di taglio raccomandati CXD ≤ 6mm - Metrici
Zalecane dane o cięciu (Zalacane paramerty skrawania) CXD ≤ 6 mm – metryczne

| Workpiece Material Group | ISO | Hardness | Tool Series | TYPE | DEPTH | Drill Diameter (mm) 3 | 4 | 5 | 6 | Drill Diameter (mm) 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | vc - m/min | | | | f - mm/Rev | | | |
| Free Machining & Low Carbon Steels<br>1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140, 1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330 | P | up to 28 Rc | CXDSS | | 3 | 119 | 116 | 113 | 110 | .076-.127 | .102-.152 | .127-.178 | .127-.203 |
| | | | CXDSR | | 5 | 119 | 116 | 113 | 110 | | | | |
| | | | CXDCS | | 3 | 201 | 198 | 195 | 192 | .076-.127 | .102-.152 | .127-.178 | .127-.203 |
| | | | CXDCR | | 5 | 201 | 198 | 195 | 192 | | | | |
| | | | CXDCL | | 8 | 181 | 177 | 171 | 165 | | | | |
| Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels<br>1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310 | P | 28 to 38 Rc | CXDSS | | 3 | 101 | 98 | 94 | 91 | .076-.127 | .102-.152 | .127-.178 | .127-.203 |
| | | | CXDSR | | 5 | 101 | 98 | 94 | 91 | | | | |
| | | | CXDCS | | 3 | 175 | 168 | 165 | 152 | .076-.127 | .102-.152 | .127-.178 | .127-.203 |
| | | | CXDCR | | 5 | 175 | 168 | 165 | 152 | | | | |
| | | | CXDCL | | 8 | 131 | 128 | 125 | 122 | | | | |
| Tool Steels & Die Steels<br>O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, A2, A3, A6, A7, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A128, D2, D3, D4, D5, D7 | P | 28 to 44 Rc | CXDSS | | 3 | 61 | 58 | 58 | 56 | .036-.076 | .061-.102 | .076-.127 | .089-.152 |
| | | | CXDSR | | 5 | 61 | 58 | 58 | 56 | | | | |
| | | | CXDCS | | 3 | 76 | 73 | 70 | 67 | .036-.076 | .061-.102 | .076-.127 | .089-.152 |
| | | | CXDCR | | 5 | 76 | 73 | 70 | 67 | | | | |
| | | | CXDCL | | 8 | 69 | 67 | 66 | 62 | | | | |
| Stainless Steel - Easy to Machine<br>430F, 301, 303, 410, 416 Annealed, 420F, 430 | M | up to 28 Rc | CXDSS | | 3 | 107 | 104 | 101 | 98 | .076-.127 | .102-.152 | .127-.178 | .127-.203 |
| | | | CXDSR | | 5 | 107 | 104 | 101 | 98 | | | | |
| | | | CXDCS | | 3 | 168 | 152 | 145 | 137 | .076-.127 | .102-.152 | .127-.178 | .127-.203 |
| | | | CXDCR | | 5 | 168 | 152 | 145 | 137 | | | | |
| | | | CXDCL | | 8 | 137 | 130 | 122 | 116 | | | | |
| Stainless Steel - Moderately Difficult<br>301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH | M | up to 28 Rc | CXDSS | | 3 | 43 | 41 | 40 | 38 | .076-.127 | .102-.152 | .127-.178 | .127-.203 |
| | | | CXDSR | | 5 | 43 | 41 | 40 | 38 | | | | |
| | | | CXDCS | | 3 | 91 | 88 | 85 | 82 | .076-.127 | .102-.152 | .127-.178 | .127-.203 |
| | | | CXDCR | | 5 | 91 | 88 | 85 | 82 | | | | |
| | | | CXDCL | | 8 | 85 | 82 | 79 | 76 | | | | |
| Stainless Steel - Difficult to Machine<br>302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics | M | over 28 Rc | CXDSS | | 3 | 43 | 40 | 37 | 34 | .051-.076 | .061-.089 | .089-.102 | .076-.127 |
| | | | CXDSR | | 5 | 43 | 40 | 37 | 34 | | | | |
| | | | CXDCS | | 3 | 81 | 76 | 73 | 70 | .051-.076 | .061-.089 | .089-.102 | .076-.127 |
| | | | CXDCR | | 5 | 81 | 76 | 73 | 70 | | | | |
| | | | CXDCL | | 8 | 58 | 55 | 52 | 49 | | | | |
| High Temp Alloys<br>Nimonics, Inconel, Monel, Hastelloy | S | up to 42 Rc | CXDSS | | 3 | 26 | 24 | 23 | 21 | .036-.089 | .036-.089 | .051-.102 | .061-.127 |
| | | | CXDSR | | 5 | 26 | 24 | 23 | 21 | | | | |
| | | | CXDCS | | 3 | 35 | 30 | 29 | 27 | .036-.089 | .036-.089 | .051-.102 | .061-.127 |
| | | | CXDCR | | 5 | 35 | 30 | 29 | 27 | | | | |
| | | | CXDCL | | 8 | 30 | 30 | 29 | 29 | | | | |
| Titanium Alloys<br>6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al | S | up to 42 Rc | CXDSS | | 3 | 40 | 38 | 37 | 35 | .076-.102 | .102-.152 | .127-.178 | .140-.229 |
| | | | CXDSR | | 5 | 40 | 38 | 37 | 35 | | | | |
| | | | CXDCS | | 3 | 70 | 67 | 64 | 61 | .076-.102 | .102-.152 | .127-.178 | .140-.229 |
| | | | CXDCR | | 5 | 70 | 67 | 64 | 61 | | | | |
| | | | CXDCL | | 8 | 64 | 58 | 55 | 52 | | | | |
| Cast Iron Gray CG,<br>ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40 | K | up to 240 HB | CXDSS | | 3 | 146 | 143 | 140 | 131 | .076-.127 | .102-.152 | .127-.178 | .127-.203 |
| | | | CXDSR | | 5 | 146 | 143 | 140 | 131 | | | | |
| | | | CXDCS | | 3 | 201 | 195 | 189 | 183 | .076-.127 | .102-.152 | .127-.178 | .127-.203 |
| | | | CXDCR | | 5 | 201 | 195 | 189 | 183 | | | | |
| | | | CXDCL | | 8 | 152 | 149 | 146 | 143 | | | | |
| Cast Iron - Ductile & Malleable CGI<br>60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450 | K | over 240 HB | CXDSS | | 3 | 85 | 82 | 79 | 76 | .076-.127 | .102-.152 | .127-.178 | .127-.203 |
| | | | CXDSR | | 5 | 85 | 82 | 79 | 76 | | | | |
| | | | CXDCS | | 3 | 122 | 146 | 140 | 134 | .076-.127 | .102-.152 | .127-.178 | .127-.203 |
| | | | CXDCR | | 5 | 122 | 146 | 140 | 134 | | | | |
| | | | CXDCL | | 8 | 107 | 104 | 101 | 98 | | | | |

## Recommended Cutting Data CXD ≤ 8mm - Metric

Conditions de coupe recommandées CXD ≤ 8mm - Métrique
Empfohlene Schnittdaten CXD ≤ 8 mm – metrisch
Dati di taglio raccomandati CXD ≤ 8mm - Metrici
Zalecane dane o cięciu (Zalacane paramerty skrawania) CXD ≤ 8 mm – metryczne

| Workpiece Material Group | ISO | Hardness | Tool Series | TYPE | DEPTH | Drill Diameter (mm) vc - m/min | | | | | | | Drill Diameter (mm) f - mm/Rev | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| Free Machining & Low Carbon Steels 1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140,1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330 | P | up to 28 Rc | CXDSS | | 3 | 107 | 104 | 98 | 91 | 84 | 81 | 77 | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.35 | .28-.38 | .30-.37 |
| | | | CXDSR | | 5 | 107 | 104 | 98 | 91 | 84 | 81 | | | | | | | | |
| | | | CXDCS | | 3 | 189 | 183 | 175 | 168 | 160 | 152 | | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.35 | .28-.38 | .30-.37 |
| | | | CXDCR | | 5 | 189 | 183 | 175 | 168 | 160 | 152 | 145 | | | | | | | |
| | | | CXDCL | | 8 | 158 | 152 | 146 | 140 | 134 | | | | | | | | | |
| Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137,4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132,5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2,W1 to W310 | P | 28 to 38 Rc | CXDSS | | 3 | 88 | 85 | 82 | 81 | 79 | 79 | 75 | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.35 | .28-.38 | .30-.37 |
| | | | CXDSR | | 5 | 88 | 85 | 82 | 81 | 79 | 79 | | | | | | | | |
| | | | CXDCS | | 3 | 145 | 137 | 130 | 122 | 99 | 96 | | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.35 | .28-.38 | .30-.37 |
| | | | CXDCR | | 5 | 145 | 137 | 130 | 122 | 99 | 96 | 92 | | | | | | | |
| | | | CXDCL | | 8 | 114 | 107 | 99 | 93 | 76 | | | | | | | | | |
| Tool Steels & Die Steels O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, A2, A3, A6, A7, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A128, D2, D3, D4, D5, D7 | P | 28 to 44 Rc | CXDSS | | 3 | 56 | 55 | 55 | 53 | 53 | 52 | 49 | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.35 | .28-.38 | .30-.37 |
| | | | CXDSR | | 5 | 56 | 55 | 55 | 53 | 53 | 52 | | | | | | | | |
| | | | CXDCS | | 3 | 64 | 64 | 61 | 61 | 58 | 58 | | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.35 | .28-.38 | .30-.37 |
| | | | CXDCR | | 5 | 64 | 64 | 61 | 61 | 58 | 58 | 55 | | | | | | | |
| | | | CXDCL | | 8 | 61 | 58 | 58 | 58 | 55 | | | | | | | | | |
| Stainless Steel - Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430 | M | up to 28 Rc | CXDSS | | 3 | 94 | 91 | 84 | 76 | 69 | 61 | 55 | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.36 | .28-.38 | .30-.37 |
| | | | CXDSR | | 5 | 94 | 91 | 84 | 76 | 69 | 61 | | | | | | | | |
| | | | CXDCS | | 3 | 122 | 119 | 116 | 113 | 101 | 98 | | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.35 | .28-.38 | .30-.37 |
| | | | CXDCR | | 5 | 122 | 119 | 116 | 113 | 101 | 98 | 94 | | | | | | | |
| | | | CXDCL | | 8 | 114 | 113 | 107 | 104 | 91 | | | | | | | | | |
| Stainless Steel - Moderately Difficult 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH | M | up to 28 Rc | CXDSS | | 3 | 37 | 35 | 34 | 32 | 30 | 29 | 28 | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.36 | .28-.38 | .30-.37 |
| | | | CXDSR | | 5 | 37 | 35 | 34 | 32 | 30 | 29 | | | | | | | | |
| | | | CXDCS | | 3 | 79 | 76 | 73 | 73 | 70 | 67 | | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.35 | .28-.38 | .30-.37 |
| | | | CXDCR | | 5 | 79 | 76 | 73 | 73 | 70 | 67 | 64 | | | | | | | |
| | | | CXDCL | | 8 | 73 | 70 | 67 | 67 | 64 | | | | | | | | | |
| Stainless Steel - Difficult to Machine 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics | M | over 28 Rc | CXDSS | | 3 | 34 | 32 | 32 | 30 | 30 | 29 | 27 | .11-.15 | .13-.23 | .18-.25 | .21-.27 | .22-.31 | .25-.33 | .30-.37 |
| | | | CXDSR | | 5 | 34 | 32 | 32 | 30 | 30 | 29 | | | | | | | | |
| | | | CXDCS | | 3 | 67 | 61 | 58 | 55 | 52 | 47 | | .11-.15 | .13-.23 | .18-.25 | .21-.27 | .22-.31 | .25-.33 | .30-.37 |
| | | | CXDCR | | 5 | 67 | 61 | 58 | 55 | 52 | 47 | 45 | | | | | | | |
| | | | CXDCL | | 8 | 46 | 43 | 40 | 38 | 36 | | | | | | | | | |
| High Temp Alloys Nimonics, Inconel, Monel, Hastelloy | S | up to 42 Rc | CXDSS | | 3 | 20 | 18 | 17 | 15 | 14 | 12 | 11 | .08-.13 | .11-.15 | .12-.17 | .14-.19 | .16-.21 | .18-.25 | .17-.24 |
| | | | CXDSR | | 5 | 20 | 18 | 17 | 15 | 14 | 12 | | | | | | | | |
| | | | CXDCS | | 3 | 26 | 26 | 24 | 24 | 23 | 23 | | .09-.13 | .11-.15 | .12-.17 | .14-.19 | .16-.21 | .18-.25 | .17-.24 |
| | | | CXDCR | | 5 | 26 | 26 | 24 | 24 | 23 | 23 | 22 | | | | | | | |
| | | | CXDCL | | 8 | 24 | 24 | 23 | 23 | 21 | | | | | | | | | |
| Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al | S | up to 42 Rc | CXDSS | | 3 | 34 | 32 | 30 | 30 | 27 | 27 | 25 | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.36 | .28-.38 | .30-.37 |
| | | | CXDSR | | 5 | 34 | 32 | 30 | 30 | 27 | 27 | | | | | | | | |
| | | | CXDCS | | 3 | 55 | 55 | 52 | 49 | 46 | 46 | | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.36 | .28-.38 | .30-.37 |
| | | | CXDCR | | 5 | 55 | 55 | 52 | 49 | 46 | 46 | 44 | | | | | | | |
| | | | CXDCL | | 8 | 49 | 46 | 43 | 40 | 38 | | | | | | | | | |
| Cast Iron - Gray CG, ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40 | K | up to 240 HB | CXDSS | | 3 | 125 | 122 | 119 | 113 | 110 | 107 | 102 | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.36 | .28-.38 | .30-.37 |
| | | | CXDSR | | 5 | 125 | 122 | 119 | 113 | 110 | 107 | | | | | | | | |
| | | | CXDCS | | 3 | 177 | 171 | 168 | 168 | 160 | 152 | | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.35 | .28-.38 | .30-.37 |
| | | | CXDCR | | 5 | 177 | 171 | 168 | 168 | 160 | 152 | 145 | | | | | | | |
| | | | CXDCL | | 8 | 140 | 137 | 134 | 134 | 128 | | | | | | | | | |
| Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450 | K | over 240 HB | CXDSS | | 3 | 73 | 70 | 67 | 64 | 61 | 58 | 55 | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.36 | .28-.38 | .30-.37 |
| | | | CXDSR | | 5 | 73 | 70 | 67 | 64 | 61 | 58 | | | | | | | | |
| | | | CXDCS | | 3 | 122 | 114 | 107 | 91 | 84 | 76 | | .16-.24 | .18-.27 | .21-.31 | .22-.35 | .25-.35 | .28-.38 | .30-.37 |
| | | | CXDCR | | 5 | 122 | 114 | 107 | 91 | 84 | 76 | 72 | | | | | | | |
| | | | CXDCL | | 8 | 91 | 82 | 76 | 67 | 61 | | | | | | | | | |

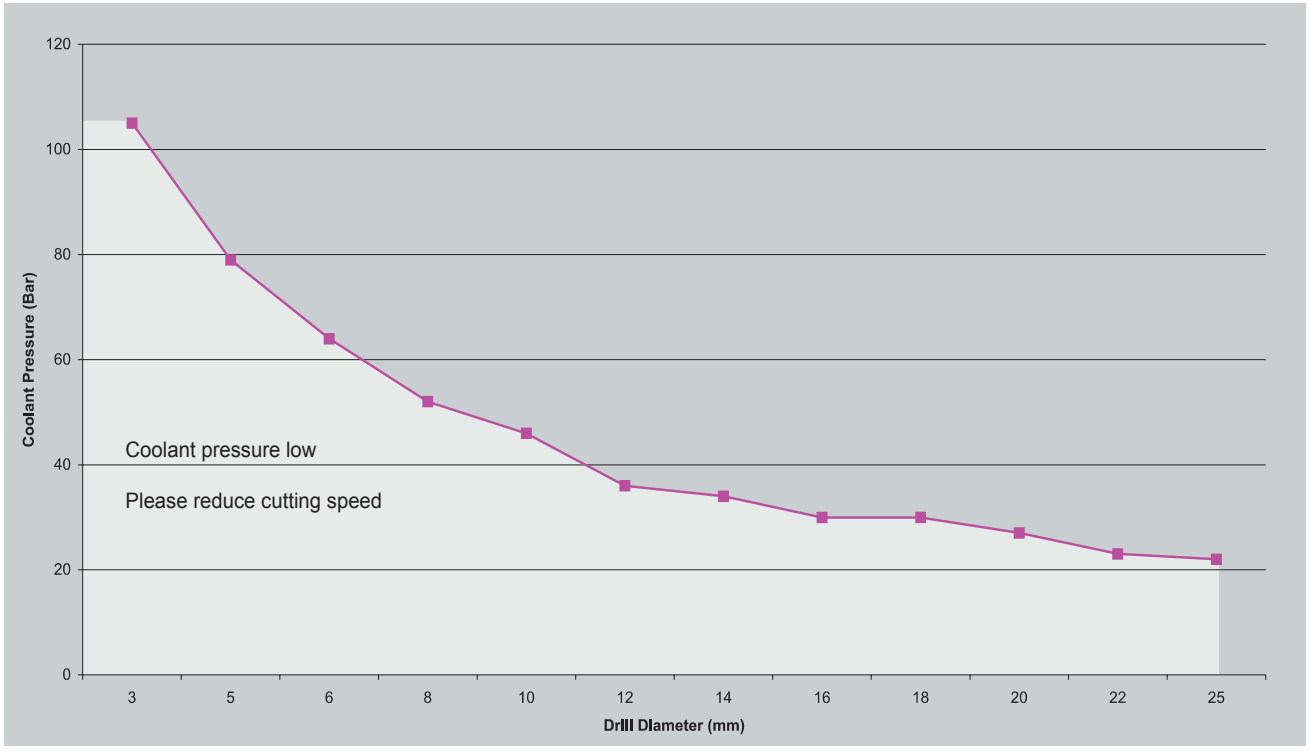
## Drill Troubleshooting

Dépannage Foret | Fehlerbehebung Bohrer | Risoluzione dei problemi relativi alla foratura | Diagnozowanie usterek wierteł

| | | Problem | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Tool Deterioration | | | | | | | | | | | | | Chip Formation | | | Tool Life | Workpiece | | | | | | | | Process | | | | | | |
| | Possible Solutions | Flank wear | Margin wear | Breakage | Flaking | Creater wear | Chisel edge wear | Corner chipping | Flute chipping | Cutting edge chipping | Cutting edge wear | Point center chipping | Rake face | Scoring on tool body | Long stringy | Varied chip form | Blue/brown chips | Tool Life | Undersized hole | Oversized hole | Poor alignment | Poor surface finish | Heavy burr breakout | Retract marks | Hole location | Hole straightness | Deflection | Point Deflection | Galling | Vibration | Abnormal noise | Chip packing | No drill penetration |
| Speed & Feed | Reduce feed or reduce at exit | x | | x | | | x | x | x | x | | x | x | x | | | | x | x | x | | x | x | | | x | | | | | x | |
| | Reduce feed at entrance | | | x | | | | | | | | | | | | | | | x | | | x | | | x | | x | | | | | x | |
| | Consistent feed rate | | | x | | | | | | | | | | | x | x | | | | | | | | | | | | | | x | | x | |
| | Increase feed | x | | | | | x | | | | x | | | | x | | | | x | x | | | | | | | | | | | | | |
| | Reduce speed | x | x | | | x | | x | | | x | | | | | | | x | x | | | | | | | | | | x | | x | x | |
| | Increase speed | | | | | | | | | | | | | | | | | | | | | x | | | | | | | | | | | |
| Coolant | Coolant mix | | x | x | x | | | | | x | | | | x | | | | x | x | | | x | x | | | | | | | | x | |
| | Coolant increase flow | x | | x | | | x | x | | x | | | | | | | x | x | x | | | x | x | | | | | | | | x | |
| | Coolant filter | x | | x | x | | | | | x | | | | | | | | x | x | | | x | x | | | | | | | | x | |
| Setup | Workpiece clamp rigid | | x | x | | | x | x | | x | | | | x | | | | x | | x | x | x | x | x | x | x | | | | | | x |
| | Collet accuracy | | | x | | | | | | x | | | | | | | | | | x | | | | | x | x | | | | x | | | |
| | Tool holder fit .0008 | | | x | | | | | | x | | | | | | | | | | x | | | | | x | x | | | | x | | | |
| | Alignment | | | x | | | | | | x | | | | | | | | | | x | | | | | | | | | | | | x |
| | Peck drill | | | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Concentricity | | x | x | x | | | x | x | | | | | x | | | | | | | x | x | | x | x | x | | x | | x | | | |
| | Do not extract tool during peck | | | | | | | x | | | | | | | | | | | | | | | | | | | | | | | | | |

## Recommended Minimum Coolant Pressure

Pression minimale recommandée pour le liquide de coupe | Empfohlener Mindestdruck für Kühlmittel
Pressione minima del refrigerante consigliata | Zalecane minimalne ciśnienie chłodziwa





# Twister® Solid Carbide & HSSCo Platinum Drills

## General Purpose Drills

Forets pour utilisation générale | Universalbohrer
Punte per uso generale | Wiertła ogólnego przeznaczenia

EN

Our FordMax drills range is one of the most comprehensive available and covering high-precision micro and circuit board drills up to high performance, large diameter drills for machining aluminium, stainless steel and exotic alloys, as well as our HSSCo Platinum drills for steel, stainless steels, copper and aluminium.

FR

"Notre gamme de forets FordMax est l'une des plus complètes, disponibles sur le marché, elle couvre depuis les forets de grande précision et forets pour circuit imprimé jusqu'aux forets haute performance, une gamme large de diamètres pour l'usinage de l'aluminium, de l'acier inoxydable et des alliages exotiques, aussi bien que nos forets en Platinium HSSCo pour l'acier, l'acier inoxydable, le cuivre et l'aluminium."

DE

Unser Sortiment der FordMax-Bohrer gehört zu den umfangreichsten, auf dem Markt erhältlichen Produktpaletten. Es umfasst Hochpräzisions-Mikrobohrer und Bohrer für Leiterplatten sowie Hochleistungsbohrer, Bohrer mit großem Durchmesser zur Bearbeitung von Aluminium, Edelstahl und Sonderlegierungen sowie unsere HSSCo-Platinbohrer für Stahl, rostfreien Stahl, Kupfer und Aluminium.

IT

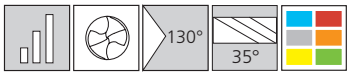
La nostra gamma di punte FordMax è una tra le più complete e comprende, tra l'altro, micropunte ad alta precisione e per circuiti stampati, punte ad elevate prestazioni, punte di grandi diametri per lavorazioni di alluminio, acciaio inossidabile e materiali esotici. La serie Platinum in HSSCo è idonea per acciaio, acciaio inossidabile, rame e alluminio.

PL

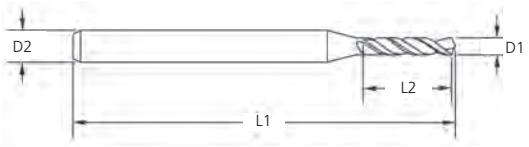
Zakres wierteł FordMax jest jednym z najbardziej wszechstronnych i dostępnych. Obejmuje precyzyjne i wysokowydajne mikro wiertła i wiertła z płytkami lutowanymi o szerokim zakresie średnic do obróbki aluminium, stali nierdzewnej i stopów egzotycznych, a także wiertła HSSCo Platinum do stali, stali nierdzewnych, miedzi i aluminium.


| | Page |
|---|---|
| **Twister® Micro Drill** Series 302 Uncoated | 158 |
| **Twister® Hi-Roc® Drill 3xD** Series 200 Uncoated | 159 - 160 |
| **Twister® Kevlar/Composite Drill 3xD** Series 207 Uncoated | 161 |
| **Twister® Hi-Tuff® Drill 5xD** Series 205 Uncoated | 162 - 163 |
| **Twister® Micro Drill 5xD** Series 300 Uncoated | 164 |
| **Twister® Performance Drill 3xD** Series HPDSS, HPDCS | 165 - 167 |
| **Twister® Performance Drill 5xD** Series HPDSR, HPDCR | 168 - 170 |
| **Twister® X-AL 3 Flute Performance Aluminium Drill 4-5xD** Series 229 | 171 |
| **Twister® Hi-Tuff® Jobbers Drill 5xD** Series 224 Uncoated | 172 - 173 |
| **Twister® Centre Drill** Series 402 Uncoated | 174 |
| **Twister® 90° NC Spot Drill** Series 404 Uncoated | 175 |
| **Twister® 120° NC Spot Drill** Series 403 Uncoated | 176 |
| **HSSCo Platinum Drills** Series PRM-KSN | 176 |
| **HSSCo Platinum Drills** Series PRXS-KST | 177 - 178 |
| **HSSCo Platinum Drills** Series PRXS-KMT | 178 - 179 |
| **Technical Information** | 180 - 184 |

# Twister® Micro Drill Series 302 Uncoated





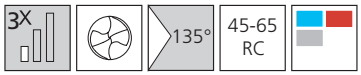




| Series 302 | Drill Dimensions | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| 302 0010 | 0.1 | 3.175 | 38.1 | 1.7 |
| 302 0015 | 0.15 | 3.175 | 38.1 | 2.5 |
| 302 0020 | 0.2 | 3.175 | 38.1 | 3.2 |
| 302 0025 | 0.25 | 3.175 | 38.1 | 3.8 |
| 302 0030 | 0.3 | 3.175 | 38.1 | 5.0 |
| 302 0035 | 0.35 | 3.175 | 38.1 | 5.0 |
| 302 0035-1 | 0.35 | 3.175 | 38.1 | 6.0 |
| 302 0040 | 0.4 | 3.175 | 38.1 | 5.0 |
| 302 0040-1 | 0.4 | 3.175 | 38.1 | 6.0 |
| 302 0045 | 0.45 | 3.175 | 38.1 | 5.0 |
| 302 0045-1 | 0.45 | 3.175 | 38.1 | 6.0 |
| 302 0045-2 | 0.45 | 3.175 | 38.1 | 8.0 |
| 302 0050 | 0.5 | 3.175 | 38.1 | 5.0 |
| 302 0050-1 | 0.5 | 3.175 | 38.1 | 6.0 |
| 302 0050-2 | 0.5 | 3.175 | 38.1 | 8.0 |
| 302 0055 | 0.55 | 3.175 | 38.1 | 5.0 |
| 302 0055-1 | 0.55 | 3.175 | 38.1 | 6.0 |
| 302 0055-2 | 0.55 | 3.175 | 38.1 | 8.0 |
| 302 0060 | 0.6 | 3.175 | 38.1 | 5.0 |
| 302 0060-1 | 0.6 | 3.175 | 38.1 | 6.0 |
| 302 0060-2 | 0.6 | 3.175 | 38.1 | 8.0 |
| 302 0065 | 0.65 | 3.175 | 38.1 | 5.0 |
| 302 0065-1 | 0.65 | 3.175 | 38.1 | 6.0 |
| 302 0065-2 | 0.65 | 3.175 | 38.1 | 8.0 |
| 302 0070 | 0.7 | 3.175 | 38.1 | 6.0 |
| 302 0070-1 | 0.7 | 3.175 | 38.1 | 8.0 |
| 302 0070-2 | 0.7 | 3.175 | 38.1 | 10.2 |
| 302 0075 | 0.75 | 3.175 | 38.1 | 6.0 |
| 302 0075-1 | 0.75 | 3.175 | 38.1 | 8.0 |
| 302 0075-2 | 0.75 | 3.175 | 38.1 | 10.2 |
| 302 0080 | 0.8 | 3.175 | 38.1 | 6.0 |
| 302 0080-1 | 0.8 | 3.175 | 38.1 | 10.2 |
| 302 0085 | 0.85 | 3.175 | 38.1 | 6.0 |
| 302 0085-1 | 0.85 | 3.175 | 38.1 | 10.2 |
| 302 0090 | 0.9 | 3.175 | 38.1 | 10.2 |
| 302 0095 | 0.95 | 3.175 | 38.1 | 10.2 |
| 302 0100 | 1.0 | 3.175 | 38.1 | 10.2 |
| 302 0105 | 1.05 | 3.175 | 38.1 | 10.2 |
| 302 0110 | 1.1 | 3.175 | 38.1 | 10.2 |
| 302 0115 | 1.15 | 3.175 | 38.1 | 10.2 |

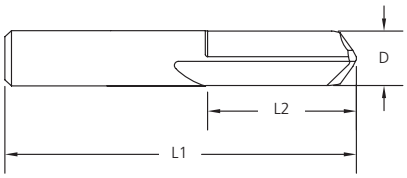
| Series 302 | Drill Dimensions | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| 302 0120 | 1.2 | 3.175 | 38.1 | 10.2 |
| 302 0125 | 1.25 | 3.175 | 38.1 | 10.2 |
| 302 0130 | 1.3 | 3.175 | 38.1 | 10.2 |
| 302 0135 | 1.35 | 3.175 | 38.1 | 10.2 |
| 302 0140 | 1.4 | 3.175 | 38.1 | 10.2 |
| 302 0145 | 1.45 | 3.175 | 38.1 | 10.2 |
| 302 0150 | 1.5 | 3.175 | 38.1 | 10.2 |
| 302 0155 | 1.55 | 3.175 | 38.1 | 10.2 |
| 302 0160 | 1.6 | 3.175 | 38.1 | 10.2 |
| 302 0165 | 1.65 | 3.175 | 38.1 | 10.2 |
| 302 0170 | 1.7 | 3.175 | 38.1 | 10.2 |
| 302 0175 | 1.75 | 3.175 | 38.1 | 10.2 |
| 302 0180 | 1.8 | 3.175 | 38.1 | 10.2 |
| 302 0185 | 1.85 | 3.175 | 38.1 | 10.2 |
| 302 0190 | 1.9 | 3.175 | 38.1 | 10.2 |
| 302 0195 | 1.95 | 3.175 | 38.1 | 10.2 |
| 302 0200 | 2.0 | 3.175 | 38.1 | 10.2 |
| 302 0205 | 2.05 | 3.175 | 38.1 | 10.2 |
| 302 0210 | 2.1 | 3.175 | 38.1 | 10.2 |
| 302 0215 | 2.15 | 3.175 | 38.1 | 10.2 |
| 302 0220 | 2.2 | 3.175 | 38.1 | 10.2 |
| 302 0225 | 2.25 | 3.175 | 38.1 | 10.2 |
| 302 0230 | 2.3 | 3.175 | 38.1 | 10.2 |
| 302 0235 | 2.35 | 3.175 | 38.1 | 10.2 |
| 302 0240 | 2.4 | 3.175 | 38.1 | 10.2 |
| 302 0245 | 2.45 | 3.175 | 38.1 | 10.2 |
| 302 0250 | 2.5 | 3.175 | 38.1 | 10.2 |
| 302 0255 | 2.55 | 3.175 | 38.1 | 10.2 |
| 302 0260 | 2.6 | 3.175 | 38.1 | 10.2 |
| 302 0265 | 2.65 | 3.175 | 38.1 | 10.2 |
| 302 0270 | 2.7 | 3.175 | 38.1 | 10.2 |
| 302 0275 | 2.75 | 3.175 | 38.1 | 10.2 |
| 302 0280 | 2.8 | 3.175 | 38.1 | 10.2 |
| 302 0285 | 2.85 | 3.175 | 38.1 | 10.2 |
| 302 0290 | 2.9 | 3.175 | 38.1 | 10.2 |
| 302 0295 | 2.95 | 3.175 | 38.1 | 10.2 |
| 302 0300 | 3.0 | 3.175 | 38.1 | 10.2 |
| 302 0305 | 3.05 | 3.175 | 38.1 | 10.2 |
| 302 0310 | 3.1 | 3.175 | 38.1 | 10.2 |
| 302 0315 | 3.15 | 3.175 | 38.1 | 10.2 |

P181

# Twister® Hi-Roc® Drill - 3xD Series 200 Uncoated



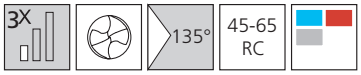


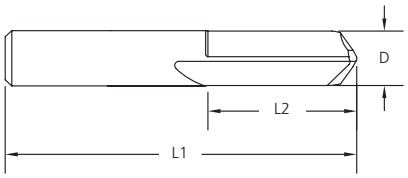

| Series 200 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 200 0080 | 0.8 | 38.0 | 5.0 |
| 200 0085 | 0.85 | 38.0 | 5.5 |
| 200 0090 | 0.9 | 38.0 | 5.5 |
| 200 0095 | 0.95 | 38.0 | 6.0 |
| 200 0100 | 1.0 | 38.0 | 6.5 |
| 200 0105 | 1.05 | 38.0 | 6.5 |
| 200 0110 | 1.1 | 38.0 | 6.5 |
| 200 0115 | 1.15 | 38.0 | 6.5 |
| 200 0120 | 1.2 | 38.0 | 8.0 |
| 200 0125 | 1.25 | 38.0 | 8.0 |
| 200 0130 | 1.3 | 38.0 | 8.0 |
| 200 0135 | 1.35 | 38.0 | 8.0 |
| 200 0140 | 1.4 | 38.0 | 8.0 |
| 200 0145 | 1.45 | 38.0 | 8.0 |
| 200 0150 | 1.5 | 38.0 | 8.0 |
| 200 0160 | 1.6 | 38.0 | 8.0 |
| 200 0170 | 1.7 | 38.0 | 9.5 |
| 200 0180 | 1.8 | 38.0 | 9.5 |
| 200 0190 | 1.9 | 38.0 | 9.5 |
| 200 0200 | 2.0 | 38.0 | 9.5 |
| 200 0210 | 2.1 | 38.0 | 12.5 |
| 200 0220 | 2.2 | 38.0 | 12.5 |
| 200 0230 | 2.3 | 38.0 | 12.5 |
| 200 0240 | 2.4 | 38.0 | 12.5 |
| 200 0250 | 2.5 | 38.0 | 12.5 |
| 200 0260 | 2.6 | 38.0 | 16.0 |
| 200 0270 | 2.7 | 38.0 | 16.0 |
| 200 0280 | 2.8 | 38.0 | 16.0 |
| 200 0290 | 2.9 | 38.0 | 16.0 |
| 200 0300 | 3.0 | 38.0 | 16.0 |
| 200 0310 | 3.1 | 38.0 | 16.0 |
| 200 0320 | 3.2 | 38.0 | 16.0 |
| 200 0330 | 3.3 | 38.0 | 16.0 |
| 200 0340 | 3.4 | 51.0 | 16.0 |
| 200 0350 | 3.5 | 51.0 | 16.0 |
| 200 0360 | 3.6 | 51.0 | 16.0 |
| 200 0370 | 3.7 | 51.0 | 16.0 |
| 200 0380 | 3.8 | 51.0 | 16.0 |
| 200 0390 | 3.9 | 51.0 | 16.0 |
| 200 0400 | 4.0 | 51.0 | 16.0 |
| 200 0410 | 4.1 | 51.0 | 16.0 |
| 200 0420 | 4.2 | 51.0 | 16.0 |
| 200 0430 | 4.3 | 51.0 | 16.0 |
| 200 0440 | 4.4 | 51.0 | 16.0 |
| 200 0450 | 4.5 | 51.0 | 16.0 |

| Series 200 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 200 0460 | 4.6 | 51.0 | 16.0 |
| 200 0470 | 4.7 | 51.0 | 16.0 |
| 200 0480 | 4.8 | 51.0 | 16.0 |
| 200 0490 | 4.9 | 51.0 | 16.0 |
| 200 0500 | 5.0 | 51.0 | 19.0 |
| 200 0510 | 5.1 | 51.0 | 19.0 |
| 200 0520 | 5.2 | 51.0 | 19.0 |
| 200 0530 | 5.3 | 51.0 | 19.0 |
| 200 0540 | 5.4 | 51.0 | 19.0 |
| 200 0550 | 5.5 | 51.0 | 19.0 |
| 200 0560 | 5.6 | 51.0 | 19.0 |
| 200 0570 | 5.7 | 51.0 | 19.0 |
| 200 0580 | 5.8 | 51.0 | 19.0 |
| 200 0590 | 5.9 | 51.0 | 19.0 |
| 200 0600 | 6.0 | 51.0 | 19.0 |
| 200 0610 | 6.1 | 51.0 | 19.0 |
| 200 0620 | 6.2 | 51.0 | 19.0 |
| 200 0630 | 6.3 | 51.0 | 19.0 |
| 200 0640 | 6.4 | 51.0 | 19.0 |
| 200 0650 | 6.5 | 51.0 | 19.0 |
| 200 0660 | 6.6 | 64.0 | 19.0 |
| 200 0670 | 6.7 | 64.0 | 19.0 |
| 200 0680 | 6.8 | 64.0 | 19.0 |
| 200 0690 | 6.9 | 64.0 | 19.0 |
| 200 0700 | 7.0 | 64.0 | 19.0 |
| 200 0710 | 7.1 | 64.0 | 19.0 |
| 200 0720 | 7.2 | 64.0 | 19.0 |
| 200 0730 | 7.3 | 64.0 | 19.0 |
| 200 0740 | 7.4 | 64.0 | 19.0 |
| 200 0750 | 7.5 | 64.0 | 19.0 |
| 200 0760 | 7.6 | 64.0 | 19.0 |
| 200 0770 | 7.7 | 64.0 | 19.0 |
| 200 0780 | 7.8 | 64.0 | 19.0 |
| 200 0790 | 7.9 | 64.0 | 19.0 |
| 200 0800 | 8.0 | 64.0 | 19.0 |
| 200 0810 | 8.1 | 64.0 | 19.0 |
| 200 0820 | 8.2 | 64.0 | 25.5 |
| 200 0830 | 8.3 | 64.0 | 25.5 |
| 200 0840 | 8.4 | 64.0 | 25.5 |
| 200 0850 | 8.5 | 64.0 | 25.5 |
| 200 0860 | 8.6 | 64.0 | 25.5 |
| 200 0870 | 8.7 | 64.0 | 25.5 |
| 200 0880 | 8.8 | 64.0 | 25.5 |
| 200 0890 | 8.9 | 64.0 | 25.5 |
| 200 0900 | 9.0 | 64.0 | 25.5 |

# Twister® Hi-Roc® Drill - 3xD Series 200 Uncoated





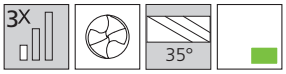




| Series 200 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 200 0910 | 9.1 | 64.0 | 25.5 |
| 200 0920 | 9.2 | 64.0 | 25.5 |
| 200 0930 | 9.3 | 64.0 | 25.5 |
| 200 0940 | 9.4 | 64.0 | 25.5 |
| 200 0950 | 9.5 | 64.0 | 25.5 |
| 200 0960 | 9.6 | 64.0 | 25.5 |
| 200 0970 | 9.7 | 70.0 | 25.5 |
| 200 0980 | 9.8 | 70.0 | 25.5 |
| 200 0990 | 9.9 | 70.0 | 25.5 |
| 200 1000 | 10.0 | 70.0 | 25.5 |
| 200 1010 | 10.1 | 70.0 | 25.5 |
| 200 1020 | 10.2 | 70.0 | 25.5 |
| 200 1030 | 10.3 | 70.0 | 25.5 |
| 200 1040 | 10.4 | 70.0 | 25.5 |
| 200 1050 | 10.5 | 70.0 | 25.5 |
| 200 1060 | 10.6 | 70.0 | 25.5 |
| 200 1070 | 10.7 | 70.0 | 25.5 |
| 200 1080 | 10.8 | 70.0 | 25.5 |
| 200 1090 | 10.9 | 70.0 | 25.5 |
| 200 1100 | 11.0 | 70.0 | 25.5 |
| 200 1110 | 11.1 | 70.0 | 25.5 |
| 200 1120 | 11.2 | 70.0 | 25.5 |
| 200 1130 | 11.3 | 76.0 | 25.5 |

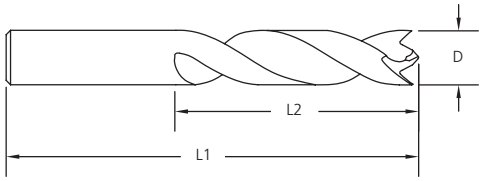
| Series 200 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 200 1140 | 11.4 | 76.0 | 25.5 |
| 200 1150 | 11.5 | 76.0 | 25.5 |
| 200 1160 | 11.6 | 76.0 | 25.5 |
| 200 1170 | 11.7 | 76.0 | 25.5 |
| 200 1180 | 11.8 | 76.0 | 25.5 |
| 200 1190 | 11.9 | 76.0 | 25.5 |
| 200 1200 | 12.0 | 76.0 | 25.5 |
| 200 1250 | 12.5 | 76.0 | 25.5 |
| 200 1300 | 13.0 | 89.0 | 28.5 |
| 200 1350 | 13.5 | 89.0 | 28.5 |
| 200 1400 | 14.0 | 89.0 | 28.5 |
| 200 1450 | 14.5 | 89.0 | 32.0 |
| 200 1500 | 15.0 | 89.0 | 32.0 |
| 200 1550 | 15.5 | 89.0 | 32.0 |
| 200 1600 | 16.0 | 89.0 | 32.0 |
| 200 1650 | 16.5 | 102.0 | 38.0 |
| 200 1700 | 17.0 | 102.0 | 38.0 |
| 200 1750 | 17.5 | 102.0 | 38.0 |
| 200 1800 | 18.0 | 102.0 | 38.0 |
| 200 1850 | 18.5 | 102.0 | 38.0 |
| 200 1900 | 19.0 | 102.0 | 38.0 |
| 200 2000 | 20.0 | 102.0 | 38.0 |

P182

# Twister® Kevlar/Composite Drill - 3xD Series 207 Uncoated





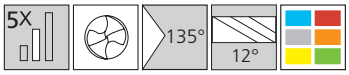




| Series 207 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 207 0240 | 2.4 | 44.0 | 12.5 |
| 207 0250 | 2.5 | 46.0 | 12.5 |
| 207 0260 | 2.6 | 46.0 | 12.5 |
| 207 0270 | 2.7 | 46.0 | 12.5 |
| 207 0280 | 2.8 | 48.0 | 16.0 |
| 207 0290 | 2.9 | 48.0 | 16.0 |
| 207 0300 | 3.0 | 48.0 | 16.0 |
| 207 0310 | 3.1 | 48.0 | 16.0 |
| 207 0320 | 3.2 | 48.0 | 16.0 |
| 207 0330 | 3.3 | 49.0 | 17.5 |
| 207 0340 | 3.4 | 49.0 | 17.5 |
| 207 0350 | 3.5 | 49.0 | 17.5 |
| 207 0360 | 3.6 | 49.0 | 17.5 |
| 207 0370 | 3.7 | 52.0 | 19.0 |
| 207 0380 | 3.8 | 52.0 | 19.0 |
| 207 0390 | 3.9 | 52.0 | 19.0 |
| 207 0400 | 4.0 | 54.0 | 22.0 |
| 207 0410 | 4.1 | 54.0 | 22.0 |
| 207 0420 | 4.2 | 54.0 | 22.0 |
| 207 0430 | 4.3 | 54.0 | 22.0 |
| 207 0440 | 4.4 | 56.0 | 24.0 |
| 207 0450 | 4.5 | 56.0 | 24.0 |
| 207 0460 | 4.6 | 56.0 | 24.0 |
| 207 0470 | 4.7 | 56.0 | 24.0 |
| 207 0480 | 4.8 | 57.0 | 25.5 |
| 207 0490 | 4.9 | 57.0 | 25.5 |
| 207 0500 | 5.0 | 57.0 | 25.5 |

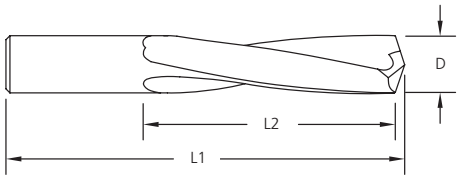
| Series 207 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 207 0510 | 5.1 | 57.0 | 25.5 |
| 207 0520 | 5.2 | 60.0 | 27.0 |
| 207 0530 | 5.3 | 60.0 | 27.0 |
| 207 0540 | 5.4 | 60.0 | 27.0 |
| 207 0550 | 5.5 | 60.0 | 27.0 |
| 207 0560 | 5.6 | 62.0 | 28.5 |
| 207 0570 | 5.7 | 62.0 | 28.5 |
| 207 0580 | 5.8 | 62.0 | 28.5 |
| 207 0590 | 5.9 | 62.0 | 28.5 |
| 207 0600 | 6.0 | 64.0 | 32.0 |
| 207 0610 | 6.1 | 64.0 | 32.0 |
| 207 0620 | 6.2 | 64.0 | 32.0 |
| 207 0630 | 6.3 | 64.0 | 32.0 |
| 207 0640 | 6.4 | 64.0 | 32.0 |
| 207 0650 | 6.5 | 67.0 | 33.5 |
| 207 0700 | 7.0 | 68.0 | 35.0 |
| 207 0750 | 7.5 | 70.0 | 35.0 |
| 207 0800 | 8.0 | 71.0 | 38.0 |
| 207 0850 | 8.5 | 75.0 | 39.5 |
| 207 0900 | 9.0 | 78.0 | 39.5 |
| 207 0950 | 9.5 | 79.0 | 41.5 |
| 207 1000 | 10.0 | 84.0 | 44.5 |
| 207 1050 | 10.5 | 86.0 | 46.0 |
| 207 1100 | 11.0 | 87.0 | 47.5 |
| 207 1150 | 11.5 | 92.0 | 51.0 |
| 207 1200 | 12.0 | 94.0 | 54.0 |

P183

# Twister® Hi-Tuff® Drill - 5xD Series 205 Uncoated



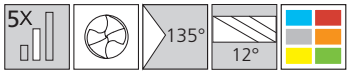


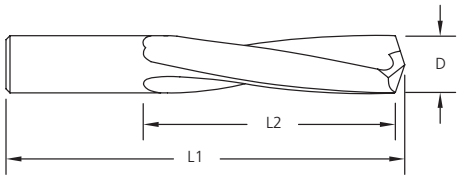

| Series 205 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 205 0030 | 0.3 | 38.0 | 5.0 |
| 205 0035 | 0.35 | 38.0 | 5.0 |
| 205 0040 | 0.4 | 38.0 | 5.0 |
| 205 0045 | 0.45 | 38.0 | 5.0 |
| 205 0050 | 0.5 | 38.0 | 6.5 |
| 205 0055 | 0.55 | 38.0 | 6.5 |
| 205 0060 | 0.6 | 38.0 | 6.5 |
| 205 0065 | 0.65 | 38.0 | 8.0 |
| 205 0070 | 0.7 | 38.0 | 8.0 |
| 205 0075 | 0.75 | 38.0 | 8.0 |
| 205 0080 | 0.8 | 38.0 | 9.5 |
| 205 0085 | 0.85 | 38.0 | 9.5 |
| 205 0090 | 0.9 | 38.0 | 11.0 |
| 205 0095 | 0.95 | 38.0 | 11.0 |
| 205 0100 | 1.0 | 38.0 | 12.5 |
| 205 0105 | 1.05 | 38.0 | 12.5 |
| 205 0110 | 1.1 | 38.0 | 12.5 |
| 205 0115 | 1.15 | 38.0 | 12.5 |
| 205 0120 | 1.2 | 38.0 | 12.5 |
| 205 0125 | 1.25 | 41.0 | 16.0 |
| 205 0130 | 1.3 | 41.0 | 16.0 |
| 205 0135 | 1.35 | 41.0 | 16.0 |
| 205 0140 | 1.4 | 41.0 | 16.0 |
| 205 0145 | 1.45 | 41.0 | 16.0 |
| 205 0150 | 1.5 | 41.0 | 16.0 |
| 205 0160 | 1.6 | 41.0 | 16.0 |
| 205 0170 | 1.7 | 43.0 | 17.5 |
| 205 0180 | 1.8 | 43.0 | 17.5 |
| 205 0190 | 1.9 | 43.0 | 17.5 |
| 205 0200 | 2.0 | 44.0 | 19.0 |
| 205 0210 | 2.1 | 44.0 | 19.0 |
| 205 0220 | 2.2 | 44.0 | 19.0 |
| 205 0230 | 2.3 | 44.0 | 19.0 |
| 205 0240 | 2.4 | 44.0 | 19.0 |
| 205 0250 | 2.5 | 46.0 | 21.0 |
| 205 0260 | 2.6 | 46.0 | 20.5 |
| 205 0270 | 2.7 | 46.0 | 20.5 |
| 205 0280 | 2.8 | 48.0 | 22.0 |
| 205 0290 | 2.9 | 48.0 | 22.0 |
| 205 0300 | 3.0 | 48.0 | 22.0 |
| 205 0310 | 3.1 | 48.0 | 22.0 |
| 205 0320 | 3.2 | 48.0 | 22.0 |
| 205 0330 | 3.3 | 49.0 | 24.0 |
| 205 0340 | 3.4 | 49.0 | 24.0 |
| 205 0350 | 3.5 | 49.0 | 24.0 |

| Series 205 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 205 0360 | 3.6 | 49.0 | 24.0 |
| 205 0370 | 3.7 | 52.0 | 25.5 |
| 205 0380 | 3.8 | 52.0 | 25.5 |
| 205 0390 | 3.9 | 52.0 | 25.5 |
| 205 0400 | 4.0 | 54.0 | 27.0 |
| 205 0410 | 4.1 | 54.0 | 27.0 |
| 205 0420 | 4.2 | 54.0 | 27.0 |
| 205 0430 | 4.3 | 54.0 | 27.0 |
| 205 0440 | 4.4 | 56.0 | 28.5 |
| 205 0450 | 4.5 | 56.0 | 28.5 |
| 205 0460 | 4.6 | 56.0 | 28.5 |
| 205 0470 | 4.7 | 57.0 | 30.0 |
| 205 0480 | 4.8 | 57.0 | 30.0 |
| 205 0490 | 4.9 | 57.0 | 30.0 |
| 205 0500 | 5.0 | 57.0 | 30.0 |
| 205 0510 | 5.1 | 57.0 | 30.0 |
| 205 0520 | 5.2 | 60.0 | 32.0 |
| 205 0530 | 5.3 | 60.0 | 32.0 |
| 205 0540 | 5.4 | 60.0 | 32.0 |
| 205 0550 | 5.5 | 60.0 | 32.0 |
| 205 0560 | 5.6 | 62.0 | 33.4 |
| 205 0570 | 5.7 | 62.0 | 33.4 |
| 205 0580 | 5.8 | 62.0 | 33.4 |
| 205 0590 | 5.9 | 62.0 | 33.4 |
| 205 0600 | 6.0 | 64.0 | 35.0 |
| 205 0610 | 6.1 | 64.0 | 35.0 |
| 205 0620 | 6.2 | 64.0 | 35.0 |
| 205 0630 | 6.3 | 64.0 | 35.0 |
| 205 0640 | 6.4 | 64.0 | 35.0 |
| 205 0650 | 6.5 | 67.0 | 36.5 |
| 205 0660 | 6.6 | 67.0 | 36.5 |
| 205 0670 | 6.7 | 67.0 | 38.0 |
| 205 0680 | 6.8 | 68.0 | 38.0 |
| 205 0690 | 6.9 | 68.0 | 38.0 |
| 205 0700 | 7.0 | 68.0 | 38.0 |
| 205 0710 | 7.1 | 68.0 | 38.0 |
| 205 0720 | 7.2 | 68.0 | 38.0 |
| 205 0730 | 7.3 | 68.0 | 38.0 |
| 205 0740 | 7.4 | 70.0 | 39.5 |
| 205 0750 | 7.5 | 70.0 | 39.5 |
| 205 0760 | 7.6 | 70.0 | 39.5 |
| 205 0770 | 7.7 | 71.0 | 41.5 |
| 205 0780 | 7.8 | 71.0 | 41.5 |
| 205 0790 | 7.9 | 71.0 | 41.5 |
| 205 0800 | 8.0 | 71.0 | 41.5 |

# Twister® Hi-Tuff® Drill - 5xD Series 205 Uncoated





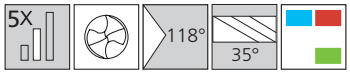




| Series 205 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 205 0810 | 8.1 | 75.0 | 43.0 |
| 205 0820 | 8.2 | 75.0 | 43.0 |
| 205 0830 | 8.3 | 75.0 | 43.0 |
| 205 0840 | 8.4 | 75.0 | 43.0 |
| 205 0850 | 8.5 | 75.0 | 43.0 |
| 205 0860 | 8.6 | 75.0 | 43.0 |
| 205 0870 | 8.7 | 75.0 | 43.0 |
| 205 0880 | 8.8 | 75.0 | 43.0 |
| 205 0890 | 8.9 | 78.0 | 44.5 |
| 205 0900 | 9.0 | 78.0 | 44.5 |
| 205 0910 | 9.1 | 78.0 | 44.5 |
| 205 0920 | 9.2 | 78.0 | 44.5 |
| 205 0930 | 9.3 | 79.0 | 46.0 |
| 205 0940 | 9.4 | 79.0 | 46.0 |
| 205 0950 | 9.5 | 79.0 | 46.0 |
| 205 0960 | 9.6 | 83.0 | 47.5 |
| 205 0970 | 9.7 | 83.0 | 47.5 |
| 205 0980 | 9.8 | 83.0 | 47.5 |
| 205 0990 | 9.9 | 83.0 | 47.5 |
| 205 1000 | 10.0 | 84.0 | 49.0 |
| 205 1010 | 10.1 | 84.0 | 49.0 |
| 205 1020 | 10.2 | 84.0 | 49.0 |
| 205 1030 | 10.3 | 84.0 | 49.0 |
| 205 1040 | 10.4 | 84.0 | 49.0 |
| 205 1050 | 10.5 | 86.0 | 51.0 |
| 205 1060 | 10.6 | 86.0 | 51.0 |
| 205 1070 | 10.7 | 86.0 | 51.0 |
| 205 1080 | 10.8 | 86.0 | 51.0 |

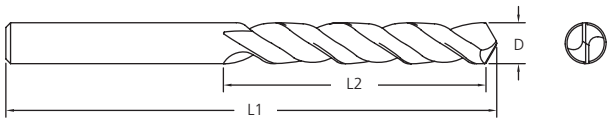
| Series 205 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 205 1090 | 10.9 | 87.0 | 52.5 |
| 205 1100 | 11.0 | 87.0 | 52.5 |
| 205 1110 | 11.1 | 87.0 | 52.5 |
| 205 1120 | 11.2 | 92.0 | 54.0 |
| 205 1130 | 11.3 | 92.0 | 54.0 |
| 205 1140 | 11.4 | 92.0 | 54.0 |
| 205 1150 | 11.5 | 92.0 | 54.0 |
| 205 1160 | 11.6 | 92.0 | 54.0 |
| 205 1170 | 11.7 | 92.0 | 54.0 |
| 205 1180 | 11.8 | 92.0 | 54.0 |
| 205 1190 | 11.9 | 92.0 | 54.0 |
| 205 1200 | 12.0 | 94.0 | 55.5 |
| 205 1250 | 12.5 | 95.0 | 57.0 |
| 205 1300 | 13.0 | 98.0 | 60.5 |
| 205 1350 | 13.5 | 102.0 | 63.5 |
| 205 1400 | 14.0 | 102.0 | 63.5 |
| 205 1450 | 14.5 | 105.0 | 66.5 |
| 205 1500 | 15.0 | 105.0 | 66.5 |
| 205 1550 | 15.5 | 108.0 | 70.0 |
| 205 1600 | 16.0 | 108.0 | 70.0 |
| 205 1650 | 16.5 | 114.0 | 73.0 |
| 205 1700 | 17.0 | 117.0 | 73.0 |
| 205 1750 | 17.5 | 121.0 | 76.0 |
| 205 1800 | 18.0 | 121.0 | 76.0 |
| 205 1850 | 18.5 | 127.0 | 79.5 |
| 205 1900 | 19.0 | 127.0 | 79.5 |
| 205 2000 | 20.0 | 133.0 | 82.5 |

P182

# Twister® Micro Drill 5xD Series 300 Uncoated





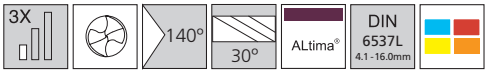

| | Drill Dimensions | | |
|---|---|---|---|
| **Tool No** | **Ø D** | **L1** | **L2** |
| 300 0050 | 0.5 | 38.0 | 9.5 |
| 300 0055 | 0.55 | 38.0 | 9.5 |
| 300 0060 | 0.6 | 38.0 | 9.5 |
| 300 0065 | 0.65 | 38.0 | 12.5 |
| 300 0070 | 0.7 | 38.0 | 12.5 |
| 300 0075 | 0.75 | 38.0 | 12.5 |
| 300 0080 | 0.8 | 38.0 | 12.5 |
| 300 0085 | 0.85 | 38.0 | 12.5 |
| 300 0090 | 0.9 | 38.0 | 16.0 |
| 300 0095 | 0.95 | 38.0 | 16.0 |
| 300 0100 | 1.0 | 38.0 | 16.0 |
| 300 0105 | 1.05 | 38.0 | 16.0 |
| 300 0110 | 1.1 | 38.0 | 16.0 |
| 300 0115 | 1.15 | 38.0 | 16.0 |
| 300 0120 | 1.2 | 38.0 | 16.0 |
| 300 0125 | 1.25 | 38.0 | 16.0 |
| 300 0130 | 1.3 | 38.0 | 16.0 |
| 300 0135 | 1.35 | 38.0 | 16.0 |
| 300 0140 | 1.4 | 38.0 | 16.0 |
| 300 0145 | 1.45 | 38.0 | 16.0 |
| 300 0150 | 1.5 | 38.0 | 16.0 |
| 300 0155 | 1.55 | 38.0 | 16.0 |
| 300 0160 | 1.6 | 38.0 | 16.0 |
| 300 0165 | 1.65 | 38.0 | 16.0 |
| 300 0170 | 1.7 | 38.0 | 16.0 |
| 300 0175 | 1.75 | 38.0 | 16.0 |
| 300 0180 | 1.8 | 38.0 | 16.0 |

| | Drill Dimensions | | |
|---|---|---|---|
| **Tool No** | **Ø D** | **L1** | **L2** |
| 300 0185 | 1.85 | 38.0 | 16.0 |
| 300 0190 | 1.9 | 38.0 | 16.0 |
| 300 0195 | 1.95 | 38.0 | 16.0 |
| 300 0200 | 2.0 | 38.0 | 16.0 |
| 300 0205 | 2.05 | 38.0 | 16.0 |
| 300 0210 | 2.1 | 38.0 | 16.0 |
| 300 0215 | 2.15 | 38.0 | 16.0 |
| 300 0220 | 2.2 | 38.0 | 16.0 |
| 300 0225 | 2.25 | 38.0 | 16.0 |
| 300 0230 | 2.3 | 38.0 | 16.0 |
| 300 0235 | 2.35 | 38.0 | 16.0 |
| 300 0240 | 2.4 | 38.0 | 16.0 |
| 300 0245 | 2.45 | 38.0 | 16.0 |
| 300 0250 | 2.5 | 38.0 | 16.0 |
| 300 0255 | 2.55 | 38.0 | 16.0 |
| 300 0260 | 2.6 | 38.0 | 16.0 |
| 300 0265 | 2.65 | 38.0 | 16.0 |
| 300 0270 | 2.7 | 38.0 | 16.0 |
| 300 0275 | 2.75 | 38.0 | 16.0 |
| 300 0280 | 2.8 | 38.0 | 16.0 |
| 300 0285 | 2.85 | 38.0 | 16.0 |
| 300 0290 | 2.9 | 38.0 | 16.0 |
| 300 0295 | 2.95 | 38.0 | 16.0 |
| 300 0300 | 3.0 | 38.0 | 16.0 |
| 300 0305 | 3.05 | 38.0 | 16.0 |
| 300 0310 | 3.1 | 38.0 | 16.0 |
| 300 0315 | 3.15 | 38.0 | 16.0 |

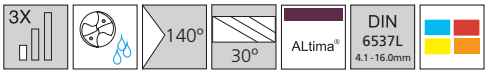
P181

# Twister® HPD Performance Drills - 3xD Series HPDSS, HPDCS

Series **HPDSS**

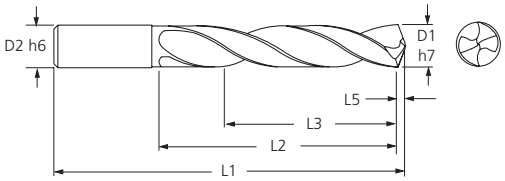



Series **HPDCS**





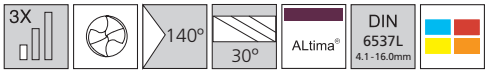


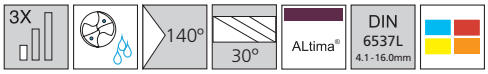

| Series HPDSS | Series HPDCS | Tool Dimensions | | | | | |
|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| HPDSS 0300A | HPDCS 0300A | 3.0 | 3.0 | 62.0 | 20.0 | 14.0 | 0.46 |
| HPDSS 0310A | HPDCS 0310A | 3.1 | 4.0 | 62.0 | 20.0 | 14.0 | 0.48 |
| HPDSS 0320A | HPDCS 0320A | 3.2 | 4.0 | 62.0 | 20.0 | 14.0 | 0.49 |
| HPDSS 0330A | HPDCS 0330A | 3.3 | 4.0 | 62.0 | 20.0 | 14.0 | 0.51 |
| HPDSS 0340A | HPDCS 0340A | 3.4 | 4.0 | 62.0 | 20.0 | 14.0 | 0.52 |
| HPDSS 0350A | HPDCS 0350A | 3.5 | 4.0 | 62.0 | 20.0 | 14.0 | 0.54 |
| HPDSS 0360A | HPDCS 0360A | 3.6 | 4.0 | 62.0 | 20.0 | 14.0 | 0.55 |
| HPDSS 0370A | HPDCS 0370A | 3.7 | 4.0 | 62.0 | 20.0 | 14.0 | 0.57 |
| HPDSS 0380A | HPDCS 0380A | 3.8 | 4.0 | 66.0 | 24.0 | 17.0 | 0.58 |
| HPDSS 0390A | HPDCS 0390A | 3.9 | 4.0 | 66.0 | 24.0 | 17.0 | 0.60 |
| HPDSS 0400A | HPDCS 0400A | 4.0 | 4.0 | 66.0 | 24.0 | 17.0 | 0.61 |
| HPDSS 0410A | HPDCS 0410A | 4.1 | 6.0 | 66.0 | 24.0 | 17.0 | 0.64 |
| HPDSS 0420A | HPDCS 0420A | 4.2 | 6.0 | 66.0 | 24.0 | 17.0 | 0.64 |
| HPDSS 0430A | HPDCS 0430A | 4.3 | 6.0 | 66.0 | 24.0 | 17.0 | 0.66 |
| HPDSS 0440A | HPDCS 0440A | 4.4 | 6.0 | 66.0 | 24.0 | 17.0 | 0.67 |
| HPDSS 0450A | HPDCS 0450A | 4.5 | 6.0 | 66.0 | 24.0 | 17.0 | 0.69 |
| HPDSS 0460A | HPDCS 0460A | 4.6 | 6.0 | 66.0 | 24.0 | 17.0 | 0.71 |
| HPDSS 0470A | HPDCS 0470A | 4.7 | 6.0 | 66.0 | 24.0 | 17.0 | 0.72 |
| HPDSS 0480A | HPDCS 0480A | 4.8 | 6.0 | 66.0 | 28.0 | 20.0 | 0.74 |
| HPDSS 0490A | HPDCS 0490A | 4.9 | 6.0 | 66.0 | 28.0 | 20.0 | 0.75 |
| HPDSS 0500A | HPDCS 0500A | 5.0 | 6.0 | 66.0 | 28.0 | 20.0 | 0.77 |
| HPDSS 0510A | HPDCS 0510A | 5.1 | 6.0 | 66.0 | 28.0 | 20.0 | 0.78 |
| HPDSS 0520A | HPDCS 0520A | 5.2 | 6.0 | 66.0 | 28.0 | 20.0 | 0.80 |
| HPDSS 0530A | HPDCS 0530A | 5.3 | 6.0 | 66.0 | 28.0 | 20.0 | 0.81 |
| HPDSS 0540A | HPDCS 0540A | 5.4 | 6.0 | 66.0 | 28.0 | 20.0 | 0.83 |
| HPDSS 0550A | HPDCS 0550A | 5.5 | 6.0 | 66.0 | 28.0 | 20.0 | 0.84 |
| HPDSS 0560A | HPDCS 0560A | 5.6 | 6.0 | 66.0 | 28.0 | 20.0 | 0.86 |
| HPDSS 0570A | HPDCS 0570A | 5.7 | 6.0 | 66.0 | 28.0 | 20.0 | 0.87 |
| HPDSS 0580A | HPDCS 0580A | 5.8 | 6.0 | 66.0 | 28.0 | 20.0 | 0.89 |
| HPDSS 0590A | HPDCS 0590A | 5.9 | 6.0 | 66.0 | 28.0 | 20.0 | 0.90 |
| HPDSS 0600A | HPDCS 0600A | 6.0 | 6.0 | 66.0 | 28.0 | 20.0 | 0.92 |
| HPDSS 0610A | HPDCS 0610A | 6.1 | 8.0 | 79.0 | 34.0 | 24.0 | 0.94 |
| HPDSS 0620A | HPDCS 0620A | 6.2 | 8.0 | 79.0 | 34.0 | 24.0 | 0.95 |
| HPDSS 0630A | HPDCS 0630A | 6.3 | 8.0 | 79.0 | 34.0 | 24.0 | 0.97 |
| HPDSS 0640A | HPDCS 0640A | 6.4 | 8.0 | 79.0 | 34.0 | 24.0 | 0.98 |
| HPDSS 0650A | HPDCS 0650A | 6.5 | 8.0 | 79.0 | 34.0 | 24.0 | 1.00 |
| HPDSS 0660A | HPDCS 0660A | 6.6 | 8.0 | 79.0 | 34.0 | 24.0 | 1.01 |
| HPDSS 0670A | HPDCS 0670A | 6.7 | 8.0 | 79.0 | 34.0 | 24.0 | 1.03 |
| HPDSS 0680A | HPDCS 0680A | 6.8 | 8.0 | 79.0 | 34.0 | 24.0 | 1.04 |
| HPDSS 0690A | HPDCS 0690A | 6.9 | 8.0 | 79.0 | 34.0 | 24.0 | 1.06 |
| HPDSS 0700A | HPDCS 0700A | 7.0 | 8.0 | 79.0 | 34.0 | 24.0 | 1.07 |
| HPDSS 0710A | HPDCS 0710A | 7.1 | 8.0 | 79.0 | 41.0 | 29.0 | 1.09 |
| HPDSS 0720A | HPDCS 0720A | 7.2 | 8.0 | 79.0 | 41.0 | 29.0 | 1.10 |
| HPDSS 0730A | HPDCS 0730A | 7.3 | 8.0 | 79.0 | 41.0 | 29.0 | 1.12 |

# Twister® HPD Performance Drills - 3xD Series HPDSS, HPDCS

Series **HPDSS**

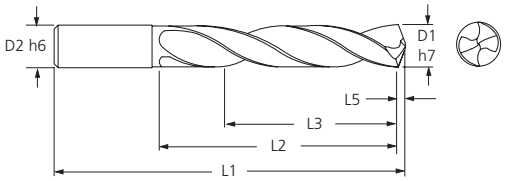



Series **HPDCS**





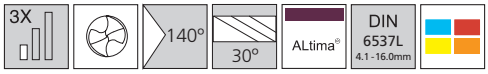


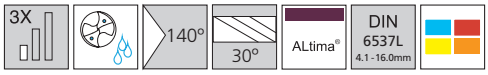

| Series HPDSS | Series HPDCS | Tool Dimensions | | | | | |
|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| HPDSS 0740A | HPDCS 0740A | 7.4 | 8.0 | 79.0 | 41.0 | 29.0 | 1.13 |
| HPDSS 0750A | HPDCS 0750A | 7.5 | 8.0 | 79.0 | 41.0 | 29.0 | 1.15 |
| HPDSS 0760A | HPDCS 0760A | 7.6 | 8.0 | 79.0 | 41.0 | 29.0 | 1.17 |
| HPDSS 0770A | HPDCS 0770A | 7.7 | 8.0 | 79.0 | 41.0 | 29.0 | 1.18 |
| HPDSS 0780A | HPDCS 0780A | 7.8 | 8.0 | 79.0 | 41.0 | 29.0 | 1.20 |
| HPDSS 0790A | HPDCS 0790A | 7.9 | 8.0 | 79.0 | 41.0 | 29.0 | 1.21 |
| HPDSS 0800A | HPDCS 0800A | 8.0 | 8.0 | 79.0 | 41.0 | 29.0 | 1.23 |
| HPDSS 0810A | HPDCS 0810A | 8.1 | 10.0 | 89.0 | 47.0 | 35.0 | 1.24 |
| HPDSS 0820A | HPDCS 0820A | 8.2 | 10.0 | 89.0 | 47.0 | 35.0 | 1.26 |
| HPDSS 0830A | HPDCS 0830A | 8.3 | 10.0 | 89.0 | 47.0 | 35.0 | 1.27 |
| HPDSS 0840A | HPDCS 0840A | 8.4 | 10.0 | 89.0 | 47.0 | 35.0 | 1.29 |
| HPDSS 0850A | HPDCS 0850A | 8.5 | 10.0 | 89.0 | 47.0 | 35.0 | 1.30 |
| HPDSS 0860A | HPDCS 0860A | 8.6 | 10.0 | 89.0 | 47.0 | 35.0 | 1.32 |
| HPDSS 0870A | HPDCS 0870A | 8.7 | 10.0 | 89.0 | 47.0 | 35.0 | 1.33 |
| HPDSS 0880A | HPDCS 0880A | 8.8 | 10.0 | 89.0 | 47.0 | 35.0 | 1.35 |
| HPDSS 0890A | HPDCS 0890A | 8.9 | 10.0 | 89.0 | 47.0 | 35.0 | 1.36 |
| HPDSS 0900A | HPDCS 0900A | 9.0 | 10.0 | 89.0 | 47.0 | 35.0 | 1.38 |
| HPDSS 0910A | HPDCS 0910A | 9.1 | 10.0 | 89.0 | 47.0 | 35.0 | 1.40 |
| HPDSS 0920A | HPDCS 0920A | 9.2 | 10.0 | 89.0 | 47.0 | 35.0 | 1.41 |
| HPDSS 0930A | HPDCS 0930A | 9.3 | 10.0 | 89.0 | 47.0 | 35.0 | 1.43 |
| HPDSS 0940A | HPDCS 0940A | 9.4 | 10.0 | 89.0 | 47.0 | 35.0 | 1.44 |
| HPDSS 0950A | HPDCS 0950A | 9.5 | 10.0 | 89.0 | 47.0 | 35.0 | 1.46 |
| HPDSS 0960A | HPDCS 0960A | 9.6 | 10.0 | 89.0 | 47.0 | 35.0 | 1.47 |
| HPDSS 0970A | HPDCS 0970A | 9.7 | 10.0 | 89.0 | 47.0 | 35.0 | 1.49 |
| HPDSS 0980A | HPDCS 0980A | 9.8 | 10.0 | 89.0 | 47.0 | 35.0 | 1.50 |
| HPDSS 0990A | HPDCS 0990A | 9.9 | 10.0 | 89.0 | 47.0 | 35.0 | 1.52 |
| HPDSS 1000A | HPDCS 1000A | 10.0 | 10.0 | 89.0 | 47.0 | 35.0 | 1.53 |
| HPDSS 1010A | HPDCS 1010A | 10.1 | 12.0 | 102.0 | 55.0 | 40.0 | 1.55 |
| HPDSS 1020A | HPDCS 1020A | 10.2 | 12.0 | 102.0 | 55.0 | 40.0 | 1.56 |
| HPDSS 1030A | HPDCS 1030A | 10.3 | 12.0 | 102.0 | 55.0 | 40.0 | 1.58 |
| HPDSS 1040A | HPDCS 1040A | 10.4 | 12.0 | 102.0 | 55.0 | 40.0 | 1.59 |
| HPDSS 1050A | HPDCS 1050A | 10.5 | 12.0 | 102.0 | 55.0 | 40.0 | 1.61 |
| HPDSS 1060A | HPDCS 1060A | 10.6 | 12.0 | 102.0 | 55.0 | 40.0 | 1.63 |
| HPDSS 1070A | HPDCS 1070A | 10.7 | 12.0 | 102.0 | 55.0 | 40.0 | 1.64 |
| HPDSS 1080A | HPDCS 1080A | 10.8 | 12.0 | 102.0 | 55.0 | 40.0 | 1.66 |
| HPDSS 1090A | HPDCS 1090A | 10.9 | 12.0 | 102.0 | 55.0 | 40.0 | 1.67 |
| HPDSS 1100A | HPDCS 1100A | 11.0 | 12.0 | 102.0 | 55.0 | 40.0 | 1.69 |
| HPDSS 1110A | HPDCS 1110A | 11.1 | 12.0 | 102.0 | 55.0 | 40.0 | 1.70 |
| HPDSS 1120A | HPDCS 1120A | 11.2 | 12.0 | 102.0 | 55.0 | 40.0 | 1.72 |
| HPDSS 1130A | HPDCS 1130A | 11.3 | 12.0 | 102.0 | 55.0 | 40.0 | 1.73 |
| HPDSS 1140A | HPDCS 1140A | 11.4 | 12.0 | 102.0 | 55.0 | 40.0 | 1.75 |
| HPDSS 1150A | HPDCS 1150A | 11.5 | 12.0 | 102.0 | 55.0 | 40.0 | 1.76 |
| HPDSS 1160A | HPDCS 1160A | 11.6 | 12.0 | 102.0 | 55.0 | 40.0 | 1.78 |
| HPDSS 1170A | HPDCS 1170A | 11.7 | 12.0 | 102.0 | 55.0 | 40.0 | 1.79 |

# Twister® HPD Performance Drills - 3xD Series HPDSS, HPDCS

Series **HPDSS**

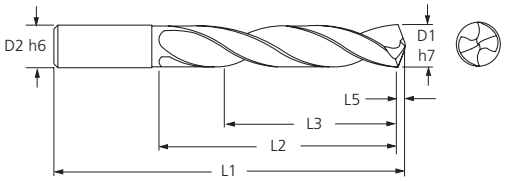



Series **HPDCS**







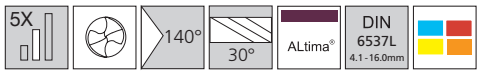




| Series HPDSS | Series HPDCS | Tool Dimensions | | | | | |
|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| HPDSS 1180A | HPDCS 1180A | 11.8 | 12.0 | 102.0 | 55.0 | 40.0 | 1.81 |
| HPDSS 1190A | HPDCS 1190A | 11.9 | 12.0 | 102.0 | 55.0 | 40.0 | 1.82 |
| HPDSS 1200A | HPDCS 1200A | 12.0 | 12.0 | 102.0 | 55.0 | 40.0 | 1.84 |
| HPDSS 1210A | HPDCS 1210A | 12.1 | 14.0 | 107.0 | 60.0 | 43.0 | 1.86 |
| HPDSS 1220A | HPDCS 1220A | 12.2 | 14.0 | 107.0 | 60.0 | 43.0 | 1.87 |
| HPDSS 1230A | HPDCS 1230A | 12.3 | 14.0 | 107.0 | 60.0 | 43.0 | 1.89 |
| HPDSS 1240A | HPDCS 1240A | 12.4 | 14.0 | 107.0 | 60.0 | 43.0 | 1.90 |
| HPDSS 1250A | HPDCS 1250A | 12.5 | 14.0 | 107.0 | 60.0 | 43.0 | 1.92 |
| HPDSS 1260A | HPDCS 1260A | 12.6 | 14.0 | 107.0 | 60.0 | 43.0 | 1.93 |
| HPDSS 1270A | HPDCS 1270A | 12.7 | 14.0 | 107.0 | 60.0 | 43.0 | 1.95 |
| HPDSS 1280A | HPDCS 1280A | 12.8 | 14.0 | 107.0 | 60.0 | 43.0 | 1.96 |
| HPDSS 1290A | HPDCS 1290A | 12.9 | 14.0 | 107.0 | 60.0 | 43.0 | 1.99 |
| HPDSS 1300A | HPDCS 1300A | 13.0 | 14.0 | 107.0 | 60.0 | 43.0 | 1.98 |
| HPDSS 1310A | HPDCS 1310A | 13.1 | 14.0 | 107.0 | 60.0 | 43.0 | 2.01 |
| HPDSS 1320A | HPDCS 1320A | 13.2 | 14.0 | 107.0 | 60.0 | 43.0 | 2.02 |
| HPDSS 1330A | HPDCS 1330A | 13.3 | 14.0 | 107.0 | 60.0 | 43.0 | 2.04 |
| HPDSS 1340A | HPDCS 1340A | 13.4 | 14.0 | 107.0 | 60.0 | 43.0 | 2.05 |
| HPDSS 1350A | HPDCS 1350A | 13.5 | 14.0 | 107.0 | 60.0 | 43.0 | 2.07 |
| HPDSS 1360A | HPDCS 1360A | 13.6 | 14.0 | 107.0 | 60.0 | 43.0 | 2.09 |
| HPDSS 1370A | HPDCS 1370A | 13.7 | 14.0 | 107.0 | 60.0 | 43.0 | 2.10 |
| HPDSS 1380A | HPDCS 1380A | 13.8 | 14.0 | 107.0 | 60.0 | 43.0 | 2.12 |
| HPDSS 1390A | HPDCS 1390A | 13.9 | 14.0 | 107.0 | 60.0 | 43.0 | 2.13 |
| HPDSS 1400A | HPDCS 1400A | 14.0 | 14.0 | 107.0 | 60.0 | 43.0 | 2.15 |
| HPDSS 1410A | HPDCS 1410A | 14.1 | 16.0 | 115.0 | 65.0 | 45.0 | 2.16 |
| HPDSS 1420A | HPDCS 1420A | 14.2 | 16.0 | 115.0 | 65.0 | 45.0 | 2.18 |
| HPDSS 1430A | HPDCS 1430A | 14.3 | 16.0 | 115.0 | 65.0 | 45.0 | 2.19 |
| HPDSS 1440A | HPDCS 1440A | 14.4 | 16.0 | 115.0 | 65.0 | 45.0 | 2.21 |
| HPDSS 1450A | HPDCS 1450A | 14.5 | 16.0 | 115.0 | 65.0 | 45.0 | 2.22 |
| HPDSS 1460A | HPDCS 1460A | 14.6 | 16.0 | 115.0 | 65.0 | 45.0 | 2.24 |
| HPDSS 1470A | HPDCS 1470A | 14.7 | 16.0 | 115.0 | 65.0 | 45.0 | 2.25 |
| HPDSS 1480A | HPDCS 1480A | 14.8 | 16.0 | 115.0 | 65.0 | 45.0 | 2.27 |
| HPDSS 1490A | HPDCS 1490A | 14.9 | 16.0 | 115.0 | 65.0 | 45.0 | 2.28 |
| HPDSS 1500A | HPDCS 1500A | 15.0 | 16.0 | 115.0 | 65.0 | 45.0 | 2.30 |
| HPDSS 1510A | HPDCS 1510A | 15.1 | 16.0 | 115.0 | 65.0 | 45.0 | 2.32 |
| HPDSS 1520A | HPDCS 1520A | 15.2 | 16.0 | 115.0 | 65.0 | 45.0 | 2.33 |
| HPDSS 1530A | HPDCS 1530A | 15.3 | 16.0 | 115.0 | 65.0 | 45.0 | 2.35 |
| HPDSS 1540A | HPDCS 1540A | 15.4 | 16.0 | 115.0 | 65.0 | 45.0 | 2.36 |
| HPDSS 1550A | HPDCS 1550A | 15.5 | 16.0 | 115.0 | 65.0 | 45.0 | 2.38 |
| HPDSS 1560A | HPDCS 1560A | 15.6 | 16.0 | 115.0 | 65.0 | 45.0 | 2.39 |
| HPDSS 1570A | HPDCS 1570A | 15.7 | 16.0 | 115.0 | 65.0 | 45.0 | 2.41 |
| HPDSS 1580A | HPDCS 1580A | 15.8 | 16.0 | 115.0 | 65.0 | 45.0 | 2.42 |
| HPDSS 1590A | HPDCS 1590A | 15.9 | 16.0 | 115.0 | 65.0 | 45.0 | 2.44 |
| HPDSS 1600A | HPDCS 1600A | 16.0 | 16.0 | 115.0 | 65.0 | 45.0 | 2.45 |

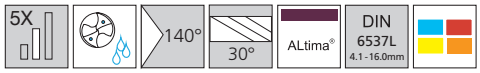
P180

# Twister® HPD Performance Drills - 5xD Series HPDSR, HPDCR

Series **HPDSR**

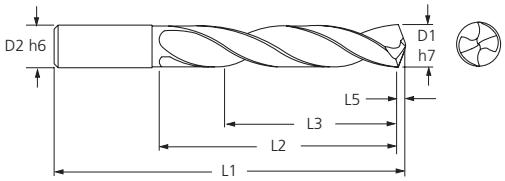



Series **HPDCR**





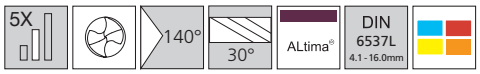


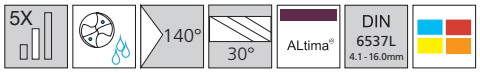

| Series HPDSR | Series HPDCR | Tool Dimensions | | | | | |
|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| HPDSR 0300A | HPDCR 0300A | 3.0 | 3.0 | 66.0 | 28.0 | 23.0 | 0.46 |
| HPDSR 0310A | HPDCR 0310A | 3.1 | 4.0 | 66.0 | 28.0 | 23.0 | 0.48 |
| HPDSR 0320A | HPDCR 0320A | 3.2 | 4.0 | 66.0 | 28.0 | 23.0 | 0.49 |
| HPDSR 0330A | HPDCR 0330A | 3.3 | 4.0 | 66.0 | 28.0 | 23.0 | 0.51 |
| HPDSR 0340A | HPDCR 0340A | 3.4 | 4.0 | 66.0 | 28.0 | 23.0 | 0.52 |
| HPDSR 0350A | HPDCR 0350A | 3.5 | 4.0 | 66.0 | 28.0 | 23.0 | 0.54 |
| HPDSR 0360A | HPDCR 0360A | 3.6 | 4.0 | 66.0 | 28.0 | 23.0 | 0.55 |
| HPDSR 0370A | HPDCR 0370A | 3.7 | 4.0 | 66.0 | 28.0 | 23.0 | 0.57 |
| HPDSR 0380A | HPDCR 0380A | 3.8 | 4.0 | 74.0 | 36.0 | 29.0 | 0.58 |
| HPDSR 0390A | HPDCR 0390A | 3.9 | 4.0 | 74.0 | 36.0 | 29.0 | 0.60 |
| HPDSR 0400A | HPDCR 0400A | 4.0 | 4.0 | 74.0 | 36.0 | 29.0 | 0.61 |
| HPDSR 0410A | HPDCR 0410A | 4.1 | 6.0 | 74.0 | 36.0 | 29.0 | 0.64 |
| HPDSR 0420A | HPDCR 0420A | 4.2 | 6.0 | 74.0 | 36.0 | 29.0 | 0.64 |
| HPDSR 0430A | HPDCR 0430A | 4.3 | 6.0 | 74.0 | 36.0 | 29.0 | 0.66 |
| HPDSR 0440A | HPDCR 0440A | 4.4 | 6.0 | 74.0 | 36.0 | 29.0 | 0.67 |
| HPDSR 0450A | HPDCR 0450A | 4.5 | 6.0 | 74.0 | 36.0 | 29.0 | 0.69 |
| HPDSR 0460A | HPDCR 0460A | 4.6 | 6.0 | 74.0 | 36.0 | 29.0 | 0.71 |
| HPDSR 0470A | HPDCR 0470A | 4.7 | 6.0 | 74.0 | 36.0 | 29.0 | 0.72 |
| HPDSR 0480A | HPDCR 0480A | 4.8 | 6.0 | 82.0 | 44.0 | 35.0 | 0.74 |
| HPDSR 0490A | HPDCR 0490A | 4.9 | 6.0 | 82.0 | 44.0 | 35.0 | 0.75 |
| HPDSR 0500A | HPDCR 0500A | 5.0 | 6.0 | 82.0 | 44.0 | 35.0 | 0.77 |
| HPDSR 0510A | HPDCR 0510A | 5.1 | 6.0 | 82.0 | 44.0 | 35.0 | 0.78 |
| HPDSR 0520A | HPDCR 0520A | 5.2 | 6.0 | 82.0 | 44.0 | 35.0 | 0.80 |
| HPDSR 0530A | HPDCR 0530A | 5.3 | 6.0 | 82.0 | 44.0 | 35.0 | 0.81 |
| HPDSR 0540A | HPDCR 0540A | 5.4 | 6.0 | 82.0 | 44.0 | 35.0 | 0.83 |
| HPDSR 0550A | HPDCR 0550A | 5.5 | 6.0 | 82.0 | 44.0 | 35.0 | 0.84 |
| HPDSR 0560A | HPDCR 0560A | 5.6 | 6.0 | 82.0 | 44.0 | 35.0 | 0.86 |
| HPDSR 0570A | HPDCR 0570A | 5.7 | 6.0 | 82.0 | 44.0 | 35.0 | 0.87 |
| HPDSR 0580A | HPDCR 0580A | 5.8 | 6.0 | 82.0 | 44.0 | 35.0 | 0.89 |
| HPDSR 0590A | HPDCR 0590A | 5.9 | 6.0 | 82.0 | 44.0 | 35.0 | 0.90 |
| HPDSR 0600A | HPDCR 0600A | 6.0 | 6.0 | 82.0 | 44.0 | 35.0 | 0.92 |
| HPDSR 0610A | HPDCR 0610A | 6.1 | 8.0 | 91.0 | 53.0 | 43.0 | 0.94 |
| HPDSR 0620A | HPDCR 0620A | 6.2 | 8.0 | 91.0 | 53.0 | 43.0 | 0.95 |
| HPDSR 0630A | HPDCR 0630A | 6.3 | 8.0 | 91.0 | 53.0 | 43.0 | 0.97 |
| HPDSR 0640A | HPDCR 0640A | 6.4 | 8.0 | 91.0 | 53.0 | 43.0 | 0.98 |
| HPDSR 0650A | HPDCR 0650A | 6.5 | 8.0 | 91.0 | 53.0 | 43.0 | 1.00 |
| HPDSR 0660A | HPDCR 0660A | 6.6 | 8.0 | 91.0 | 53.0 | 43.0 | 1.01 |
| HPDSR 0670A | HPDCR 0670A | 6.7 | 8.0 | 91.0 | 53.0 | 43.0 | 1.03 |
| HPDSR 0680A | HPDCR 0680A | 6.8 | 8.0 | 91.0 | 53.0 | 43.0 | 1.04 |
| HPDSR 0690A | HPDCR 0690A | 6.9 | 8.0 | 91.0 | 53.0 | 43.0 | 1.06 |
| HPDSR 0700A | HPDCR 0700A | 7.0 | 8.0 | 91.0 | 53.0 | 43.0 | 1.07 |
| HPDSR 0710A | HPDCR 0710A | 7.1 | 8.0 | 91.0 | 53.0 | 43.0 | 1.09 |
| HPDSR 0720A | HPDCR 0720A | 7.2 | 8.0 | 91.0 | 53.0 | 43.0 | 1.10 |

# Twister® HPD Performance Drills - 5xD Series HPDSR, HPDCR

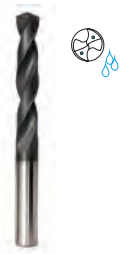
Series **HPDSR**

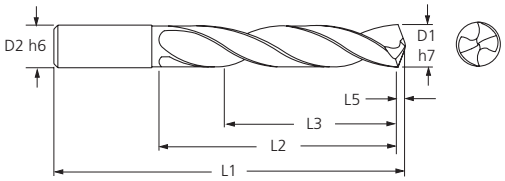



Series **HPDCR**





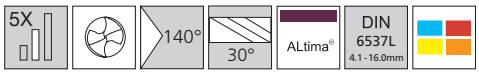





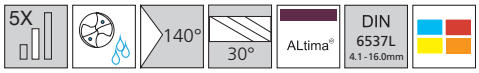

| Series HPDSR | Series HPDCR | Tool Dimensions | | | | | |
|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| HPDSR 0730A | HPDCR 0730A | 7.3 | 8.0 | 91.0 | 53.0 | 43.0 | 1.12 |
| HPDSR 0740A | HPDCR 0740A | 7.4 | 8.0 | 91.0 | 53.0 | 43.0 | 1.13 |
| HPDSR 0750A | HPDCR 0750A | 7.5 | 8.0 | 91.0 | 53.0 | 43.0 | 1.15 |
| HPDSR 0760A | HPDCR 0760A | 7.6 | 8.0 | 91.0 | 53.0 | 43.0 | 1.17 |
| HPDSR 0770A | HPDCR 0770A | 7.7 | 8.0 | 91.0 | 53.0 | 43.0 | 1.18 |
| HPDSR 0780A | HPDCR 0780A | 7.8 | 8.0 | 91.0 | 53.0 | 43.0 | 1.20 |
| HPDSR 0790A | HPDCR 0790A | 7.9 | 8.0 | 91.0 | 53.0 | 43.0 | 1.21 |
| HPDSR 0800A | HPDCR 0800A | 8.0 | 8.0 | 91.0 | 53.0 | 43.0 | 1.23 |
| HPDSR 0810A | HPDCR 0810A | 8.1 | 10.0 | 103.0 | 61.0 | 49.0 | 1.24 |
| HPDSR 0820A | HPDCR 0820A | 8.2 | 10.0 | 103.0 | 61.0 | 49.0 | 1.26 |
| HPDSR 0830A | HPDCR 0830A | 8.3 | 10.0 | 103.0 | 61.0 | 49.0 | 1.27 |
| HPDSR 0840A | HPDCR 0840A | 8.4 | 10.0 | 103.0 | 61.0 | 49.0 | 1.29 |
| HPDSR 0850A | HPDCR 0850A | 8.5 | 10.0 | 103.0 | 61.0 | 49.0 | 1.30 |
| HPDSR 0860A | HPDCR 0860A | 8.6 | 10.0 | 103.0 | 61.0 | 49.0 | 1.32 |
| HPDSR 0870A | HPDCR 0870A | 8.7 | 10.0 | 103.0 | 61.0 | 49.0 | 1.33 |
| HPDSR 0880A | HPDCR 0880A | 8.8 | 10.0 | 103.0 | 61.0 | 49.0 | 1.35 |
| HPDSR 0890A | HPDCR 0890A | 8.9 | 10.0 | 103.0 | 61.0 | 49.0 | 1.36 |
| HPDSR 0900A | HPDCR 0900A | 9.0 | 10.0 | 103.0 | 61.0 | 49.0 | 1.38 |
| HPDSR 0910A | HPDCR 0910A | 9.1 | 10.0 | 103.0 | 61.0 | 49.0 | 1.40 |
| HPDSR 0920A | HPDCR 0920A | 9.2 | 10.0 | 103.0 | 61.0 | 49.0 | 1.41 |
| HPDSR 0930A | HPDCR 0930A | 9.3 | 10.0 | 103.0 | 61.0 | 49.0 | 1.43 |
| HPDSR 0940A | HPDCR 0940A | 9.4 | 10.0 | 103.0 | 61.0 | 49.0 | 1.44 |
| HPDSR 0950A | HPDCR 0950A | 9.5 | 10.0 | 103.0 | 61.0 | 49.0 | 1.46 |
| HPDSR 0960A | HPDCR 0960A | 9.6 | 10.0 | 103.0 | 61.0 | 49.0 | 1.47 |
| HPDSR 0970A | HPDCR 0970A | 9.7 | 10.0 | 103.0 | 61.0 | 49.0 | 1.49 |
| HPDSR 0980A | HPDCR 0980A | 9.8 | 10.0 | 103.0 | 61.0 | 49.0 | 1.50 |
| HPDSR 0990A | HPDCR 0990A | 9.9 | 10.0 | 103.0 | 61.0 | 49.0 | 1.52 |
| HPDSR 1000A | HPDCR 1000A | 10.0 | 10.0 | 103.0 | 61.0 | 49.0 | 1.53 |
| HPDSR 1010A | HPDCR 1010A | 10.1 | 12.0 | 118.0 | 71.0 | 56.0 | 1.55 |
| HPDSR 1020A | HPDCR 1020A | 10.2 | 12.0 | 118.0 | 71.0 | 56.0 | 1.56 |
| HPDSR 1030A | HPDCR 1030A | 10.3 | 12.0 | 118.0 | 71.0 | 56.0 | 1.58 |
| HPDSR 1040A | HPDCR 1040A | 10.4 | 12.0 | 118.0 | 71.0 | 56.0 | 1.59 |
| HPDSR 1050A | HPDCR 1050A | 10.5 | 12.0 | 118.0 | 71.0 | 56.0 | 1.61 |
| HPDSR 1060A | HPDCR 1060A | 10.6 | 12.0 | 118.0 | 71.0 | 56.0 | 1.63 |
| HPDSR 1070A | HPDCR 1070A | 10.7 | 12.0 | 118.0 | 71.0 | 56.0 | 1.64 |
| HPDSR 1080A | HPDCR 1080A | 10.8 | 12.0 | 118.0 | 71.0 | 56.0 | 1.66 |
| HPDSR 1090A | HPDCR 1090A | 10.9 | 12.0 | 118.0 | 71.0 | 56.0 | 1.67 |
| HPDSR 1100A | HPDCR 1100A | 11.0 | 12.0 | 118.0 | 71.0 | 56.0 | 1.69 |
| HPDSR 1110A | HPDCR 1110A | 11.1 | 12.0 | 118.0 | 71.0 | 56.0 | 1.70 |
| HPDSR 1120A | HPDCR 1120A | 11.2 | 12.0 | 118.0 | 71.0 | 56.0 | 1.72 |
| HPDSR 1130A | HPDCR 1130A | 11.3 | 12.0 | 118.0 | 71.0 | 56.0 | 1.73 |
| HPDSR 1140A | HPDCR 1140A | 11.4 | 12.0 | 118.0 | 71.0 | 56.0 | 1.75 |
| HPDSR 1150A | HPDCR 1150A | 11.5 | 12.0 | 118.0 | 71.0 | 56.0 | 1.76 |
| HPDSR 1160A | HPDCR 1160A | 11.6 | 12.0 | 118.0 | 71.0 | 56.0 | 1.78 |

# Twister® HPD Performance Drills - 5xD Series HPDSR, HPDCR

Series **HPDSR**

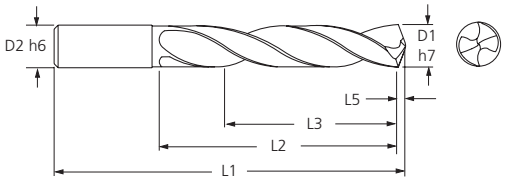



Series **HPDCR**





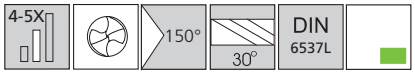


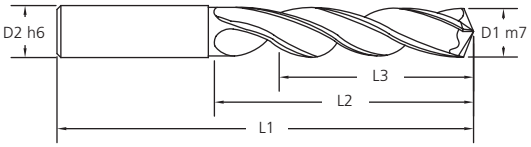

| Series HPDSR | Series HPDCR | Tool Dimensions | | | | | |
|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Ø D1 | Ø D2 | L1 | L2 (Max.) | L3 | L5 |
| HPDSR 1170A | HPDCR 1170A | 11.7 | 12.0 | 118.0 | 71.0 | 56.0 | 1.79 |
| HPDSR 1180A | HPDCR 1180A | 11.8 | 12.0 | 118.0 | 71.0 | 56.0 | 1.81 |
| HPDSR 1190A | HPDCR 1190A | 11.9 | 12.0 | 118.0 | 71.0 | 56.0 | 1.82 |
| HPDSR 1200A | HPDCR 1200A | 12.0 | 12.0 | 118.0 | 71.0 | 56.0 | 1.84 |
| HPDSR 1210A | HPDCR 1210A | 12.1 | 14.0 | 124.0 | 77.0 | 60.0 | 1.86 |
| HPDSR 1220A | HPDCR 1220A | 12.2 | 14.0 | 124.0 | 77.0 | 60.0 | 1.87 |
| HPDSR 1230A | HPDCR 1230A | 12.3 | 14.0 | 124.0 | 77.0 | 60.0 | 1.89 |
| HPDSR 1240A | HPDCR 1240A | 12.4 | 14.0 | 124.0 | 77.0 | 60.0 | 1.90 |
| HPDSR 1250A | HPDCR 1250A | 12.5 | 14.0 | 124.0 | 77.0 | 60.0 | 1.92 |
| HPDSR 1260A | HPDCR 1260A | 12.6 | 14.0 | 124.0 | 77.0 | 60.0 | 1.93 |
| HPDSR 1270A | HPDCR 1270A | 12.7 | 14.0 | 124.0 | 77.0 | 60.0 | 1.95 |
| HPDSR 1280A | HPDCR 1280A | 12.8 | 14.0 | 124.0 | 77.0 | 60.0 | 1.96 |
| HPDSR 1290A | HPDCR 1290A | 12.9 | 14.0 | 124.0 | 77.0 | 60.0 | 1.99 |
| HPDSR 1300A | HPDCR 1300A | 13.0 | 14.0 | 124.0 | 77.0 | 60.0 | 1.98 |
| HPDSR 1310A | HPDCR 1310A | 13.1 | 14.0 | 124.0 | 77.0 | 60.0 | 2.01 |
| HPDSR 1320A | HPDCR 1320A | 13.2 | 14.0 | 124.0 | 77.0 | 60.0 | 2.02 |
| HPDSR 1330A | HPDCR 1330A | 13.3 | 14.0 | 124.0 | 77.0 | 60.0 | 2.04 |
| HPDSR 1340A | HPDCR 1340A | 13.4 | 14.0 | 124.0 | 77.0 | 60.0 | 2.05 |
| HPDSR 1350A | HPDCR 1350A | 13.5 | 14.0 | 124.0 | 77.0 | 60.0 | 2.07 |
| HPDSR 1360A | HPDCR 1360A | 13.6 | 14.0 | 124.0 | 77.0 | 60.0 | 2.09 |
| HPDSR 1370A | HPDCR 1370A | 13.7 | 14.0 | 124.0 | 77.0 | 60.0 | 2.10 |
| HPDSR 1380A | HPDCR 1380A | 13.8 | 14.0 | 124.0 | 77.0 | 60.0 | 2.12 |
| HPDSR 1390A | HPDCR 1390A | 13.9 | 14.0 | 124.0 | 77.0 | 60.0 | 2.13 |
| HPDSR 1400A | HPDCR 1400A | 14.0 | 14.0 | 124.0 | 77.0 | 60.0 | 2.15 |
| HPDSR 1410A | HPDCR 1410A | 14.1 | 16.0 | 133.0 | 83.0 | 63.0 | 2.16 |
| HPDSR 1420A | HPDCR 1420A | 14.2 | 16.0 | 133.0 | 83.0 | 63.0 | 2.18 |
| HPDSR 1430A | HPDCR 1430A | 14.3 | 16.0 | 133.0 | 83.0 | 63.0 | 2.19 |
| HPDSR 1440A | HPDCR 1440A | 14.4 | 16.0 | 133.0 | 83.0 | 63.0 | 2.21 |
| HPDSR 1450A | HPDCR 1450A | 14.5 | 16.0 | 133.0 | 83.0 | 63.0 | 2.22 |
| HPDSR 1460A | HPDCR 1460A | 14.6 | 16.0 | 133.0 | 83.0 | 63.0 | 2.24 |
| HPDSR 1470A | HPDCR 1470A | 14.7 | 16.0 | 133.0 | 83.0 | 63.0 | 2.25 |
| HPDSR 1480A | HPDCR 1480A | 14.8 | 16.0 | 133.0 | 83.0 | 63.0 | 2.27 |
| HPDSR 1490A | HPDCR 1490A | 14.9 | 16.0 | 133.0 | 83.0 | 63.0 | 2.28 |
| HPDSR 1500A | HPDCR 1500A | 15.0 | 16.0 | 133.0 | 83.0 | 63.0 | 2.30 |
| HPDSR 1510A | HPDCR 1510A | 15.1 | 16.0 | 133.0 | 83.0 | 63.0 | 2.32 |
| HPDSR 1520A | HPDCR 1520A | 15.2 | 16.0 | 133.0 | 83.0 | 63.0 | 2.33 |
| HPDSR 1530A | HPDCR 1530A | 15.3 | 16.0 | 133.0 | 83.0 | 63.0 | 2.35 |
| HPDSR 1540A | HPDCR 1540A | 15.4 | 16.0 | 133.0 | 83.0 | 63.0 | 2.36 |
| HPDSR 1550A | HPDCR 1550A | 15.5 | 16.0 | 133.0 | 83.0 | 63.0 | 2.38 |
| HPDSR 1560A | HPDCR 1560A | 15.6 | 16.0 | 133.0 | 83.0 | 63.0 | 2.39 |
| HPDSR 1570A | HPDCR 1570A | 15.7 | 16.0 | 133.0 | 83.0 | 63.0 | 2.41 |
| HPDSR 1580A | HPDCR 1580A | 15.8 | 16.0 | 133.0 | 83.0 | 63.0 | 2.42 |
| HPDSR 1590A | HPDCR 1590A | 15.9 | 16.0 | 133.0 | 83.0 | 63.0 | 2.44 |
| HPDSR 1600A | HPDCR 1600A | 16.0 | 16.0 | 133.0 | 83.0 | 63.0 | 2.45 |

P180

# Twister® X-AL 3 Flute Performance Aluminium Drill - 4-5xD Series 229





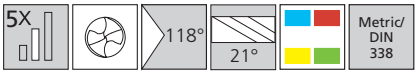




| Series 229 | Drill Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| 229 0200 | 2.0 | 2.0 | 38.0 | 16.0 | 12.0 |
| 229 0230 | 2.3 | 2.3 | 43.0 | 20.0 | 15.0 |
| 229 0250 | 2.5 | 2.5 | 43.0 | 20.0 | 15.0 |
| 229 0290 | 2.9 | 2.9 | 46.0 | 25.0 | 19.0 |
| 229 0300 | 3.0 | 6.0 | 66.0 | 28.0 | 23.0 |
| 229 0310 | 3.1 | 6.0 | 66.0 | 28.0 | 23.0 |
| 229 0320 | 3.2 | 6.0 | 66.0 | 28.0 | 23.0 |
| 229 0330 | 3.3 | 6.0 | 66.0 | 28.0 | 23.0 |
| 229 0340 | 3.4 | 6.0 | 66.0 | 28.0 | 23.0 |
| 229 0350 | 3.5 | 6.0 | 66.0 | 28.0 | 23.0 |
| 229 0360 | 3.6 | 6.0 | 66.0 | 28.0 | 23.0 |
| 229 0370 | 3.7 | 6.0 | 66.0 | 28.0 | 23.0 |
| 229 0380 | 3.8 | 6.0 | 74.0 | 36.0 | 29.0 |
| 229 0390 | 3.9 | 6.0 | 74.0 | 36.0 | 29.0 |
| 229 0400 | 4.0 | 6.0 | 74.0 | 36.0 | 29.0 |
| 229 0410 | 4.1 | 6.0 | 74.0 | 36.0 | 29.0 |
| 229 0420 | 4.2 | 6.0 | 74.0 | 36.0 | 29.0 |
| 229 0440 | 4.4 | 6.0 | 74.0 | 36.0 | 29.0 |
| 229 0450 | 4.5 | 6.0 | 74.0 | 36.0 | 29.0 |
| 229 0460 | 4.6 | 6.0 | 74.0 | 36.0 | 29.0 |
| 229 0480 | 4.8 | 6.0 | 82.0 | 44.0 | 35.0 |
| 229 0490 | 4.9 | 6.0 | 82.0 | 44.0 | 35.0 |
| 229 0500 | 5.0 | 6.0 | 82.0 | 44.0 | 35.0 |
| 229 0520 | 5.2 | 6.0 | 82.0 | 44.0 | 35.0 |
| 229 0550 | 5.5 | 6.0 | 82.0 | 44.0 | 35.0 |
| 229 0560 | 5.6 | 6.0 | 82.0 | 44.0 | 35.0 |
| 229 0600 | 6.0 | 6.0 | 82.0 | 44.0 | 35.0 |
| 229 0620 | 6.2 | 8.0 | 91.0 | 53.0 | 43.0 |
| 229 0650 | 6.5 | 8.0 | 91.0 | 53.0 | 43.0 |
| 229 0670 | 6.7 | 8.0 | 91.0 | 53.0 | 43.0 |
| 229 0680 | 6.8 | 8.0 | 91.0 | 53.0 | 43.0 |

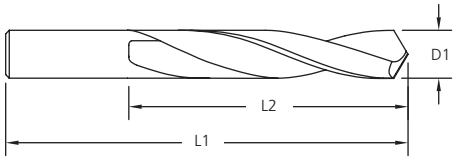
| Series 229 | Drill Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | L3 |
| 229 0700 | 7.0 | 8.0 | 91.0 | 53.0 | 43.0 |
| 229 0720 | 7.2 | 8.0 | 91.0 | 53.0 | 43.0 |
| 229 0730 | 7.3 | 8.0 | 91.0 | 53.0 | 43.0 |
| 229 0740 | 7.4 | 8.0 | 91.0 | 53.0 | 43.0 |
| 229 0750 | 7.5 | 8.0 | 91.0 | 53.0 | 43.0 |
| 229 0780 | 7.8 | 8.0 | 91.0 | 53.0 | 43.0 |
| 229 0800 | 8.0 | 8.0 | 91.0 | 53.0 | 43.0 |
| 229 0810 | 8.1 | 10.0 | 103.0 | 61.0 | 49.0 |
| 229 0840 | 8.4 | 10.0 | 103.0 | 61.0 | 49.0 |
| 229 0850 | 8.5 | 10.0 | 103.0 | 61.0 | 49.0 |
| 229 0900 | 9.0 | 10.0 | 103.0 | 61.0 | 49.0 |
| 229 0950 | 9.5 | 10.0 | 103.0 | 61.0 | 49.0 |
| 229 0970 | 9.7 | 10.0 | 103.0 | 61.0 | 49.0 |
| 229 1000 | 10.0 | 10.0 | 103.0 | 61.0 | 49.0 |
| 229 1020 | 10.2 | 12.0 | 118.0 | 71.0 | 56.0 |
| 229 1040 | 10.4 | 12.0 | 118.0 | 71.0 | 56.0 |
| 229 1050 | 10.5 | 12.0 | 118.0 | 71.0 | 56.0 |
| 229 1060 | 10.6 | 12.0 | 118.0 | 71.0 | 56.0 |
| 229 1100 | 11.0 | 12.0 | 118.0 | 71.0 | 56.0 |
| 229 1150 | 11.5 | 12.0 | 118.0 | 71.0 | 56.0 |
| 229 1200 | 12.0 | 12.0 | 118.0 | 71.0 | 56.0 |
| 229 1250 | 12.5 | 14.0 | 124.0 | 77.0 | 60.0 |
| 229 1270 | 12.7 | 14.0 | 124.0 | 77.0 | 60.0 |
| 229 1300 | 13.0 | 14.0 | 124.0 | 77.0 | 60.0 |
| 229 1350 | 13.5 | 14.0 | 124.0 | 77.0 | 60.0 |
| 229 1400 | 14.0 | 14.0 | 124.0 | 77.0 | 60.0 |
| 229 1450 | 14.5 | 16.0 | 133.0 | 83.0 | 63.0 |
| 229 1500 | 15.0 | 16.0 | 133.0 | 83.0 | 63.0 |
| 229 1550 | 15.5 | 16.0 | 133.0 | 83.0 | 63.0 |
| 229 1580 | 15.8 | 16.0 | 133.0 | 83.0 | 63.0 |
| 229 1600 | 16.0 | 16.0 | 133.0 | 83.0 | 63.0 |

P180

# Twister® Hi-Tuff® Jobbers Drill - 5xD Series 224 Uncoated



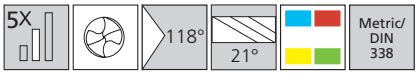


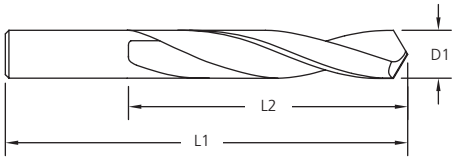

| Series 224 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 224 0030 | 0.3 | 26.0 | 3.0 |
| 224 0035 | 0.35 | 26.0 | 4.0 |
| 224 0040 | 0.4 | 26.0 | 5.0 |
| 224 0045 | 0.45 | 26.0 | 5.0 |
| 224 0050 | 0.5 | 26.0 | 6.0 |
| 224 0055 | 0.55 | 26.0 | 7.0 |
| 224 0060 | 0.6 | 26.0 | 7.0 |
| 224 0065 | 0.65 | 26.0 | 8.0 |
| 224 0070 | 0.7 | 28.0 | 9.0 |
| 224 0075 | 0.75 | 28.0 | 9.0 |
| 224 0080 | 0.8 | 30.0 | 10.0 |
| 224 0085 | 0.85 | 30.0 | 10.0 |
| 224 0090 | 0.9 | 32.0 | 11.0 |
| 224 0095 | 0.95 | 32.0 | 11.0 |
| 224 0100 | 1.0 | 34.0 | 12.0 |
| 224 0105 | 1.05 | 34.0 | 12.0 |
| 224 0110 | 1.1 | 36.0 | 14.0 |
| 224 0115 | 1.15 | 36.0 | 14.0 |
| 224 0120 | 1.2 | 38.0 | 16.0 |
| 224 0125 | 1.25 | 38.0 | 16.0 |
| 224 0130 | 1.3 | 38.0 | 16.0 |
| 224 0135 | 1.35 | 40.0 | 18.0 |
| 224 0140 | 1.4 | 40.0 | 18.0 |
| 224 0145 | 1.45 | 40.0 | 18.0 |
| 224 0150 | 1.5 | 40.0 | 18.0 |
| 224 0160 | 1.6 | 43.0 | 20.0 |
| 224 0170 | 1.7 | 43.0 | 20.0 |
| 224 0180 | 1.8 | 46.0 | 22.0 |
| 224 0190 | 1.9 | 46.0 | 22.0 |
| 224 0200 | 2.0 | 49.0 | 24.0 |
| 224 0210 | 2.1 | 49.0 | 24.0 |
| 224 0220 | 2.2 | 53.0 | 27.0 |
| 224 0230 | 2.3 | 53.0 | 27.0 |
| 224 0240 | 2.4 | 57.0 | 30.0 |
| 224 0250 | 2.5 | 57.0 | 30.0 |
| 224 0260 | 2.6 | 57.0 | 30.0 |
| 224 0270 | 2.7 | 61.0 | 33.0 |
| 224 0280 | 2.8 | 61.0 | 33.0 |
| 224 0290 | 2.9 | 61.0 | 33.0 |
| 224 0300 | 3.0 | 61.0 | 33.0 |
| 224 0310 | 3.1 | 65.0 | 36.0 |
| 224 0320 | 3.2 | 65.0 | 36.0 |
| 224 0330 | 3.3 | 65.0 | 36.0 |
| 224 0340 | 3.4 | 70.0 | 39.0 |
| 224 0350 | 3.5 | 70.0 | 39.0 |

| Series 224 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 224 0360 | 3.6 | 70.0 | 39.0 |
| 224 0370 | 3.7 | 70.0 | 39.0 |
| 224 0380 | 3.8 | 75.0 | 43.0 |
| 224 0390 | 3.9 | 75.0 | 43.0 |
| 224 0400 | 4.0 | 75.0 | 43.0 |
| 224 0410 | 4.1 | 75.0 | 43.0 |
| 224 0420 | 4.2 | 75.0 | 43.0 |
| 224 0430 | 4.3 | 80.0 | 47.0 |
| 224 0440 | 4.4 | 80.0 | 47.0 |
| 224 0450 | 4.5 | 80.0 | 47.0 |
| 224 0460 | 4.6 | 80.0 | 47.0 |
| 224 0470 | 4.7 | 80.0 | 47.0 |
| 224 0480 | 4.8 | 86.0 | 52.0 |
| 224 0490 | 4.9 | 86.0 | 52.0 |
| 224 0500 | 5.0 | 86.0 | 52.0 |
| 224 0510 | 5.1 | 86.0 | 52.0 |
| 224 0520 | 5.2 | 86.0 | 52.0 |
| 224 0530 | 5.3 | 86.0 | 52.0 |
| 224 0540 | 5.4 | 93.0 | 57.0 |
| 224 0550 | 5.5 | 93.0 | 57.0 |
| 224 0560 | 5.6 | 93.0 | 57.0 |
| 224 0570 | 5.7 | 93.0 | 57.0 |
| 224 0580 | 5.8 | 93.0 | 57.0 |
| 224 0590 | 5.9 | 93.0 | 57.0 |
| 224 0600 | 6.0 | 93.0 | 57.0 |
| 224 0610 | 6.1 | 101.0 | 63.0 |
| 224 0620 | 6.2 | 101.0 | 63.0 |
| 224 0630 | 6.3 | 101.0 | 63.0 |
| 224 0640 | 6.4 | 101.0 | 63.0 |
| 224 0650 | 6.5 | 101.0 | 63.0 |
| 224 0660 | 6.6 | 101.0 | 63.0 |
| 224 0670 | 6.7 | 101.0 | 63.0 |
| 224 0680 | 6.8 | 109.0 | 69.0 |
| 224 0690 | 6.9 | 109.0 | 69.0 |
| 224 0700 | 7.0 | 109.0 | 69.0 |
| 224 0710 | 7.1 | 109.0 | 69.0 |
| 224 0720 | 7.2 | 109.0 | 69.0 |
| 224 0730 | 7.3 | 109.0 | 69.0 |
| 224 0740 | 7.4 | 109.0 | 69.0 |
| 224 0750 | 7.5 | 109.0 | 69.0 |
| 224 0760 | 7.6 | 117.0 | 75.0 |
| 224 0770 | 7.7 | 117.0 | 75.0 |
| 224 0780 | 7.8 | 117.0 | 75.0 |
| 224 0790 | 7.9 | 117.0 | 75.0 |
| 224 0800 | 8.0 | 117.0 | 75.0 |

# Twister® Hi-Tuff® Jobbers Drill - 5xD Series 224 Uncoated





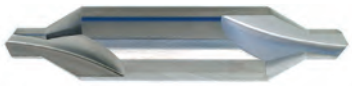

| Series 224 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 224 0810 | 8.1 | 117.0 | 75.0 |
| 224 0820 | 8.2 | 117.0 | 75.0 |
| 224 0830 | 8.3 | 117.0 | 75.0 |
| 224 0840 | 8.4 | 117.0 | 75.0 |
| 224 0850 | 8.5 | 117.0 | 75.0 |
| 224 0860 | 8.6 | 125.0 | 81.0 |
| 224 0870 | 8.7 | 125.0 | 81.0 |
| 224 0880 | 8.8 | 125.0 | 81.0 |
| 224 0890 | 8.9 | 125.0 | 81.0 |
| 224 0900 | 9.0 | 125.0 | 81.0 |
| 224 0910 | 9.1 | 125.0 | 81.0 |
| 224 0920 | 9.2 | 125.0 | 81.0 |
| 224 0930 | 9.3 | 125.0 | 81.0 |
| 224 0940 | 9.4 | 125.0 | 81.0 |
| 224 0950 | 9.5 | 125.0 | 81.0 |
| 224 0960 | 9.6 | 133.0 | 87.0 |
| 224 0970 | 9.7 | 133.0 | 87.0 |
| 224 0980 | 9.8 | 133.0 | 87.0 |
| 224 0990 | 9.9 | 133.0 | 87.0 |
| 224 1000 | 10.0 | 133.0 | 87.0 |
| 224 1010 | 10.1 | 133.0 | 87.0 |
| 224 1020 | 10.2 | 133.0 | 87.0 |

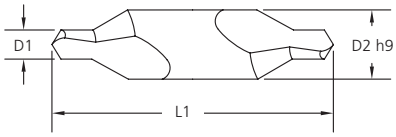
| Series 224 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 224 1030 | 10.3 | 133.0 | 160.0 |
| 224 1040 | 10.4 | 133.0 | 160.0 |
| 224 1050 | 10.5 | 133.0 | 160.0 |
| 224 1060 | 10.6 | 133.0 | 87.0 |
| 224 1070 | 10.7 | 142.0 | 94.0 |
| 224 1080 | 10.8 | 142.0 | 94.0 |
| 224 1090 | 10.9 | 142.0 | 94.0 |
| 224 1100 | 11.0 | 142.0 | 94.0 |
| 224 1110 | 11.1 | 142.0 | 94.0 |
| 224 1120 | 11.2 | 142.0 | 94.0 |
| 224 1130 | 11.3 | 142.0 | 94.0 |
| 224 1140 | 11.4 | 142.0 | 94.0 |
| 224 1150 | 11.5 | 142.0 | 94.0 |
| 224 1160 | 11.6 | 142.0 | 94.0 |
| 224 1170 | 11.7 | 142.0 | 94.0 |
| 224 1180 | 11.8 | 142.0 | 94.0 |
| 224 1190 | 11.9 | 151.0 | 101.0 |
| 224 1200 | 12.0 | 151.0 | 101.0 |
| 224 1250 | 12.5 | 151.0 | 101.0 |
| 224 1300 | 13.0 | 151.0 | 101.0 |
| 224 1350 | 13.5 | 160.0 | 108.0 |
| 224 1400 | 14.0 | 160.0 | 108.0 |

P183

# Twister® Centre Drill Series 402 Uncoated

Metric/ DIN 333A



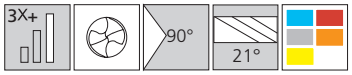



| Series 402 | Drill Dimensions | | |
|---|---|---|---|
| **Tool No** | **Ø D1** | **Ø D2** | **L1** |
| 402 0050 | 0.5 | 3.15 | 31.5* |
| 402 0080 | 0.8 | 3.15 | 31.5* |
| 402 0100 | 1.0 | 3.15 | 31.5 |
| 402 0125 | 1.25 | 3.15 | 31.5 |
| 402 0160 | 1.6 | 4.0 | 35.5 |
| 402 0200 | 2.0 | 5.0 | 40.0 |
| 402 0250 | 2.5 | 6.3 | 45.0 |
| 402 0315 | 3.15 | 8.0 | 50.0 |
| 402 0400 | 4.0 | 10.0 | 56.0 |
| 402 0500 | 5.0 | 12.5 | 63.0 |

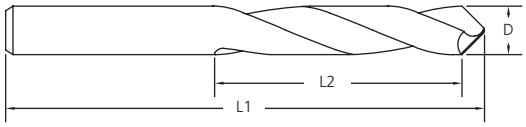
* Overall Length (L1) Not To DIN Specification

P183

# Twister® 90° NC Spot Drill Series 404 Uncoated



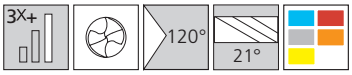


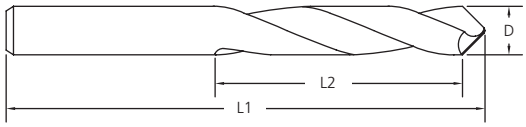

| Series 404 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 404 0500 | 5.0 | 51.0 | 26.0 |
| 404 0600 | 6.0 | 51.0 | 26.0 |
| 404 0800 | 8.0 | 64.0 | 26.0 |
| 404 1000 | 10.0 | 70.0 | 30.0 |
| 404 1200 | 12.0 | 76.0 | 40.0 |

P183

# Twister® 120° NC Spot Drill Series 403 Uncoated






| Series 403 | Drill Dimensions | | |
|---|---|---|---|
| Tool No | Ø D | L1 | L2 |
| 403 0500 | 5.0 | 51.0 | 26.0 |
| 403 0600 | 6.0 | 51.0 | 26.0 |
| 403 0800 | 8.0 | 64.0 | 26.0 |
| 403 1000 | 10.0 | 70.0 | 30.0 |
| 403 1200 | 12.0 | 76.0 | 40.0 |

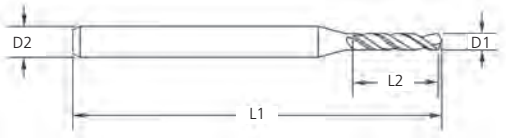
P183



# HSSCo Platinum Drills Series PRM-KSN Uncoated





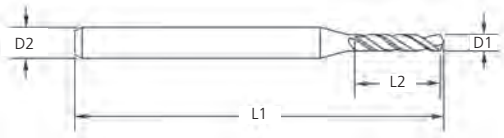

| Series PRM-KSN | Tool Dimensions (mm) | | |
|---|---|---|---|
| Tool No | D1 | L1 | L2 |
| PRM-KS00030N | 0.3 | 40.0 | 3.5 |
| PRM-KS00040N | 0.4 | 40.0 | 4.5 |
| PRM-KS00050N | 0.5 | 40.0 | 5.0 |
| PRM-KS00060N | 0.6 | 40.0 | 6.0 |
| PRM-KS00070N | 0.7 | 40.0 | 6.0 |
| PRM-KS00080N | 0.8 | 40.0 | 7.0 |
| PRM-KS00090N | 0.9 | 40.0 | 8.0 |

P184

# HSSCo Platinum Drills Series PRXS-KST





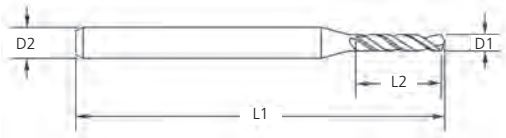

| Series PRXS-KST | Tool Dimensions (mm) | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| PRXS-KS00100T | 1.0 | 3.0 | 40.0 | 8.0 |
| PRXS-KS00110T | 1.1 | 3.0 | 40.0 | 10.0 |
| PRXS-KS00120T | 1.2 | 3.0 | 40.0 | 10.0 |
| PRXS-KS00130T | 1.3 | 3.0 | 40.0 | 11.0 |
| PRXS-KS00140T | 1.4 | 3.0 | 40.0 | 11.0 |
| PRXS-KS00150T | 1.5 | 3.0 | 40.0 | 12.0 |
| PRXS-KS00160T | 1.6 | 3.0 | 40.0 | 12.0 |
| PRXS-KS00170T | 1.7 | 3.0 | 40.0 | 12.0 |
| PRXS-KS00180T | 1.8 | 3.0 | 40.0 | 12.0 |
| PRXS-KS00190T | 1.9 | 3.0 | 40.0 | 12.0 |
| PRXS-KS00200T | 2.0 | 3.0 | 40.0 | 13.0 |
| PRXS-KS00210T | 2.1 | 3.0 | 40.0 | 13.0 |
| PRXS-KS00220T | 2.2 | 3.0 | 40.0 | 13.0 |
| PRXS-KS00230T | 2.3 | 3.0 | 40.0 | 13.0 |
| PRXS-KS00240T | 2.4 | 3.0 | 40.0 | 13.0 |
| PRXS-KS00250T | 2.5 | 3.0 | 40.0 | 13.0 |
| PRXS-KS00260T | 2.6 | 3.0 | 40.0 | 13.0 |
| PRXS-KS00270T | 2.7 | 3.0 | 40.0 | 16.0 |
| PRXS-KS00280T | 2.8 | 3.0 | 40.0 | 16.0 |
| PRXS-KS00290T | 2.9 | 3.0 | 40.0 | 16.0 |
| PRXS-KS00300T | 3.0 | 4.0 | 40.0 | 16.0 |
| PRXS-KS00310T | 3.1 | 4.0 | 50.0 | 18.0 |
| PRXS-KS00320T | 3.2 | 4.0 | 50.0 | 18.0 |
| PRXS-KS00330T | 3.3 | 4.0 | 50.0 | 18.0 |
| PRXS-KS00340T | 3.4 | 4.0 | 50.0 | 20.0 |
| PRXS-KS00350T | 3.5 | 4.0 | 50.0 | 20.0 |
| PRXS-KS00360T | 3.6 | 4.0 | 50.0 | 20.0 |
| PRXS-KS00370T | 3.7 | 4.0 | 50.0 | 20.0 |
| PRXS-KS00380T | 3.8 | 4.0 | 50.0 | 22.0 |
| PRXS-KS00390T | 3.9 | 4.0 | 50.0 | 22.0 |
| PRXS-KS00400T | 4.0 | 6.0 | 70.0 | 22.0 |
| PRXS-KS00410T | 4.1 | 6.0 | 70.0 | 22.0 |
| PRXS-KS00420T | 4.2 | 6.0 | 70.0 | 22.0 |
| PRXS-KS00430T | 4.3 | 6.0 | 70.0 | 22.0 |
| PRXS-KS00440T | 4.4 | 6.0 | 70.0 | 26.0 |
| PRXS-KS00450T | 4.5 | 6.0 | 70.0 | 26.0 |
| PRXS-KS00460T | 4.6 | 6.0 | 70.0 | 26.0 |
| PRXS-KS00470T | 4.7 | 6.0 | 70.0 | 26.0 |
| PRXS-KS00480T | 4.8 | 6.0 | 70.0 | 26.0 |
| PRXS-KS00490T | 4.9 | 6.0 | 70.0 | 26.0 |
| PRXS-KS00500T | 5.0 | 6.0 | 70.0 | 26.0 |
| PRXS-KS00510T | 5.1 | 6.0 | 70.0 | 26.0 |
| PRXS-KS00520T | 5.2 | 6.0 | 70.0 | 26.0 |
| PRXS-KS00530T | 5.3 | 6.0 | 70.0 | 26.0 |
| PRXS-KS00540T | 5.4 | 6.0 | 70.0 | 28.0 |
| PRXS-KS00550T | 5.5 | 6.0 | 70.0 | 28.0 |
| PRXS-KS00560T | 5.6 | 6.0 | 70.0 | 28.0 |
| PRXS-KS00570T | 5.7 | 6.0 | 70.0 | 28.0 |
| PRXS-KS00580T | 5.8 | 6.0 | 70.0 | 28.0 |

| Series PRXS-KST | Tool Dimensions (mm) | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| PRXS-KS00590T | 5.9 | 6.0 | 70.0 | 28.0 |
| PRXS-KS00600T | 6.0 | 8.0 | 80.0 | 31.0 |
| PRXS-KS00610T | 6.1 | 8.0 | 80.0 | 31.0 |
| PRXS-KS00620T | 6.2 | 8.0 | 80.0 | 31.0 |
| PRXS-KS00630T | 6.3 | 8.0 | 80.0 | 31.0 |
| PRXS-KS00640T | 6.4 | 8.0 | 80.0 | 31.0 |
| PRXS-KS00650T | 6.5 | 8.0 | 80.0 | 31.0 |
| PRXS-KS00660T | 6.6 | 8.0 | 80.0 | 31.0 |
| PRXS-KS00670T | 6.7 | 8.0 | 80.0 | 31.0 |
| PRXS-KS00680T | 6.8 | 8.0 | 80.0 | 34.0 |
| PRXS-KS00690T | 6.9 | 8.0 | 80.0 | 34.0 |
| PRXS-KS00700T | 7.0 | 8.0 | 80.0 | 34.0 |
| PRXS-KS00710T | 7.1 | 8.0 | 80.0 | 34.0 |
| PRXS-KS00720T | 7.2 | 8.0 | 80.0 | 34.0 |
| PRXS-KS00730T | 7.3 | 8.0 | 80.0 | 34.0 |
| PRXS-KS00740T | 7.4 | 8.0 | 80.0 | 34.0 |
| PRXS-KS00750T | 7.5 | 8.0 | 80.0 | 34.0 |
| PRXS-KS00760T | 7.6 | 8.0 | 80.0 | 37.0 |
| PRXS-KS00770T | 7.7 | 8.0 | 80.0 | 37.0 |
| PRXS-KS00780T | 7.8 | 8.0 | 80.0 | 37.0 |
| PRXS-KS00790T | 7.9 | 8.0 | 80.0 | 37.0 |
| PRXS-KS00800T | 8.0 | 10.0 | 90.0 | 37.0 |
| PRXS-KS00810T | 8.1 | 10.0 | 90.0 | 37.0 |
| PRXS-KS00820T | 8.2 | 10.0 | 90.0 | 37.0 |
| PRXS-KS00830T | 8.3 | 10.0 | 90.0 | 37.0 |
| PRXS-KS00840T | 8.4 | 10.0 | 90.0 | 37.0 |
| PRXS-KS00850T | 8.5 | 10.0 | 90.0 | 37.0 |
| PRXS-KS00860T | 8.6 | 10.0 | 90.0 | 40.0 |
| PRXS-KS00870T | 8.7 | 10.0 | 90.0 | 40.0 |
| PRXS-KS00880T | 8.8 | 10.0 | 90.0 | 40.0 |
| PRXS-KS00890T | 8.9 | 10.0 | 90.0 | 40.0 |
| PRXS-KS00900T | 9.0 | 10.0 | 90.0 | 40.0 |
| PRXS-KS00910T | 9.1 | 10.0 | 90.0 | 40.0 |
| PRXS-KS00920T | 9.2 | 10.0 | 90.0 | 40.0 |
| PRXS-KS00930T | 9.3 | 10.0 | 90.0 | 40.0 |
| PRXS-KS00940T | 9.4 | 10.0 | 90.0 | 40.0 |
| PRXS-KS00950T | 9.5 | 10.0 | 90.0 | 40.0 |
| PRXS-KS00960T | 9.6 | 10.0 | 90.0 | 43.0 |
| PRXS-KS00970T | 9.7 | 10.0 | 90.0 | 43.0 |
| PRXS-KS00980T | 9.8 | 10.0 | 90.0 | 43.0 |
| PRXS-KS00990T | 9.9 | 10.0 | 90.0 | 43.0 |
| PRXS-KS01000T | 10.0 | 12.0 | 100.0 | 43.0 |
| PRXS-KS01010T | 10.1 | 12.0 | 100.0 | 43.0 |
| PRXS-KS01020T | 10.2 | 12.0 | 100.0 | 43.0 |
| PRXS-KS01030T | 10.3 | 12.0 | 100.0 | 43.0 |
| PRXS-KS01040T | 10.4 | 12.0 | 100.0 | 43.0 |
| PRXS-KS01050T | 10.5 | 12.0 | 100.0 | 43.0 |
| PRXS-KS01060T | 10.6 | 12.0 | 100.0 | 43.0 |
| PRXS-KS01070T | 10.7 | 12.0 | 100.0 | 47.0 |

# HSSCo Platinum Drills Series PRXS-KST

X Shape | CO HSS | 125° | TiN






| Series PRXS-KST | Tool Dimensions (mm) | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| PRXS-KS01080T | 10.8 | 12.0 | 100.0 | 47.0 |
| PRXS-KS01090T | 10.9 | 12.0 | 100.0 | 47.0 |
| PRXS-KS01100T | 11.0 | 12.0 | 100.0 | 47.0 |
| PRXS-KS01110T | 11.1 | 12.0 | 100.0 | 47.0 |
| PRXS-KS01120T | 11.2 | 12.0 | 100.0 | 47.0 |
| PRXS-KS01130T | 11.3 | 12.0 | 100.0 | 47.0 |
| PRXS-KS01140T | 11.4 | 12.0 | 100.0 | 47.0 |
| PRXS-KS01150T | 11.5 | 12.0 | 100.0 | 47.0 |
| PRXS-KS01160T | 11.6 | 12.0 | 100.0 | 47.0 |
| PRXS-KS01170T | 11.7 | 12.0 | 100.0 | 47.0 |
| PRXS-KS01180T | 11.8 | 12.0 | 100.0 | 47.0 |

| Series PRXS-KST | Tool Dimensions (mm) | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| PRXS-KS01190T | 11.9 | 12.0 | 100.0 | 51.0 |
| PRXS-KS01200T | 12.0 | 12.0 | 100.0 | 51.0 |
| PRXS-KS01210T | 12.1 | 12.0 | 100.0 | 51.0 |
| PRXS-KS01220T | 12.2 | 12.0 | 100.0 | 51.0 |
| PRXS-KS01230T | 12.3 | 12.0 | 100.0 | 51.0 |
| PRXS-KS01240T | 12.4 | 12.0 | 100.0 | 51.0 |
| PRXS-KS01250T | 12.5 | 12.0 | 100.0 | 51.0 |
| PRXS-KS01260T | 12.6 | 12.0 | 100.0 | 51.0 |
| PRXS-KS01270T | 12.7 | 12.0 | 100.0 | 51.0 |
| PRXS-KS01280T | 12.8 | 12.0 | 100.0 | 51.0 |
| PRXS-KS01290T | 12.9 | 12.0 | 100.0 | 51.0 |
| PRXS-KS01300T | 13.0 | 12.0 | 100.0 | 51.0 |

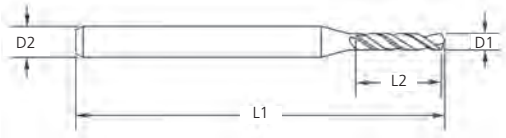
P184



# HSSCo Platinum Drills Series PRXS-KMT

X Shape | CO HSS | 125° | TiN





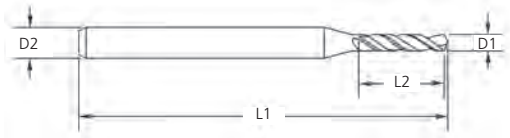

| Series PRXS-MST | Tool Dimensions (mm) | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| PRXS-KM00100T | 1.0 | 3.0 | 55.0 | 16.0 |
| PRXS-KM00110T | 1.1 | 3.0 | 55.0 | 18.0 |
| PRXS-KM00120T | 1.2 | 3.0 | 55.0 | 18.0 |
| PRXS-KM00130T | 1.3 | 3.0 | 55.0 | 20.0 |
| PRXS-KM00140T | 1.4 | 3.0 | 55.0 | 21.0 |
| PRXS-KM00150T | 1.5 | 3.0 | 55.0 | 21.0 |
| PRXS-KM00160T | 1.6 | 3.0 | 55.0 | 22.0 |
| PRXS-KM00170T | 1.7 | 3.0 | 55.0 | 22.0 |
| PRXS-KM00180T | 1.8 | 3.0 | 55.0 | 23.0 |
| PRXS-KM00190T | 1.9 | 3.0 | 55.0 | 23.0 |
| PRXS-KM00200T | 2.0 | 3.0 | 55.0 | 24.0 |
| PRXS-KM00210T | 2.1 | 3.0 | 55.0 | 24.0 |
| PRXS-KM00220T | 2.2 | 3.0 | 55.0 | 27.0 |
| PRXS-KM00230T | 2.3 | 3.0 | 55.0 | 27.0 |
| PRXS-KM00240T | 2.4 | 3.0 | 55.0 | 30.0 |
| PRXS-KM00250T | 2.5 | 3.0 | 55.0 | 30.0 |

| Series PRXS-MST | Tool Dimensions (mm) | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| PRXS-KM00260T | 2.6 | 3.0 | 55.0 | 30.0 |
| PRXS-KM00270T | 2.7 | 3.0 | 55.0 | 33.0 |
| PRXS-KM00280T | 2.8 | 3.0 | 55.0 | 33.0 |
| PRXS-KM00290T | 2.9 | 3.0 | 55.0 | 33.0 |
| PRXS-KM00300T | 3.0 | 4.0 | 70.0 | 33.0 |
| PRXS-KM00310T | 3.1 | 4.0 | 70.0 | 36.0 |
| PRXS-KM00320T | 3.2 | 4.0 | 70.0 | 36.0 |
| PRXS-KM00330T | 3.3 | 4.0 | 70.0 | 36.0 |
| PRXS-KM00340T | 3.4 | 4.0 | 70.0 | 39.0 |
| PRXS-KM00350T | 3.5 | 4.0 | 70.0 | 39.0 |
| PRXS-KM00360T | 3.6 | 4.0 | 70.0 | 39.0 |
| PRXS-KM00370T | 3.7 | 4.0 | 70.0 | 39.0 |
| PRXS-KM00380T | 3.8 | 4.0 | 70.0 | 43.0 |
| PRXS-KM00390T | 3.9 | 4.0 | 70.0 | 43.0 |
| PRXS-KM00400T | 4.0 | 6.0 | 90.0 | 43.0 |
| PRXS-KM00410T | 4.1 | 6.0 | 90.0 | 43.0 |

# HSSCo Platinum Drills Series PRXS-KMT






| Series PRXS-MST | Tool Dimensions (mm) | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| PRXS-KM00420T | 4.2 | 6.0 | 90.0 | 43.0 |
| PRXS-KM00430T | 4.3 | 6.0 | 90.0 | 47.0 |
| PRXS-KM00440T | 4.4 | 6.0 | 90.0 | 47.0 |
| PRXS-KM00450T | 4.5 | 6.0 | 90.0 | 47.0 |
| PRXS-KM00460T | 4.6 | 6.0 | 90.0 | 47.0 |
| PRXS-KM00470T | 4.7 | 6.0 | 90.0 | 47.0 |
| PRXS-KM00480T | 4.8 | 6.0 | 90.0 | 52.0 |
| PRXS-KM00490T | 4.9 | 6.0 | 90.0 | 52.0 |
| PRXS-KM00500T | 5.0 | 6.0 | 90.0 | 52.0 |
| PRXS-KM00510T | 5.1 | 6.0 | 90.0 | 52.0 |
| PRXS-KM00520T | 5.2 | 6.0 | 90.0 | 52.0 |
| PRXS-KM00530T | 5.3 | 6.0 | 90.0 | 52.0 |
| PRXS-KM00540T | 5.4 | 6.0 | 90.0 | 57.0 |
| PRXS-KM00550T | 5.5 | 6.0 | 90.0 | 57.0 |
| PRXS-KM00560T | 5.6 | 6.0 | 90.0 | 57.0 |
| PRXS-KM00570T | 5.7 | 6.0 | 90.0 | 57.0 |
| PRXS-KM00580T | 5.8 | 6.0 | 90.0 | 57.0 |
| PRXS-KM00590T | 5.9 | 6.0 | 90.0 | 57.0 |
| PRXS-KM00600T | 6.0 | 8.0 | 110.0 | 63.0 |
| PRXS-KM00610T | 6.1 | 8.0 | 110.0 | 63.0 |
| PRXS-KM00620T | 6.2 | 8.0 | 110.0 | 63.0 |
| PRXS-KM00630T | 6.3 | 8.0 | 110.0 | 63.0 |
| PRXS-KM00640T | 6.4 | 8.0 | 110.0 | 63.0 |
| PRXS-KM00650T | 6.5 | 8.0 | 110.0 | 63.0 |
| PRXS-KM00660T | 6.6 | 8.0 | 110.0 | 63.0 |
| PRXS-KM00670T | 6.7 | 8.0 | 110.0 | 69.0 |
| PRXS-KM00680T | 6.8 | 8.0 | 110.0 | 69.0 |
| PRXS-KM00690T | 6.9 | 8.0 | 110.0 | 69.0 |
| PRXS-KM00700T | 7.0 | 8.0 | 110.0 | 69.0 |
| PRXS-KM00710T | 7.1 | 8.0 | 110.0 | 69.0 |
| PRXS-KM00720T | 7.2 | 8.0 | 110.0 | 69.0 |
| PRXS-KM00730T | 7.3 | 8.0 | 110.0 | 69.0 |
| PRXS-KM00740T | 7.4 | 8.0 | 110.0 | 69.0 |
| PRXS-KM00750T | 7.5 | 8.0 | 110.0 | 69.0 |
| PRXS-KM00760T | 7.6 | 8.0 | 110.0 | 75.0 |
| PRXS-KM00770T | 7.7 | 8.0 | 110.0 | 75.0 |
| PRXS-KM00780T | 7.8 | 8.0 | 110.0 | 75.0 |
| PRXS-KM00790T | 7.9 | 8.0 | 110.0 | 75.0 |
| PRXS-KM00800T | 8.0 | 10.0 | 130.0 | 75.0 |
| PRXS-KM00810T | 8.1 | 10.0 | 130.0 | 75.0 |
| PRXS-KM00820T | 8.2 | 10.0 | 130.0 | 75.0 |
| PRXS-KM00830T | 8.3 | 10.0 | 130.0 | 75.0 |
| PRXS-KM00840T | 8.4 | 10.0 | 130.0 | 75.0 |
| PRXS-KM00850T | 8.5 | 10.0 | 130.0 | 75.0 |
| PRXS-KM00860T | 8.6 | 10.0 | 130.0 | 81.0 |

| Series PRXS-MST | Tool Dimensions (mm) | | | |
|---|---|---|---|---|
| Tool No | Ø D1 | Ø D2 | L1 | L2 |
| PRXS-KM00870T | 8.7 | 10.0 | 130.0 | 81.0 |
| PRXS-KM00880T | 8.8 | 10.0 | 130.0 | 81.0 |
| PRXS-KM00890T | 8.9 | 10.0 | 130.0 | 81.0 |
| PRXS-KM00900T | 9.0 | 10.0 | 130.0 | 81.0 |
| PRXS-KM00910T | 9.1 | 10.0 | 130.0 | 81.0 |
| PRXS-KM00920T | 9.2 | 10.0 | 130.0 | 81.0 |
| PRXS-KM00930T | 9.3 | 10.0 | 130.0 | 81.0 |
| PRXS-KM00940T | 9.4 | 10.0 | 130.0 | 81.0 |
| PRXS-KM00950T | 9.5 | 10.0 | 130.0 | 81.0 |
| PRXS-KM00960T | 9.6 | 10.0 | 130.0 | 81.0 |
| PRXS-KM00970T | 9.7 | 10.0 | 130.0 | 81.0 |
| PRXS-KM00980T | 9.8 | 10.0 | 130.0 | 81.0 |
| PRXS-KM00990T | 9.9 | 10.0 | 130.0 | 81.0 |
| PRXS-KM01000T | 10.0 | 12.0 | 150.0 | 87.0 |
| PRXS-KM01010T | 10.1 | 12.0 | 150.0 | 87.0 |
| PRXS-KM01020T | 10.2 | 12.0 | 150.0 | 87.0 |
| PRXS-KM01030T | 10.3 | 12.0 | 150.0 | 87.0 |
| PRXS-KM01040T | 10.4 | 12.0 | 150.0 | 87.0 |
| PRXS-KM01050T | 10.5 | 12.0 | 150.0 | 87.0 |
| PRXS-KM01060T | 10.6 | 12.0 | 150.0 | 87.0 |
| PRXS-KM01070T | 10.7 | 12.0 | 150.0 | 94.0 |
| PRXS-KM01080T | 10.8 | 12.0 | 150.0 | 94.0 |
| PRXS-KM01090T | 10.9 | 12.0 | 150.0 | 94.0 |
| PRXS-KM01100T | 11.0 | 12.0 | 150.0 | 94.0 |
| PRXS-KM01110T | 11.1 | 12.0 | 150.0 | 94.0 |
| PRXS-KM01120T | 11.2 | 12.0 | 150.0 | 94.0 |
| PRXS-KM01130T | 11.3 | 12.0 | 150.0 | 94.0 |
| PRXS-KM01140T | 11.4 | 12.0 | 150.0 | 94.0 |
| PRXS-KM01150T | 11.5 | 12.0 | 150.0 | 94.0 |
| PRXS-KM01160T | 11.6 | 12.0 | 150.0 | 94.0 |
| PRXS-KM01170T | 11.7 | 12.0 | 150.0 | 94.0 |
| PRXS-KM01180T | 11.8 | 12.0 | 150.0 | 94.0 |
| PRXS-KM01190T | 11.9 | 12.0 | 150.0 | 100.0 |
| PRXS-KM01200T | 12.0 | 12.0 | 150.0 | 100.0 |
| PRXS-KM01210T | 12.1 | 12.0 | 150.0 | 100.0 |
| PRXS-KM01220T | 12.2 | 12.0 | 150.0 | 100.0 |
| PRXS-KM01230T | 12.3 | 12.0 | 150.0 | 100.0 |
| PRXS-KM01240T | 12.4 | 12.0 | 150.0 | 100.0 |
| PRXS-KM01250T | 12.5 | 12.0 | 150.0 | 100.0 |
| PRXS-KM01260T | 12.6 | 12.0 | 150.0 | 100.0 |
| PRXS-KM01270T | 12.7 | 12.0 | 150.0 | 100.0 |
| PRXS-KM01280T | 12.8 | 12.0 | 150.0 | 100.0 |
| PRXS-KM01290T | 12.9 | 12.0 | 150.0 | 100.0 |
| PRXS-KM01300T | 13.0 | 12.0 | 150.0 | 100.0 |

P184

# Twister® High Performance GP Drills

## Series HPDSS & HPDCS 3xD, Series HPDSR & HPDCR 5xD Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)

| Workpiece Material Group | | Material Type | HPDSS 3xD Low | HPDSS 3xD Mid | HPDSS 3xD High | HPDCS 3xD - Through Coolant Low | HPDCS 3xD - Through Coolant Mid | HPDCS 3xD - Through Coolant High |
|---|---|---|---|---|---|---|---|---|
| | | | Vc-m/min | | | Vc-m/min | | |
| Steels | P | Low Carbon Steels ≤180HB | 140 | **160** | 180 | 170 | **190** | 210 |
| | | Med Carbon / Alloy Steels 180-350HB | 80 | **90** | 100 | 90 | **110** | 130 |
| | | Pre-Hardened Steels 35-45HRC | 40 | **50** | 60 | 60 | **70** | 80 |
| Stainless Steels | M | Martensitic Stainless - 400 Series | 90 | **100** | 110 | 100 | **120** | 140 |
| | | Austenitic Stainless - 300 Series | 40 | **50** | 60 | 60 | **70** | 80 |
| Cast Irons | K | Grey Cast Iron | 100 | **120** | 140 | 130 | **150** | 170 |
| | | Ductile Cast Iron | 50 | **60** | 70 | 70 | **80** | 90 |

RPM Formula For Metric Drills - RPM = (Vc x 318) / Drill Ø D1

| Workpiece Material Group | | Material Type | HPDSR 5xD Low | HPDSR 5xD Mid | HPDSR 5xD High | HPDCR 5xD - Through Coolant Low | HPDCR 5xD - Through Coolant Mid | HPDCR 5xD - Through Coolant High |
|---|---|---|---|---|---|---|---|---|
| | | | Vc-m/min | | | Vc-m/min | | |
| Steels | P | Low Carbon Steels ≤180HB | 130 | **150** | 170 | 160 | **180** | 200 |
| | | Med Carbon / Alloy Steels 180-350HB | 70 | **80** | 90 | 90 | **100** | 110 |
| | | Pre-Hardened Steels 35-45HRC | 40 | **50** | 60 | 50 | **60** | 70 |
| Stainless Steels | M | Martensitic Stainless - 400 Series | 80 | **90** | 100 | 90 | **110** | 130 |
| | | Austenitic Stainless - 300 Series | 40 | **50** | 60 | 50 | **60** | 70 |
| Cast Irons | K | Grey Cast Iron | 90 | **110** | 130 | 120 | **140** | 160 |
| | | Ductile Cast Iron | 40 | **50** | 60 | 60 | **70** | 80 |

RPM Formula For Metric Drills - RPM = (Vc x 318) / Drill Ø D1

| Workpiece Material Group | | Material Type | Drill Diameter (mm) 3.0 | 4.0 | 5.0 | 6.0 | 8.0 | 10.0 | 12.0 | 16.0 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Feed (mm/rev) | | | | | | | |
| Steels | P | Low Carbon Steels ≤180HB | 0.145 | 0.181 | 0.181 | 0.226 | 0.285 | 0.362 | 0.3632 | 0.453 |
| | | Med Carbon / Alloy Steels 180-350HB | | | | | | | | |
| | | Pre-Hardened Steels 35-45HRC | | | | | | | | |
| Stainless Steels | M | Martensitic Stainless - 400 Series | 0.07 | 0.09 | 0.09 | 0.11 | 0.14 | 0.18 | 0.18 | 0.225 |
| | | Austenitic Stainless - 300 Series | | | | | | | | |
| Cast Irons | K | Grey Cast Iron | 0.155 | 0.193 | 0.217 | 0.305 | 0.305 | 0.386 | 0.435 | 0.532 |
| | | Ductile Cast Iron | | | | | | | | |

Feedrate Formula For Metric Drills - Feed = RPM x mm/rev

# Twister® X-AL High Performance 3 Flute - 4-5xD

## Series 229 Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)

| Workpiece Material Groups | Example Materials | Vc (m/min) | Tool Diameter (mm) 1.5 | 3 | 6 | 12 | 20 | 25 |
|---|---|---|---|---|---|---|---|---|
| | | | Feed (mm/rev) | | | | | |
| Titanium Alloys | Ti6Al4V | 30 | 0.013 | 0.05 | 0.11 | 0.15 | 0.2 | 0.25 |
| Aluminium < 10% Si | 6061/7075 | 215 | 0.08 | 0.20 | 0.31 | 0.45 | 0.61 | 0.76 |
| Aluminium > 10% Si | - | 155 | 0.05 | 0.08 | 0.15 | 0.25 | 0.31 | 0.35 |
| Brass/Copper | - | 120 | 0.05 | 0.08 | 0.15 | 0.25 | 0.31 | 0.35 |
| Plastics | - | 90 | 0.05 | 0.08 | 0.15 | 0.25 | 0.31 | 0.35 |

RPM Formula For Metric Drills Only - RPM = (Vc x 318.0) ÷ Drill Ø D[1]
Feedrate Formula For Metric Drills - Feed = RPM x mm/rev

# Twister® Micro Drill

## Series 300 Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)

| Workpiece Material Groups | | Examples | Vc (m/min) | Tool Diameter(mm) | | | |
|---|---|---|---|---|---|---|---|
| | | | | 0.5 | 1.0 | 2.0 | 3.0 |
| | | | | Feed (mm/rev) | | | |
| Steels | P | Low Carbon Steels 1018 | 55 | .0170 | .0250 | .0500 | .0760 |
| | | Alloy Steels (up to 35 Rc) 4140 | 45 | 0170 | .0250 | .0500 | .0760 |
| Cast Irons | K | Gray Cast Iron A48 Class 20/G4000 | 85 | 0170 | .0250 | .0500 | .0760 |
| | | Ductile Cast Iron A536/60-40-18 | 55 | 0170 | .0250 | .0500 | .0760 |
| Non-Ferrous | N | Aluminum (<10% Si) 6061-T6/7075-T6 | 120 | 0170 | .0250 | .0500 | .0760 |
| | | Aluminum (>10% Si) Copper/Brass | 75 | 0170 | .0250 | .0500 | .0760 |
| | | Plastic | 90 | 0170 | .0250 | .0500 | .0760 |

RPM Formula For Metric Drills Only - RPM = (Vc x 318.0) ÷ Drill Ø D[1]
Feedrate Formula For Metric Drills - Feed = RPM x mm/rev

## Series 302 Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)

| Workpiece Material Groups | | Examples | Vc (m/min) | Tool Diameter(mm) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | < .76 | .77-.92 | .93-1.02 | 1.03-1.30 | > 1.31 |
| | | | | Feed (mm/rev) | | | | |
| Steels | P | Low Carbon Steels 1018 | 90 | .005-.015 | 0.02 | 0.025 | 0.036 | 0.038 |
| | | Alloy Steels (up to 35 Rc) 4140 | 70 | .005-.015 | 0.02 | 0.025 | 0.036 | 0.038 |
| | | Alloy Steels (36-45 Rc) 4140 | 60 | .005-.015 | 0.02 | 0.025 | 0.036 | 0.038 |
| Austenitic | M | 304/316 | 60 | .005-.010 | 0.015 | 0.02 | 0.025 | 0.03 |
| Stainless Steels | | Free Machining | 55 | .005-.010 | 0.015 | 0.02 | 0.025 | 0.03 |
| | | Ferritic Martensitic | 30 | .005-.015 | 0.02 | 0.025 | 0.036 | 0.038 |
| Precipitation Hardened Stainless Steels | | 17-4 PH | 25 | .005-.015 | 0.02 | 0.025 | 0.036 | 0.038 |
| Cast Irons | K | Gray Cast Iron A48 Class 20/G4000 | 120 | .005-.015 | 0.02 | 0.025 | 0.036 | 0.038 |
| | | Ductile Cast Iron A536/60-40-18 | 110 | .005-.015 | 0.02 | 0.025 | 0.036 | 0.038 |
| Special Alloys | S | Titanium 6AL-4V | 20 | .005-.010 | 0.015 | 0.02 | 0.025 | 0.03 |
| | | High Temp Alloys Inconel/Hastelloy/ Waspelloy | 15 | .005-.010 | 0.015 | 0.02 | 0.025 | 0.03 |
| Hardened Steels | H | >45 Rc A2/52100 | 55 | .005-.015 | 0.02 | 0.025 | 0.036 | 0.038 |
| Non-Ferrous | N | Aluminum (<10% Si) | 140 | .005-.015 | 0.02 | 0.025 | 0.036 | 0.038 |
| | | Aluminum (>10% Si) | 100 | .005-.015 | 0.02 | 0.025 | 0.036 | 0.038 |
| | | Plastics | 170 | .005-.015 | 0.02 | 0.025 | 0.036 | 0.038 |
| | | Composites/Fiber Reinforced Materials/ Circuit Boards | 200 | .013-.038 | 0.051 | 0.076 | 0.102 | 0.127 |

RPM Formula For Metric Drills Only - RPM = (Vc x 318.0) ÷ Drill Ø D[1]

Feedrate Formula For Metric Drills - Feed = RPM x mm/rev

# Twister® Hi-Roc® Drill - 3xD

## Series 200 Metric Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)

| Workpiece Material Groups | | Examples | Vc (m/min) | Tool Diameter (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1.0 | 1.5 | 3.0 | 6.0 | 10.0 | 12.0 | 16.0 | 20.0 |
| | | | | Feed (mm/rev) | | | | | | | |
| Steels | P | Low Carbon Steels 1018 | 55 | .0060 | .0130 | .0510 | .1020 | .1270 | .1520 | .1750 | .2030 |
| | | Alloy Steels (up to 35 Rc) 4140 | 45 | .0060 | .0130 | .0510 | .1020 | .1270 | .1520 | .1750 | .2030 |
| | | Alloy Steels (36-45 Rc) 4140 | 30 | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 |
| Austenitic | M | 304/316 | 40 | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 |
| Precipitation Hardened Stainless Steels | M | 17-4 PH | 20 | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 |
| Special Alloys | S | Titanium 6AL-4V | 25 | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 |
| | | High Temp Alloys Inconel/Hastelloy/ Waspelloy | 25 | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 |
| Hardened Steels | H | >45 Rc A2/52100 | 20 | .0130 | .0250 | .0250 | .0250 | .0500 | .0500 | .0500 | .0760 |
| Non-Ferrous | N | Plastic | 90 | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 |
| | | Kevlar/Graphite | 115 | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 |
| | | Glass/Ceramic | 25 | .0130 | .0250 | .0250 | .0250 | .0500 | .0500 | .0500 | .0760 |

# Twister® Series 205 207 224 Metric

| Workpiece Material Groups | | Examples | Series | | |
|---|---|---|---|---|---|
| | | | 205 | 207 | 224 |
| | | | Vc (m/min) | | |
| Steels | P | Low Carbon Steels 1018 | 55 | - | 55 |
| | | Alloy Steels (up to 35 Rc) 4140 | 45 | - | 50 |
| | | Alloy Steels (36-45 Rc) 4140 | 35 | - | 45 |
| Austenitic | M | 304/316 | 45 | - | 40 |
| Precipitation Hardened Stainless Steels | M | 17-4 PH | 20 | - | - |
| Cast Irons | K | Gray Cast Iron A48 Class 20/G4000 | 55 | - | 85 |
| | | Ductile Cast Iron A536/60-40-18 | 55 | - | 55 |
| Special Alloys | S | Titanium 6AL-4V | 25 | - | - |
| | | High Temp Alloys Inconel/Hastelloy/ Waspelloy | 20 | - | - |
| Hardened Steels | H | >45 Rc A2/52100 | 15 | - | - |
| Non-Ferrous | N | Plastic | 90 | 90 | 120 |
| | | Kevlar/Graphite | - | 115 | 120 |

RPM Formula For Metric Drills Only - RPM = (Vc x 318.0) ÷ Drill Ø D[1]

# Twister® Series 205 207 224 Metric

Recommended cutting data | Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)

| Workpiece Material Groups | | Examples | Tool Diameter (mm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1.0 | 1.5 | 3.0 | 6.0 | 10.0 | 12.0 | 16.0 | 20.0 | 26.0 |
| | | | Feed (mm/rev) | | | | | | | | |
| Steels | P | Low Carbon Steels 1018 | .0250 | .0500 | .0760 | .1520 | .2030 | .2540 | .2750 | .3050 | .3560 |
| | | Alloy Steels (up to 35 Rc) 4140 | .0250 | .0500 | .0760 | .1520 | .2030 | .2540 | .2750 | .3050 | .3560 |
| | | Alloy Steels (36-45 Rc) 4140 | .0250 | .0500 | .0760 | .1520 | .2030 | .2540 | .2750 | .3050 | .3560 |
| Austenitic | M | 304/316 | .0250 | .0500 | .0760 | .1520 | .2030 | .2540 | .2750 | .3050 | .3560 |
| Precipitation Hardened Stainless Steels | | 17-4 PH | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 | .2540 |
| Cast Irons | K | Gray Cast Iron A48 Class 20/G4000 | .0250 | .0500 | .0760 | .1520 | .2030 | .2540 | .2750 | .3050 | .3560 |
| | | Ductile Cast Iron A536/60-40-18 | .0250 | .0500 | .0760 | .1520 | .2030 | .2540 | .2750 | .3050 | .3560 |
| Special Alloys | S | Titanium 6AL-4V | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 | .2540 |
| | | High Temp Alloys Inconel/Hastelloy/ Waspelloy | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 | .2540 |
| Hardened Steels | H | >45 Rc A2/52100 | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 | .2540 |
| Non-Ferrous | N | Plastic | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 | .2540 |
| | | Kevlar/Graphite | .0060 | .0127 | .0500 | .0760 | .1010 | .1520 | .2030 | .2250 | .2540 |

Feedrate Formula For Metric Drills - Feed = RPM x mm/rev

# Twister® Series 402 403 404 Metric

| Workpiece Material Groups | | Examples | Vc (m/min) | Tool Diameter (mm) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 1.0 | 1.5 | 3.0 | 6.0 | 10.0 | 12.0 |
| | | | | Feed (mm/rev) | | | | | |
| Steels | P | Low Carbon Steels 1018 | 55 | .0125 | .0250 | .0380 | .0760 | .1020 | .1270 |
| | | Alloy Steels (up to 35 Rc) 4140 | 50 | .0125 | .0250 | .0380 | .0760 | .1020 | .1270 |
| | | Alloy Steels (36-45 Rc) 4140 | 45 | .0125 | .0250 | .0380 | .0760 | .1020 | .1270 |
| Stainless Steels | M | 304/316 | 40 | .0125 | .0250 | .0380 | .0760 | .1020 | .1270 |
| | | 17-4 PH | 20 | .0125 | .0250 | .0380 | .0760 | .1020 | .1270 |
| Cast Irons | K | Gray Cast Iron A48 Class 20/G4000 | 85 | .0125 | .0250 | .0380 | .0760 | .1020 | .1270 |
| | | Ductile Cast Iron A536/60-40-18 | 55 | .0125 | .0250 | .0380 | .0760 | .1020 | .1270 |
| Special Alloys | S | Titanium 6AL-4V | 25 | .0125 | .0250 | .0380 | .0760 | .1020 | .1270 |
| | | High Temp Alloys Inconel/Hastelloy/Waspelloy | 10 | .0125 | .0250 | .0380 | .0760 | .1020 | .1270 |
| Hardened Steels | H | >45 Rc A2/52100 | 15 | .0125 | .0250 | .0380 | .0760 | .1020 | .1270 |

RPM Formula For Metric Drills Only - RPM = (Vc x 318.0) ÷ Drill Ø D[1]
Feedrate Formula For Metric Drills - Feed = RPM x mm/rev

# HSSCo Platinum Drills Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio raccomandati | Zalecane dane o cięciu (Zalacane paramerty skrawania)



## Precision Cut PRM-KSN Multi-Purpose, short length

Coupe de précision PRM-KSN Multifonctions, courte longueur | Präzisionsschnitt PRM-KSN Mehrzweckwerkzeug, kurze Länge
Taglio di precisione PRM-KSN Universale, tipo corto | Precyzyjne cięcie (wiercenie) PRM-KSN Uniwersalne, krótkie

| Workpiece | Stainless Steel | | Carbon Steel | | Alloy Steel Tools Steel | | Alloy Steel Die Steel | | Copper Alloy | | Aluminum alloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SUS 420, 440, 316 (30-40 HRC) | | SS400, S45C, FC (Up to 25 HRC) | | SCM, SK (25-35 HRC) | | SCM, SK (35-40 HRC) | | | | | |
| Diameter (mm) | rpm | mm/ rev | rpm | mm/ rev | rpm | mm/ rev | rpm | mm/ rev | rpm | mm/ rev | rpm | mm/ rev |
| 0.3 | 12,000 | 0.01 | 20,000 | 0.01 | 19,000 | 0.01 | 15,000 | 0.01 | 20,000 | 0.01 | 20,000 | 0.01 |
| 0.4 | 9,500 | 0.01 | 16,000 | 0.01 | 14,000 | 0.01 | 11,000 | 0.01 | 16,000 | 0.02 | 20,000 | 0.02 |
| 0.5 | 7,700 | 0.02 | 13,000 | 0.02 | 12,000 | 0.02 | 9,000 | 0.01 | 12,500 | 0.03 | 20,000 | 0.03 |
| 0.6 | 6,400 | 0.02 | 11,000 | 0.02 | 10,000 | 0.02 | 7,400 | 0,02 | 10,500 | 0.03 | 20,000 | 0.04 |
| 0.7 | 5,500 | 0.03 | 9,000 | 0.03 | 8,800 | 0.03 | 6,400 | 0.02 | 9,000 | 0.04 | 18,000 | 0.05 |
| 0.8 | 4,400 | 0.03 | 8,000 | 0.04 | 7,700 | 0.03 | 5,600 | 0.03 | 8,000 | 0.04 | 16,000 | 0.05 |
| 0.9 | 4,200 | 0.04 | 7,600 | 0.04 | 6,800 | 0.03 | 5,000 | 0.03 | 7,500 | 0.04 | 15,500 | 0.06 |
| 1.0 | 4,000 | 0.04 | 7,200 | 0.05 | 6,200 | 0.04 | 4,500 | 0.03 | 7,000 | 0.05 | 15,500 | 0.06 |



## Precision Cut PRXS-KST X Shape, for stainless steel drilling, short length

Coupe de précision PRXS-KST Forme X, pour le perçage de l'acier inoxydable, courte longueur
Präzisionsschnitt PRXS-KST X-Form, zum Bohren von rostfreiem Stahl, kurze Länge
Taglio di precisione PRXS-KST Forma X, per foratura dell' acciaio inossidabile, tipo corto
Precyzyjne wiertlo PRXS-KST kształt X, do wiercenia w stali nierdzewnej, krótkie (krótka długość)



## Precision Cut PRXS-KMT X Shape, for stainless steel drilling, medium length

Coupe de précision PRXS-KMT Forme X, pour le perçage de l'acier inoxydable, longueur moyenne
Präzisionsschnitt PRXS-KMT X-Form, zum Bohren von rostfreiem Stahl, mittlere Länge
Taglio di precisione PRXS-KMT Forma X, per foratura dell' acciaio inossidabile, tipo medio
Precyzyjne wiertlo PRXS-KMT kształt X, do wiercenia w stali nierdzewnej, średni (średnia długość)

| Workpiece | Stainless Steel | | | | | | | | Steel | | Brass & Copper Alloy | | Aluminum Alloy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AISI SUS 304 SUS 316 | | AISI SUS 420 SUS 440 | | AISI SUS 430 SUS 330 | | AISI SUS 630 SUS 631 | | S45C SS40 | | C1020 2600 | | A5052 ADC 12 | |
| Diameter (mm) | rpm | mm/ rev | rpm | mm/ rev | rpm | mm/ rev | rpm | mm/ rev | rpm | mm/ rev | rpm | mm/ rev | rpm | mm/ rev |
| 2.0 | 2,700 | 0.06 | 2,800 | 0.09 | 3,000 | 0.09 | 1,600 | 0.04 | 5,500 | 0.09 | 4,500 | 0.09 | 9,000 | 0.09 |
| 3.0 | 1,800 | 0.08 | 1,900 | 0.13 | 2,000 | 0.13 | 1,100 | 0.05 | 3,700 | 0.13 | 2,800 | 0.13 | 2,800 | 0.13 |
| 4.0 | 1,350 | 0.10 | 1,400 | 0.15 | 1,500 | 0.15 | 800 | 0.07 | 2,800 | 0.15 | 2,200 | 0.15 | 2,200 | 0.15 |
| 5.0 | 1,080 | 0.12 | 1,200 | 0.18 | 1,300 | 0.18 | 650 | 0.09 | 2,200 | 0.18 | 1,800 | 0.18 | 1,800 | 0.18 |
| 6.0 | 900 | 0.15 | 950 | 0.19 | 1,000 | 0.19 | 550 | 0.10 | 1,800 | 0.19 | 1,400 | 0.19 | 1,400 | 0.19 |
| 8.0 | 680 | 0.19 | 720 | 0.20 | 800 | 0.20 | 400 | 0.14 | 1,400 | 0.20 | 1,100 | 0.20 | 1,100 | 0.20 |
| 10.0 | 540 | 0.21 | 570 | 0.22 | 600 | 0.22 | 320 | 0.18 | 1,100 | 0.22 | 900 | 0.22 | 900 | 0.22 |
| 12.0 | 450 | 0.23 | 480 | 0.25 | 500 | 0.25 | 280 | 0.19 | 930 | 0.25 | 710 | 0.25 | 710 | 0.25 |
| 13.0 | 420 | 0.25 | 440 | 0.26 | 450 | 0.26 | 250 | 0,.20 | 880 | 0.26 | 660 | 0.26 | 660 | 0.26 |

* The rpm & mm/rev shall be 10% off for PRXS-KMT



M.A. FORDMAX RANGE

# TrueSize®

## Reamers

Alésoirs | Reibahlen | Alesatori | Rozwiertaki

In applications demanding precision hole tolerances, tighter diameter control and quality bore finishes, our TrueSize® reamers provide a high quality and highly cost-effective solution. Our reamers are available in a wide range of sizes and can be used to machine virtually any material, including cast iron, aluminium, stainless steel, exotic alloys, plastics and other non-ferrous materials.

FR

Pour les applications exigeant de la précision et une bonne tolérance de trous, un contrôle de diamètre plus strict et une finition de qualité dans le perçage, nos alésoirs TrueSize® fournissent des solutions de grande qualité et hautement rentables. Nos alésoirs sont disponibles dans une grande variété de tailles et peuvent être utilisés pour usiner pratiquement n'importe quel matériau, y compris la fonte, l'aluminium, l'acier inoxydable, les alliages exotiques, le plastique et d'autres matériaux non-ferreux.

DE

Für Anwendungen, bei denen Präzisionsbohrungen mit geringen Toleranzen, eine strengere Durchmesserkontrolle und eine hochwertige Oberflächengüte der Bohrungen erforderlich sind, bieten unsere TrueSize®-Reibahlen eine Lösung von hoher Qualität und zu einem sehr guten Preis-Leistungs-Verhältnis. Unsere Reibahlen sind in diversen Größen erhältlich und können zur Bearbeitung nahezu jeden Materials verwendet werden, einschließlich Gusseisen, Aluminium, rostfreiem Stahl, Sonderlegierungen, Kunststoffen und sonstigen eisenfreien Materialien.

IT

Nelle applicazioni che richiedono tolleranze di precisione per i fori, controllo più stretto del diametro e finiture di qualità, i nostri alesatori TrueSize® offrono una soluzione di alta qualità e altamente efficiente. I nostri alesatori sono disponibili in una vasta gamma di misure e possono essere utilizzati per la lavorazione di qualsiasi materiale, tra cui ghisa, alluminio, acciaio inossidabile, leghe esotiche, materie plastiche e altri materiali non ferrosi.

PL

W zastosowaniach wymagających precyzyjnych tolerancji otworów, dokładniejszej kontroli średnicy i wysokiej jakości wykończenia, nasze rozwiertaki TrueSize® zapewniają wysoką jakość i bardzo ekonomiczne rozwiązanie. Nasze rozwiertaki są dostępne w szerokiej gamie rozmiarów i mogą być stosowane do maszyn praktycznie w każdym materiale, w tym żeliwie, aluminium, stali nierdzewnej, stopach egzotycznych, tworzywach sztucznych i innych materiałach nieżelaznych.


| | Page |
|---|---|
| **TrueSize® Solid Carbide Reamers**<br>Recommended Stock Allowance | 186 |
| **TrueSize® Straight Flute Carbide Reamers**<br>Series 272 | 187 - 195 |
| **Technical Information** | 196 |

# TrueSize® Solid Carbide Reamers

## Recommended Stock Allowance For Truesize® Solid Carbide Metric Reamers

Surépaisseur recommandée pour les alésoirs métriques en carbure monoblocs Truesize® | Empfohlenes Aufmaß für Truesize®-Vollhartmetall-Reibahlen
Sovrametallo raccomandato per alesatori metrici in metallo duro Truesize® | Zalecany naddatek dla rozwiertaków węglikowych Truesize®

| Workpiece Material Group | Material Type | Reamer Diameter (mm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.35 | 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 | 8.00 | 10.00 | 12.00 | 16.00 |
| | | Drill Diameter (mm) | | | | | | | | | | |
| | | 0.30 | 0.90 | 1.80 | 2.70 | 3.70 | 4.70 | 5.70 | 7.60 | 9.60 | 11.60 | 15.50 |
| | | Stock Allowance (mm) | | | | | | | | | | |
| P | Low Carbon | 0.03 | 0.09 | 0.17 | 0.24 | 0.26 | 0.27 | 0.28 | 0.31 | 0.33 | 0.35 | 0.41 |
| | Medium Carbon | 0.03 | 0.08 | 0.15 | 0.21 | 0.23 | 0.24 | 0.25 | 0.28 | 0.31 | 0.32 | 0.38 |
| | Tool Steel | 0.03 | 0.08 | 0.15 | 0.21 | 0.23 | 0.24 | 0.25 | 0.28 | 0.31 | 0.32 | 0.38 |
| M | Stainless | 0.03 | 0.08 | 0.15 | 0.21 | 0.23 | 0.24 | 0.25 | 0.28 | 0.31 | 0.32 | 0.38 |
| S | High Temp Alloys | 0.03 | 0.07 | 0.14 | 0.20 | 0.21 | 0.22 | 0.23 | 0.24 | 0.26 | 0.29 | 0.33 |
| | Titanium Alloys | 0.03 | 0.09 | 0.17 | 0.24 | 0.26 | 0.27 | 0.28 | 0.31 | 0.33 | 0.35 | 0.41 |
| K | Grey Cast Iron | 0.03 | 0.09 | 0.17 | 0.24 | 0.26 | 0.27 | 0.28 | 0.31 | 0.33 | 0.35 | 0.41 |
| | Ductile Cast Iron | 0.03 | 0.09 | 0.17 | 0.24 | 0.26 | 0.27 | 0.28 | 0.31 | 0.33 | 0.35 | 0.41 |
| H | Hardened Steel | 0.02 | 0.06 | 0.12 | 0.17 | 0.19 | 0.19 | 0.20 | 0.23 | 0.26 | 0.27 | 0.33 |
| N | Aluminium Alloys | 0.04 | 0.09 | 0.19 | 0.27 | 0.29 | 0.29 | 0.30 | 0.32 | 0.34 | 0.37 | 0.41 |
| | Copper & Hard Bronze | 0.04 | 0.09 | 0.19 | 0.27 | 0.29 | 0.29 | 0.30 | 0.33 | 0.36 | 0.38 | 0.43 |
| | Brass & Soft Bronze | 0.04 | 0.09 | 0.19 | 0.27 | 0.29 | 0.29 | 0.30 | 0.32 | 0.34 | 0.37 | 0.41 |

## Dowel Pin Chart - Metric Dowels

Tableau des goupilles - goupilles métriques | Tabelle der Spannstifte – metrische Spannstifte | Tabella spine calibrate - Spine metriche | Tabela kołków – kołki metryczne

| Dowel Pin | Strong Press Fit | Reamer Required | Tight Press Fit | Reamer Required | Loose Press Fit | Reamer Required | Tight Slip Fit | Reamer Required | Loose Slip Fit | Reamer Required |
|---|---|---|---|---|---|---|---|---|---|---|
| Size (mm) | Reamer Ø | Tool No. | Reamer Ø | Tool No. | Reamer Ø | Tool No. | Reamer Ø | Tool No. | Reamer Ø | Tool No. |
| 2.0 | 1.95 | 27207670 | 1.98 | 27207810 | 1.99 | 27207850 | 2.01 | 27207900 | 2.02 | 27207950 |
| 3.0 | 2.95 | 27211610 | 2.98 | 27211750 | 3.00 | 27211800 | 3.01 | 27211850 | 3.02 | 27211900 |
| 4.0 | 3.95 | 27215550 | 3.99 | 27215700 | 4.00 | 27215750 | 4.01 | 27215800 | 4.03 | 27215850 |
| 5.0 | 4.95 | 27219490 | 4.99 | 27219650 | 5.00 | 27219690 | 5.02 | 27219750 | 5.03 | 27219800 |
| 6.0 | 5.95 | 27223430 | 5.98 | 27223550 | 5.99 | 27223600 | 6.01 | 27223650 | 6.02 | 27223700 |
| 8.0 | 7.95 | 27231300 | 7.98 | 27231400 | 8.00 | 27231500 | 8.00 | 27231500 | 8.03 | 27231600 |
| 10.0 | 9.96 | 27239200 | 9.98 | 27239300 | 10.00 | 27239370 | 10.01 | 27239400 | 10.03 | 27239500 |
| 12.0 | 11.96 | 27247100 | 11.99 | 27247200 | 12.00 | 27247240 | 12.01 | 27247300 | 12.01 | 27247300 |

Truesize® Reamer Tolerance - DIN 1420 H7
Dowels are to nominal size +0.0025 / -0.0025mm

**ISO 9001:2008 Certified**
ISO 9001:2008 Certifié
Nach ISO 9001:2008 zertifiziert
Certificato ISO 9001: 2008
Certyfikat ISO 9001:2008

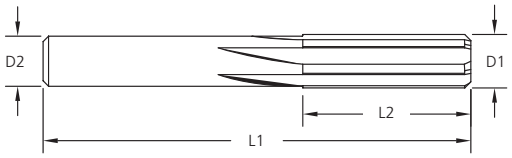
# TrueSize® Straight Flute Carbide Reamers Series 272

VHM | 45° | DIN 1420 H7 | RHC

**DIN 1420 H7**

| D¹ (mm) | Tolerance (mm) |
|---|---|
| ≤ 3.00 | + 0.004 / + 0.008 |
| › 3.00 - 6.00 | + 0.005 / + 0.010 |
| › 6.00 - 10.00 | + 0.006 / + 0.012 |
| › 10.00 - 16.00 | + 0.008 / + 0.015 |






| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27201300 | 0.330 | 0.33 | 38.0 | 5.0 | 4 |
| 27201350 | 0.343 | 0.34 | 38.0 | 5.0 | 4 |
| 27201380 | 0.351 | 0.35 | 38.0 | 5.0 | 4 |
| 27201400 | 0.356 | 0.36 | 38.0 | 5.0 | 4 |
| 27201450 | 0.368 | 0.37 | 38.0 | 5.0 | 4 |
| 27201500 | 0.381 | 0.38 | 38.0 | 5.0 | 4 |
| 27201550 | 0.394 | 0.39 | 38.0 | 5.0 | 4 |
| 27201570 | 0.400 | 0.40 | 38.0 | 5.0 | 4 |
| 27201600 | 0.406 | 0.41 | 38.0 | 5.0 | 4 |
| 27201650 | 0.419 | 0.42 | 38.0 | 5.0 | 4 |
| 27201700 | 0.432 | 0.43 | 38.0 | 5.0 | 4 |
| 27201750 | 0.445 | 0.45 | 38.0 | 5.0 | 4 |
| 27201770 | 0.450 | 0.45 | 38.0 | 5.0 | 4 |
| 27201800 | 0.457 | 0.46 | 38.0 | 5.0 | 4 |
| 27201850 | 0.470 | 0.47 | 38.0 | 5.0 | 4 |
| 27201900 | 0.483 | 0.48 | 38.0 | 5.0 | 4 |
| 27201950 | 0.495 | 0.49 | 38.0 | 5.0 | 4 |
| 27201970 | 0.500 | 0.50 | 38.0 | 5.0 | 4 |
| 27202000 | 0.508 | 0.51 | 38.0 | 5.0 | 4 |
| 27202050 | 0.521 | 0.52 | 38.0 | 6.5 | 4 |
| 27202100 | 0.533 | 0.53 | 38.0 | 6.5 | 4 |
| 27202150 | 0.546 | 0.55 | 38.0 | 6.5 | 4 |
| 27202170 | 0.551 | 0.55 | 38.0 | 6.5 | 4 |
| 27202200 | 0.559 | 0.56 | 38.0 | 6.5 | 4 |
| 27202250 | 0.572 | 0.57 | 38.0 | 6.5 | 4 |
| 27202300 | 0.584 | 0.58 | 38.0 | 6.5 | 4 |
| 27202350 | 0.597 | 0.59 | 38.0 | 6.5 | 4 |
| 27202360 | 0.600 | 0.60 | 38.0 | 6.5 | 4 |
| 27202400 | 0.610 | 0.61 | 38.0 | 6.5 | 4 |
| 27202450 | 0.622 | 0.62 | 38.0 | 6.5 | 4 |
| 27202500 | 0.635 | 0.64 | 38.0 | 6.5 | 4 |
| 27202550 | 0.648 | 0.65 | 38.0 | 6.5 | 4 |
| 27202560 | 0.650 | 0.65 | 38.0 | 6.5 | 4 |
| 27202600 | 0.660 | 0.66 | 38.0 | 6.5 | 4 |
| 27202650 | 0.673 | 0.67 | 38.0 | 6.5 | 4 |
| 27202700 | 0.686 | 0.69 | 38.0 | 6.5 | 4 |
| 27202750 | 0.700 | 0.70 | 38.0 | 6.5 | 4 |
| 27202800 | 0.711 | 0.71 | 38.0 | 6.5 | 4 |
| 27202850 | 0.724 | 0.72 | 38.0 | 6.5 | 4 |
| 27202900 | 0.737 | 0.73 | 38.0 | 6.5 | 4 |
| 27202920 | 0.742 | 0.74 | 38.0 | 6.5 | 4 |
| 27202951 | 0.750 | 0.75 | 38.0 | 6.5 | 4 |
| 27203000 | 0.762 | 0.76 | 38.0 | 6.5 | 4 |
| 27203050 | 0.775 | 0.78 | 38.0 | 6.5 | 4 |
| 27203100 | 0.787 | 0.79 | 38.0 | 6.5 | 4 |
| 27203120 | 0.792 | 0.79 | 38.0 | 6.5 | 4 |
| 27203150 | 0.800 | 0.80 | 38.0 | 6.5 | 4 |

| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27203200 | 0.813 | 0.81 | 38.0 | 6.5 | 4 |
| 27203250 | 0.826 | 0.83 | 38.0 | 6.5 | 4 |
| 27203300 | 0.838 | 0.84 | 38.0 | 6.5 | 4 |
| 27203350 | 0.850 | 0.85 | 38.0 | 6.5 | 4 |
| 27203400 | 0.864 | 0.86 | 38.0 | 6.5 | 4 |
| 27203450 | 0.876 | 0.88 | 38.0 | 6.5 | 4 |
| 27203500 | 0.889 | 0.89 | 38.0 | 6.5 | 4 |
| 27203540 | 0.900 | 0.90 | 38.0 | 6.5 | 4 |
| 27203600 | 0.914 | 0.91 | 38.0 | 6.5 | 4 |
| 27203650 | 0.927 | 0.93 | 38.0 | 6.5 | 4 |
| 27203700 | 0.940 | 0.94 | 38.0 | 6.5 | 4 |
| 27203740 | 0.950 | 0.95 | 38.0 | 6.5 | 4 |
| 27203800 | 0.965 | 0.97 | 38.0 | 6.5 | 4 |
| 27203850 | 0.978 | 0.98 | 38.0 | 6.5 | 4 |
| 27203900 | 0.991 | 0.99 | 38.0 | 6.5 | 4 |
| 27203940 | 1.000 | 1.00 | 38.0 | 6.5 | 4 |
| 27204000 | 1.016 | 1.02 | 38.0 | 6.5 | 4 |
| 27204050 | 1.029 | 1.03 | 38.0 | 9.5 | 4 |
| 27204100 | 1.041 | 1.04 | 38.0 | 9.5 | 4 |
| 27204130 | 1.049 | 1.05 | 38.0 | 9.5 | 4 |
| 27204150 | 1.054 | 1.06 | 38.0 | 9.5 | 4 |
| 27204200 | 1.067 | 1.07 | 38.0 | 9.5 | 4 |
| 27204250 | 1.080 | 1.08 | 38.0 | 9.5 | 4 |
| 27204300 | 1.092 | 1.09 | 38.0 | 9.5 | 4 |
| 27204330 | 1.100 | 1.10 | 38.0 | 9.5 | 4 |
| 27204350 | 1.105 | 1.09 | 38.0 | 9.5 | 4 |
| 27204400 | 1.118 | 1.09 | 38.0 | 9.5 | 4 |
| 27204450 | 1.130 | 1.09 | 38.0 | 9.5 | 4 |
| 27204500 | 1.143 | 1.09 | 38.0 | 9.5 | 4 |
| 27204520 | 1.148 | 1.09 | 38.0 | 9.5 | 4 |
| 27204550 | 1.156 | 1.09 | 38.0 | 9.5 | 4 |
| 27204600 | 1.168 | 1.09 | 38.0 | 9.5 | 4 |
| 27204650 | 1.181 | 1.09 | 38.0 | 9.5 | 4 |
| 27204680 | 1.189 | 1.09 | 38.0 | 9.5 | 4 |
| 27204700 | 1.194 | 1.09 | 38.0 | 9.5 | 4 |
| 27204720 | 1.200 | 1.09 | 38.0 | 9.5 | 4 |
| 27204750 | 1.207 | 1.09 | 38.0 | 9.5 | 4 |
| 27204800 | 1.219 | 1.09 | 38.0 | 9.5 | 4 |
| 27204850 | 1.232 | 1.09 | 38.0 | 9.5 | 4 |
| 27204900 | 1.245 | 1.09 | 38.0 | 9.5 | 4 |
| 27204920 | 1.250 | 1.09 | 38.0 | 9.5 | 4 |
| 27204950 | 1.257 | 1.09 | 38.0 | 9.5 | 4 |
| 27205000 | 1.270 | 1.09 | 38.0 | 9.5 | 4 |
| 27205050 | 1.283 | 1.09 | 38.0 | 9.5 | 4 |
| 27205100 | 1.295 | 1.09 | 38.0 | 9.5 | 4 |
| 27205110 | 1.298 | 1.09 | 38.0 | 9.5 | 4 |
| 27205150 | 1.308 | 1.09 | 38.0 | 9.5 | 4 |

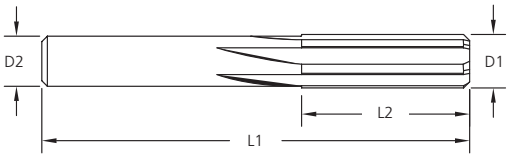
# TrueSize® Straight Flute Carbide Reamers Series 272

VHM | 45° | DIN 1420 H7 | RHC

**DIN 1420 H7**

| D¹ (mm) | Tolerance (mm) |
|---|---|
| ≤ 3.00 | + 0.004 / + 0.008 |
| › 3.00 - 6.00 | + 0.005 / + 0.010 |
| › 6.00 - 10.00 | + 0.006 / + 0.012 |
| › 10.00 - 16.00 | + 0.008 / + 0.015 |






| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27205200 | 1.321 | 1.17 | 38.0 | 9.5 | 4 |
| 27205250 | 1.334 | 1.17 | 38.0 | 9.5 | 4 |
| 27205300 | 1.346 | 1.17 | 38.0 | 9.5 | 4 |
| 27205310 | 1.349 | 1.17 | 38.0 | 9.5 | 4 |
| 27205350 | 1.359 | 1.17 | 38.0 | 9.5 | 4 |
| 27205400 | 1.372 | 1.17 | 38.0 | 9.5 | 4 |
| 27205450 | 1.384 | 1.17 | 38.0 | 9.5 | 4 |
| 27205500 | 1.397 | 1.17 | 38.0 | 9.5 | 4 |
| 27205510 | 1.400 | 1.17 | 38.0 | 9.5 | 4 |
| 27205550 | 1.410 | 1.17 | 38.0 | 9.5 | 4 |
| 27205600 | 1.422 | 1.17 | 38.0 | 9.5 | 4 |
| 27205650 | 1.435 | 1.17 | 38.0 | 9.5 | 4 |
| 27205700 | 1.448 | 1.17 | 38.0 | 9.5 | 4 |
| 27205710 | 1.450 | 1.17 | 38.0 | 9.5 | 4 |
| 27205750 | 1.461 | 1.17 | 38.0 | 9.5 | 4 |
| 27205800 | 1.473 | 1.17 | 38.0 | 9.5 | 4 |
| 27205850 | 1.486 | 1.17 | 38.0 | 9.5 | 4 |
| 27205901 | 1.500 | 1.17 | 38.0 | 9.5 | 4 |
| 27205950 | 1.511 | 1.47 | 38.0 | 9.5 | 4 |
| 27206000 | 1.524 | 1.47 | 38.0 | 9.5 | 4 |
| 27206050 | 1.537 | 1.47 | 38.0 | 9.5 | 4 |
| 27206101 | 1.550 | 1.47 | 38.0 | 9.5 | 4 |
| 27206150 | 1.562 | 1.47 | 38.0 | 9.5 | 4 |
| 27206200 | 1.575 | 1.47 | 38.0 | 9.5 | 4 |
| 27206250 | 1.588 | 1.47 | 38.0 | 9.5 | 4 |
| 27206300 | 1.600 | 1.47 | 38.0 | 9.5 | 4 |
| 27206350 | 1.613 | 1.47 | 38.0 | 9.5 | 4 |
| 27206400 | 1.626 | 1.47 | 38.0 | 9.5 | 4 |
| 27206450 | 1.638 | 1.47 | 38.0 | 9.5 | 4 |
| 27206500 | 1.650 | 1.47 | 38.0 | 9.5 | 4 |
| 27206550 | 1.664 | 1.47 | 38.0 | 9.5 | 4 |
| 27206600 | 1.676 | 1.47 | 38.0 | 9.5 | 4 |
| 27206650 | 1.689 | 1.65 | 44.0 | 12.5 | 4 |
| 27206690 | 1.700 | 1.65 | 44.0 | 12.5 | 4 |
| 27206750 | 1.715 | 1.65 | 44.0 | 12.5 | 4 |
| 27206800 | 1.727 | 1.65 | 44.0 | 12.5 | 4 |
| 27206850 | 1.740 | 1.65 | 44.0 | 12.5 | 4 |
| 27206890 | 1.750 | 1.65 | 44.0 | 12.5 | 4 |
| 27206900 | 1.753 | 1.65 | 44.0 | 12.5 | 4 |
| 27206950 | 1.765 | 1.65 | 44.0 | 12.5 | 4 |
| 27207000 | 1.778 | 1.65 | 44.0 | 12.5 | 4 |
| 27207050 | 1.791 | 1.65 | 44.0 | 12.5 | 4 |
| 27207080 | 1.798 | 1.65 | 44.0 | 12.5 | 4 |
| 27207100 | 1.803 | 1.65 | 44.0 | 12.5 | 4 |
| 27207150 | 1.816 | 1.65 | 44.0 | 12.5 | 4 |
| 27207200 | 1.829 | 1.65 | 44.0 | 12.5 | 4 |
| 27207250 | 1.842 | 1.65 | 44.0 | 12.5 | 4 |

| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27207280 | 1.850 | 1.65 | 44.0 | 12.5 | 4 |
| 27207300 | 1.854 | 1.65 | 44.0 | 12.5 | 4 |
| 27207350 | 1.867 | 1.65 | 44.0 | 12.5 | 4 |
| 27207400 | 1.880 | 1.65 | 44.0 | 12.5 | 4 |
| 27207450 | 1.892 | 1.85 | 44.0 | 12.5 | 4 |
| 27207480 | 1.900 | 1.85 | 44.0 | 12.5 | 4 |
| 27207500 | 1.905 | 1.85 | 44.0 | 12.5 | 4 |
| 27207550 | 1.918 | 1.85 | 44.0 | 12.5 | 4 |
| 27207600 | 1.930 | 1.85 | 44.0 | 12.5 | 4 |
| 27207650 | 1.943 | 1.85 | 44.0 | 12.5 | 4 |
| 27207670 | 1.948 | 1.85 | 44.0 | 12.5 | 4 |
| 27207700 | 1.956 | 1.85 | 44.0 | 12.5 | 4 |
| 27207750 | 1.969 | 1.85 | 44.0 | 12.5 | 4 |
| 27207800 | 1.981 | 1.85 | 44.0 | 12.5 | 4 |
| 27207810 | 1.984 | 1.85 | 44.0 | 12.5 | 4 |
| 27207850 | 1.994 | 1.85 | 44.0 | 12.5 | 4 |
| 27207870 | 2.000 | 1.85 | 44.0 | 12.5 | 4 |
| 27207900 | 2.007 | 1.85 | 44.0 | 12.5 | 4 |
| 27207950 | 2.019 | 1.85 | 44.0 | 12.5 | 4 |
| 27208000 | 2.032 | 1.85 | 44.0 | 12.5 | 4 |
| 27208050 | 2.045 | 1.85 | 44.0 | 12.5 | 4 |
| 27208070 | 2.050 | 1.85 | 44.0 | 12.5 | 4 |
| 27208100 | 2.057 | 1.85 | 44.0 | 12.5 | 4 |
| 27208150 | 2.070 | 2.03 | 51.0 | 12.5 | 4 |
| 27208200 | 2.083 | 2.03 | 51.0 | 12.5 | 4 |
| 27208250 | 2.096 | 2.03 | 51.0 | 12.5 | 4 |
| 27208270 | 2.101 | 2.03 | 51.0 | 12.5 | 4 |
| 27208300 | 2.108 | 2.03 | 51.0 | 12.5 | 4 |
| 27208350 | 2.121 | 2.03 | 51.0 | 12.5 | 4 |
| 27208400 | 2.134 | 2.03 | 51.0 | 12.5 | 4 |
| 27208450 | 2.146 | 2.03 | 51.0 | 12.5 | 4 |
| 27208460 | 2.149 | 2.03 | 51.0 | 12.5 | 4 |
| 27208500 | 2.159 | 2.03 | 51.0 | 12.5 | 4 |
| 27208550 | 2.172 | 2.03 | 51.0 | 12.5 | 4 |
| 27208600 | 2.184 | 2.03 | 51.0 | 12.5 | 4 |
| 27208650 | 2.197 | 2.03 | 51.0 | 12.5 | 4 |
| 27208660 | 2.200 | 2.03 | 51.0 | 12.5 | 4 |
| 27208700 | 2.210 | 2.03 | 51.0 | 12.5 | 4 |
| 27208750 | 2.223 | 2.03 | 51.0 | 12.5 | 4 |
| 27208800 | 2.235 | 2.03 | 51.0 | 12.5 | 4 |
| 27208850 | 2.248 | 2.03 | 51.0 | 12.5 | 4 |
| 27208860 | 2.250 | 2.03 | 51.0 | 12.5 | 4 |
| 27208900 | 2.261 | 2.03 | 51.0 | 12.5 | 4 |
| 27208950 | 2.273 | 2.24 | 51.0 | 12.5 | 4 |
| 27209000 | 2.286 | 2.24 | 51.0 | 12.5 | 4 |
| 27209050 | 2.300 | 2.24 | 51.0 | 12.5 | 4 |
| 27209100 | 2.311 | 2.24 | 51.0 | 12.5 | 4 |

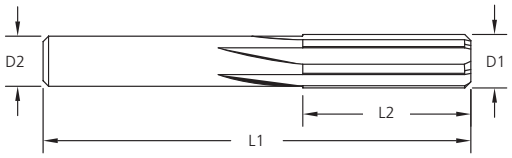
# TrueSize® Straight Flute Carbide Reamers Series 272

VHM | 45° | DIN 1420 H7 | RHC

**DIN 1420 H7**

| D¹ (mm) | Tolerance (mm) |
|---|---|
| ≤ 3.00 | + 0.004 / + 0.008 |
| › 3.00 - 6.00 | + 0.005 / + 0.010 |
| › 6.00 - 10.00 | + 0.006 / + 0.012 |
| › 10.00 - 16.00 | + 0.008 / + 0.015 |






| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27209150 | 2.324 | 2.24 | 51.0 | 12.5 | 4 |
| 27209200 | 2.337 | 2.24 | 51.0 | 12.5 | 4 |
| 27209251 | 2.350 | 2.24 | 51.0 | 12.5 | 4 |
| 27209300 | 2.362 | 2.24 | 51.0 | 12.5 | 4 |
| 27209350 | 2.375 | 2.24 | 51.0 | 12.5 | 4 |
| 27209370 | 2.380 | 2.24 | 51.0 | 12.5 | 4 |
| 27209400 | 2.388 | 2.24 | 51.0 | 12.5 | 4 |
| 27209450 | 2.400 | 2.24 | 51.0 | 12.5 | 4 |
| 27209500 | 2.413 | 2.24 | 51.0 | 12.5 | 4 |
| 27209550 | 2.426 | 2.24 | 51.0 | 12.5 | 4 |
| 27209600 | 2.438 | 2.24 | 51.0 | 12.5 | 4 |
| 27209650 | 2.451 | 2.24 | 51.0 | 12.5 | 4 |
| 27209700 | 2.464 | 2.24 | 51.0 | 12.5 | 4 |
| 27209750 | 2.477 | 2.44 | 57.0 | 16.0 | 4 |
| 27209800 | 2.489 | 2.44 | 57.0 | 16.0 | 4 |
| 27209840 | 2.500 | 2.44 | 57.0 | 16.0 | 4 |
| 27209900 | 2.515 | 2.44 | 57.0 | 16.0 | 4 |
| 27209950 | 2.527 | 2.44 | 57.0 | 16.0 | 4 |
| 27210000 | 2.540 | 2.44 | 57.0 | 16.0 | 4 |
| 27210040 | 2.550 | 2.44 | 57.0 | 16.0 | 4 |
| 27210100 | 2.565 | 2.44 | 57.0 | 16.0 | 4 |
| 27210150 | 2.578 | 2.44 | 57.0 | 16.0 | 4 |
| 27210200 | 2.591 | 2.44 | 57.0 | 16.0 | 4 |
| 27210240 | 2.601 | 2.44 | 57.0 | 16.0 | 4 |
| 27210300 | 2.616 | 2.44 | 57.0 | 16.0 | 4 |
| 27210350 | 2.629 | 2.44 | 57.0 | 16.0 | 4 |
| 27210400 | 2.642 | 2.44 | 57.0 | 16.0 | 4 |
| 27210430 | 2.649 | 2.44 | 57.0 | 16.0 | 4 |
| 27210500 | 2.667 | 2.44 | 57.0 | 16.0 | 4 |
| 27210550 | 2.680 | 2.64 | 57.0 | 16.0 | 4 |
| 27210600 | 2.692 | 2.64 | 57.0 | 16.0 | 4 |
| 27210630 | 2.700 | 2.64 | 57.0 | 16.0 | 4 |
| 27210650 | 2.705 | 2.64 | 57.0 | 16.0 | 4 |
| 27210700 | 2.718 | 2.64 | 57.0 | 16.0 | 4 |
| 27210750 | 2.731 | 2.64 | 57.0 | 16.0 | 4 |
| 27210800 | 2.743 | 2.64 | 57.0 | 16.0 | 4 |
| 27210830 | 2.751 | 2.64 | 57.0 | 16.0 | 4 |
| 27210850 | 2.756 | 2.64 | 57.0 | 16.0 | 4 |
| 27210900 | 2.769 | 2.64 | 57.0 | 16.0 | 4 |
| 27210940 | 2.779 | 2.64 | 57.0 | 16.0 | 4 |
| 27210950 | 2.781 | 2.64 | 57.0 | 16.0 | 4 |
| 27211000 | 2.794 | 2.64 | 57.0 | 16.0 | 4 |
| 27211020 | 2.800 | 2.64 | 57.0 | 16.0 | 4 |
| 27211050 | 2.807 | 2.64 | 57.0 | 16.0 | 4 |
| 27211100 | 2.819 | 2.64 | 57.0 | 16.0 | 4 |
| 27211150 | 2.832 | 2.64 | 57.0 | 16.0 | 4 |
| 27211200 | 2.845 | 2.64 | 57.0 | 16.0 | 4 |

| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27211220 | 2.850 | 2.64 | 57.0 | 16.0 | 4 |
| 27211250 | 2.858 | 2.64 | 57.0 | 16.0 | 4 |
| 27211300 | 2.870 | 2.64 | 57.0 | 16.0 | 4 |
| 27211350 | 2.883 | 2.84 | 57.0 | 16.0 | 4 |
| 27211400 | 2.896 | 2.84 | 57.0 | 16.0 | 4 |
| 27211420 | 2.900 | 2.84 | 57.0 | 16.0 | 4 |
| 27211450 | 2.908 | 2.84 | 57.0 | 16.0 | 4 |
| 27211500 | 2.921 | 2.84 | 57.0 | 16.0 | 4 |
| 27211550 | 2.934 | 2.84 | 57.0 | 16.0 | 4 |
| 27211600 | 2.946 | 2.84 | 57.0 | 16.0 | 4 |
| 27211610 | 2.949 | 2.84 | 57.0 | 16.0 | 4 |
| 27211650 | 2.959 | 2.84 | 57.0 | 16.0 | 4 |
| 27211700 | 2.972 | 2.84 | 57.0 | 16.0 | 4 |
| 27211750 | 2.985 | 2.84 | 57.0 | 16.0 | 4 |
| 27211800 | 2.997 | 2.84 | 57.0 | 16.0 | 4 |
| 27211810 | 3.000 | 2.84 | 57.0 | 16.0 | 4 |
| 27211850 | 3.010 | 2.84 | 57.0 | 16.0 | 4 |
| 27211900 | 3.023 | 2.84 | 57.0 | 16.0 | 4 |
| 27211950 | 3.035 | 2.84 | 57.0 | 16.0 | 4 |
| 27212000 | 3.048 | 2.84 | 57.0 | 16.0 | 4 |
| 27212010 | 3.051 | 2.84 | 57.0 | 16.0 | 4 |
| 27212050 | 3.061 | 2.84 | 57.0 | 16.0 | 4 |
| 27212100 | 3.073 | 2.84 | 57.0 | 16.0 | 4 |
| 27212150 | 3.086 | 3.05 | 57.0 | 16.0 | 4 |
| 27212200 | 3.099 | 3.05 | 57.0 | 16.0 | 4 |
| 27212250 | 3.112 | 3.05 | 57.0 | 16.0 | 4 |
| 27212300 | 3.124 | 3.05 | 57.0 | 16.0 | 4 |
| 27212350 | 3.137 | 3.05 | 57.0 | 16.0 | 4 |
| 27212401 | 3.150 | 3.05 | 57.0 | 16.0 | 4 |
| 27212450 | 3.162 | 3.05 | 57.0 | 16.0 | 4 |
| 27212480 | 3.170 | 3.05 | 57.0 | 16.0 | 4 |
| 27212500 | 3.175 | 3.05 | 57.0 | 16.0 | 4 |
| 27212550 | 3.188 | 3.05 | 57.0 | 16.0 | 4 |
| 27212600 | 3.200 | 3.05 | 57.0 | 16.0 | 4 |
| 27212650 | 3.213 | 3.05 | 57.0 | 16.0 | 4 |
| 27212700 | 3.226 | 3.05 | 57.0 | 16.0 | 4 |
| 27212750 | 3.239 | 3.05 | 57.0 | 16.0 | 4 |
| 27212800 | 3.251 | 3.05 | 57.0 | 16.0 | 4 |
| 27212850 | 3.264 | 3.23 | 63.0 | 19.0 | 4 |
| 27212900 | 3.277 | 3.23 | 63.0 | 19.0 | 4 |
| 27212950 | 3.289 | 3.23 | 63.0 | 19.0 | 4 |
| 27212990 | 3.300 | 3.23 | 63.0 | 19.0 | 4 |
| 27213050 | 3.315 | 3.23 | 63.0 | 19.0 | 4 |
| 27213100 | 3.327 | 3.23 | 63.0 | 19.0 | 4 |
| 27213150 | 3.340 | 3.23 | 63.0 | 19.0 | 4 |
| 27213190 | 3.350 | 3.23 | 63.0 | 19.0 | 4 |
| 27213250 | 3.366 | 3.23 | 63.0 | 19.0 | 4 |
| 27213300 | 3.378 | 3.23 | 63.0 | 19.0 | 4 |

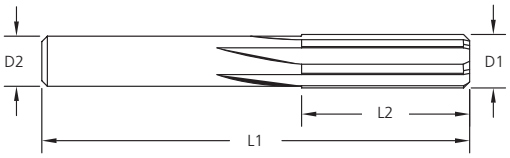
# TrueSize® Straight Flute Carbide Reamers Series 272

VHM | 45° | DIN 1420 H7 | RHC

**DIN 1420 H7**

| D¹ (mm) | Tolerance (mm) |
|---|---|
| ≤ 3.00 | + 0.004 / + 0.008 |
| › 3.00 - 6.00 | + 0.005 / + 0.010 |
| › 6.00 - 10.00 | + 0.006 / + 0.012 |
| › 10.00 - 16.00 | + 0.008 / + 0.015 |






| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27213350 | 3.391 | 3.23 | 63.0 | 19.0 | 4 |
| 27213390 | 3.401 | 3.23 | 63.0 | 19.0 | 4 |
| 27213450 | 3.416 | 3.23 | 63.0 | 19.0 | 4 |
| 27213500 | 3.429 | 3.23 | 63.0 | 19.0 | 4 |
| 27213550 | 3.442 | 3.23 | 63.0 | 19.0 | 4 |
| 27213580 | 3.449 | 3.23 | 63.0 | 19.0 | 4 |
| 27213600 | 3.454 | 3.23 | 63.0 | 19.0 | 4 |
| 27213650 | 3.467 | 3.43 | 63.0 | 19.0 | 4 |
| 27213700 | 3.480 | 3.43 | 63.0 | 19.0 | 4 |
| 27213750 | 3.493 | 3.43 | 63.0 | 19.0 | 4 |
| 27213780 | 3.500 | 3.43 | 63.0 | 19.0 | 4 |
| 27213800 | 3.505 | 3.43 | 63.0 | 19.0 | 4 |
| 27213850 | 3.518 | 3.43 | 63.0 | 19.0 | 4 |
| 27213900 | 3.531 | 3.43 | 63.0 | 19.0 | 4 |
| 27213950 | 3.543 | 3.43 | 63.0 | 19.0 | 4 |
| 27213980 | 3.551 | 3.43 | 63.0 | 19.0 | 4 |
| 27214000 | 3.556 | 3.43 | 63.0 | 19.0 | 4 |
| 27214060 | 3.571 | 3.43 | 63.0 | 19.0 | 4 |
| 27214100 | 3.581 | 3.43 | 63.0 | 19.0 | 4 |
| 27214150 | 3.594 | 3.43 | 63.0 | 19.0 | 4 |
| 27214170 | 3.599 | 3.43 | 63.0 | 19.0 | 4 |
| 27214200 | 3.607 | 3.43 | 63.0 | 19.0 | 4 |
| 27214250 | 3.620 | 3.43 | 63.0 | 19.0 | 4 |
| 27214300 | 3.632 | 3.43 | 63.0 | 19.0 | 4 |
| 27214350 | 3.645 | 3.43 | 63.0 | 19.0 | 4 |
| 27214370 | 3.650 | 3.43 | 63.0 | 19.0 | 4 |
| 27214400 | 3.658 | 3.43 | 63.0 | 19.0 | 4 |
| 27214450 | 3.670 | 3.63 | 63.0 | 19.0 | 4 |
| 27214500 | 3.683 | 3.63 | 63.0 | 19.0 | 4 |
| 27214550 | 3.696 | 3.63 | 63.0 | 19.0 | 4 |
| 27214570 | 3.701 | 3.63 | 63.0 | 19.0 | 4 |
| 27214600 | 3.708 | 3.63 | 63.0 | 19.0 | 4 |
| 27214650 | 3.721 | 3.63 | 63.0 | 19.0 | 4 |
| 27214700 | 3.734 | 3.63 | 63.0 | 19.0 | 4 |
| 27214750 | 3.747 | 3.63 | 63.0 | 19.0 | 4 |
| 27214760 | 3.750 | 3.63 | 63.0 | 19.0 | 4 |
| 27214800 | 3.759 | 3.63 | 63.0 | 19.0 | 4 |
| 27214850 | 3.772 | 3.63 | 63.0 | 19.0 | 4 |
| 27214900 | 3.785 | 3.63 | 63.0 | 19.0 | 4 |
| 27214960 | 3.800 | 3.63 | 63.0 | 19.0 | 4 |
| 27215000 | 3.810 | 3.63 | 63.0 | 19.0 | 4 |
| 27215050 | 3.823 | 3.63 | 63.0 | 19.0 | 4 |
| 27215100 | 3.835 | 3.63 | 63.0 | 19.0 | 4 |
| 27215160 | 3.851 | 3.63 | 63.0 | 19.0 | 4 |
| 27215200 | 3.861 | 3.63 | 63.0 | 19.0 | 4 |
| 27215250 | 3.874 | 3.84 | 63.0 | 19.0 | 4 |
| 27215300 | 3.886 | 3.84 | 63.0 | 19.0 | 4 |

| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27215351 | 3.900 | 3.84 | 63.0 | 19.0 | 4 |
| 27215400 | 3.912 | 3.84 | 63.0 | 19.0 | 4 |
| 27215450 | 3.924 | 3.84 | 63.0 | 19.0 | 4 |
| 27215500 | 3.937 | 3.84 | 63.0 | 19.0 | 4 |
| 27215550 | 3.950 | 3.84 | 63.0 | 19.0 | 4 |
| 27215600 | 3.962 | 3.84 | 63.0 | 19.0 | 4 |
| 27215620 | 3.967 | 3.84 | 63.0 | 19.0 | 4 |
| 27215650 | 3.975 | 3.84 | 63.0 | 19.0 | 4 |
| 27215700 | 3.988 | 3.84 | 63.0 | 19.0 | 4 |
| 27215750 | 4.000 | 3.84 | 63.0 | 19.0 | 4 |
| 27215800 | 4.013 | 3.84 | 63.0 | 19.0 | 4 |
| 27215850 | 4.026 | 3.84 | 63.0 | 19.0 | 4 |
| 27215900 | 4.039 | 3.84 | 63.0 | 19.0 | 4 |
| 27215940 | 4.049 | 4.01 | 70.0 | 22.0 | 4 |
| 27216000 | 4.064 | 4.01 | 70.0 | 22.0 | 4 |
| 27216050 | 4.077 | 4.01 | 70.0 | 22.0 | 4 |
| 27216100 | 4.089 | 4.01 | 70.0 | 22.0 | 4 |
| 27216140 | 4.100 | 4.01 | 70.0 | 22.0 | 4 |
| 27216200 | 4.115 | 4.01 | 70.0 | 22.0 | 4 |
| 27216250 | 4.128 | 4.01 | 70.0 | 22.0 | 4 |
| 27216300 | 4.140 | 4.01 | 70.0 | 22.0 | 4 |
| 27216340 | 4.150 | 4.01 | 70.0 | 22.0 | 4 |
| 27216400 | 4.166 | 4.01 | 70.0 | 22.0 | 4 |
| 27216450 | 4.178 | 4.01 | 70.0 | 22.0 | 4 |
| 27216500 | 4.191 | 4.01 | 70.0 | 22.0 | 4 |
| 27216540 | 4.201 | 4.01 | 70.0 | 22.0 | 4 |
| 27216600 | 4.216 | 4.01 | 70.0 | 22.0 | 4 |
| 27216650 | 4.229 | 4.01 | 70.0 | 22.0 | 4 |
| 27216700 | 4.242 | 4.01 | 70.0 | 22.0 | 4 |
| 27216730 | 4.249 | 4.22 | 70.0 | 22.0 | 4 |
| 27216800 | 4.267 | 4.22 | 70.0 | 22.0 | 4 |
| 27216850 | 4.280 | 4.22 | 70.0 | 22.0 | 4 |
| 27216900 | 4.293 | 4.22 | 70.0 | 22.0 | 4 |
| 27216930 | 4.300 | 4.22 | 70.0 | 22.0 | 4 |
| 27216950 | 4.305 | 4.22 | 70.0 | 22.0 | 4 |
| 27217000 | 4.318 | 4.22 | 70.0 | 22.0 | 4 |
| 27217050 | 4.331 | 4.22 | 70.0 | 22.0 | 4 |
| 27217100 | 4.343 | 4.22 | 70.0 | 22.0 | 4 |
| 27217130 | 4.351 | 4.22 | 70.0 | 22.0 | 4 |
| 27217150 | 4.356 | 4.22 | 70.0 | 22.0 | 4 |
| 27217190 | 4.366 | 4.22 | 70.0 | 22.0 | 4 |
| 27217200 | 4.369 | 4.22 | 70.0 | 22.0 | 4 |
| 27217250 | 4.382 | 4.22 | 70.0 | 22.0 | 4 |
| 27217300 | 4.394 | 4.22 | 70.0 | 22.0 | 4 |
| 27217320 | 4.399 | 4.22 | 70.0 | 22.0 | 4 |
| 27217350 | 4.407 | 4.22 | 70.0 | 22.0 | 4 |
| 27217400 | 4.420 | 4.22 | 70.0 | 22.0 | 4 |

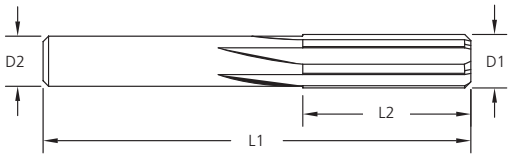
# TrueSize® Straight Flute Carbide Reamers Series 272

VHM | 45° | DIN 1420 H7 | RHC

**DIN 1420 H7**

| D¹ (mm) | Tolerance (mm) |
|---|---|
| ≤ 3.00 | + 0.004 / + 0.008 |
| › 3.00 - 6.00 | + 0.005 / + 0.010 |
| › 6.00 - 10.00 | + 0.006 / + 0.012 |
| › 10.00 - 16.00 | + 0.008 / + 0.015 |






| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27217450 | 4.432 | 4.22 | 70.0 | 22.0 | 4 |
| 27217500 | 4.445 | 4.22 | 70.0 | 22.0 | 4 |
| 27217520 | 4.450 | 4.42 | 70.0 | 22.0 | 4 |
| 27217550 | 4.458 | 4.42 | 70.0 | 22.0 | 4 |
| 27217600 | 4.470 | 4.42 | 70.0 | 22.0 | 4 |
| 27217650 | 4.483 | 4.42 | 70.0 | 22.0 | 4 |
| 27217700 | 4.496 | 4.42 | 70.0 | 22.0 | 4 |
| 27217720 | 4.501 | 4.42 | 70.0 | 22.0 | 4 |
| 27217750 | 4.509 | 4.42 | 70.0 | 22.0 | 4 |
| 27217800 | 4.521 | 4.42 | 70.0 | 22.0 | 4 |
| 27217850 | 4.534 | 4.42 | 70.0 | 22.0 | 4 |
| 27217900 | 4.547 | 4.42 | 70.0 | 22.0 | 4 |
| 27217910 | 4.549 | 4.42 | 70.0 | 22.0 | 4 |
| 27217950 | 4.559 | 4.42 | 70.0 | 22.0 | 4 |
| 27218000 | 4.572 | 4.42 | 70.0 | 22.0 | 4 |
| 27218050 | 4.585 | 4.42 | 70.0 | 22.0 | 4 |
| 27218100 | 4.597 | 4.42 | 70.0 | 22.0 | 4 |
| 27218110 | 4.600 | 4.42 | 70.0 | 22.0 | 4 |
| 27218150 | 4.610 | 4.42 | 70.0 | 22.0 | 4 |
| 27218200 | 4.623 | 4.42 | 70.0 | 22.0 | 4 |
| 27218250 | 4.636 | 4.42 | 70.0 | 22.0 | 4 |
| 27218300 | 4.648 | 4.42 | 70.0 | 22.0 | 4 |
| 27218310 | 4.651 | 4.62 | 70.0 | 22.0 | 4 |
| 27218350 | 4.661 | 4.62 | 70.0 | 22.0 | 4 |
| 27218400 | 4.674 | 4.62 | 70.0 | 22.0 | 4 |
| 27218450 | 4.686 | 4.62 | 70.0 | 22.0 | 4 |
| 27218500 | 4.700 | 4.62 | 70.0 | 22.0 | 4 |
| 27218550 | 4.712 | 4.62 | 70.0 | 22.0 | 4 |
| 27218600 | 4.724 | 4.62 | 70.0 | 22.0 | 4 |
| 27218650 | 4.737 | 4.62 | 70.0 | 22.0 | 4 |
| 27218701 | 4.750 | 4.62 | 70.0 | 22.0 | 4 |
| 27218740 | 4.760 | 4.62 | 70.0 | 22.0 | 4 |
| 27218800 | 4.775 | 4.62 | 70.0 | 22.0 | 4 |
| 27218850 | 4.788 | 4.62 | 70.0 | 22.0 | 4 |
| 27218890 | 4.798 | 4.62 | 70.0 | 22.0 | 4 |
| 27218900 | 4.800 | 4.62 | 70.0 | 22.0 | 4 |
| 27218950 | 4.813 | 4.62 | 70.0 | 22.0 | 4 |
| 27219000 | 4.826 | 4.62 | 70.0 | 22.0 | 4 |
| 27219050 | 4.839 | 4.62 | 70.0 | 22.0 | 4 |
| 27219090 | 4.849 | 4.62 | 70.0 | 22.0 | 4 |
| 27219150 | 4.864 | 4.83 | 76.0 | 25.0 | 4 |
| 27219200 | 4.877 | 4.83 | 76.0 | 25.0 | 4 |
| 27219250 | 4.890 | 4.83 | 76.0 | 25.0 | 4 |
| 27219290 | 4.900 | 4.83 | 76.0 | 25.0 | 4 |
| 27219350 | 4.915 | 4.83 | 76.0 | 25.0 | 4 |
| 27219400 | 4.928 | 4.83 | 76.0 | 25.0 | 4 |
| 27219450 | 4.940 | 4.83 | 76.0 | 25.0 | 4 |

| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27219490 | 4.950 | 4.83 | 76.0 | 25.0 | 4 |
| 27219550 | 4.966 | 4.83 | 76.0 | 25.0 | 4 |
| 27219600 | 4.978 | 4.83 | 76.0 | 25.0 | 4 |
| 27219650 | 4.991 | 4.83 | 76.0 | 25.0 | 4 |
| 27219690 | 5.001 | 4.83 | 76.0 | 25.0 | 4 |
| 27219750 | 5.017 | 4.83 | 76.0 | 25.0 | 4 |
| 27219800 | 5.029 | 4.83 | 76.0 | 25.0 | 4 |
| 27219850 | 5.042 | 4.83 | 76.0 | 25.0 | 4 |
| 27219880 | 5.050 | 4.83 | 76.0 | 25.0 | 4 |
| 27219950 | 5.067 | 5.03 | 76.0 | 25.0 | 4 |
| 27220000 | 5.080 | 5.03 | 76.0 | 25.0 | 4 |
| 27220050 | 5.093 | 5.03 | 76.0 | 25.0 | 4 |
| 27220080 | 5.100 | 5.03 | 76.0 | 25.0 | 4 |
| 27220100 | 5.105 | 5.03 | 76.0 | 25.0 | 4 |
| 27220150 | 5.118 | 5.03 | 76.0 | 25.0 | 4 |
| 27220200 | 5.131 | 5.03 | 76.0 | 25.0 | 4 |
| 27220250 | 5.144 | 5.03 | 76.0 | 25.0 | 4 |
| 27220280 | 5.151 | 5.03 | 76.0 | 25.0 | 4 |
| 27220310 | 5.159 | 5.03 | 76.0 | 25.0 | 4 |
| 27220350 | 5.169 | 5.03 | 76.0 | 25.0 | 4 |
| 27220400 | 5.182 | 5.03 | 76.0 | 25.0 | 4 |
| 27220450 | 5.194 | 5.03 | 76.0 | 25.0 | 4 |
| 27220470 | 5.199 | 5.03 | 76.0 | 25.0 | 4 |
| 27220500 | 5.207 | 5.03 | 76.0 | 25.0 | 4 |
| 27220550 | 5.220 | 5.03 | 76.0 | 25.0 | 4 |
| 27220600 | 5.232 | 5.03 | 76.0 | 25.0 | 4 |
| 27220650 | 5.245 | 5.21 | 76.0 | 25.0 | 4 |
| 27220670 | 5.250 | 5.21 | 76.0 | 25.0 | 4 |
| 27220700 | 5.258 | 5.21 | 76.0 | 25.0 | 4 |
| 27220750 | 5.271 | 5.21 | 76.0 | 25.0 | 4 |
| 27220800 | 5.283 | 5.21 | 76.0 | 25.0 | 4 |
| 27220850 | 5.296 | 5.21 | 76.0 | 25.0 | 4 |
| 27220870 | 5.301 | 5.21 | 76.0 | 25.0 | 4 |
| 27220900 | 5.309 | 5.21 | 76.0 | 25.0 | 4 |
| 27220950 | 5.321 | 5.21 | 76.0 | 25.0 | 4 |
| 27221000 | 5.334 | 5.21 | 76.0 | 25.0 | 4 |
| 27221050 | 5.347 | 5.21 | 76.0 | 25.0 | 4 |
| 27221060 | 5.349 | 5.21 | 76.0 | 25.0 | 4 |
| 27221100 | 5.359 | 5.21 | 76.0 | 25.0 | 4 |
| 27221150 | 5.372 | 5.21 | 76.0 | 25.0 | 4 |
| 27221200 | 5.385 | 5.21 | 76.0 | 25.0 | 4 |
| 27221250 | 5.398 | 5.21 | 76.0 | 25.0 | 4 |
| 27221260 | 5.400 | 5.21 | 76.0 | 25.0 | 4 |
| 27221300 | 5.410 | 5.21 | 76.0 | 25.0 | 4 |
| 27221350 | 5.423 | 5.21 | 76.0 | 25.0 | 4 |
| 27221400 | 5.436 | 5.21 | 76.0 | 25.0 | 4 |
| 27221450 | 5.448 | 5.21 | 76.0 | 25.0 | 4 |

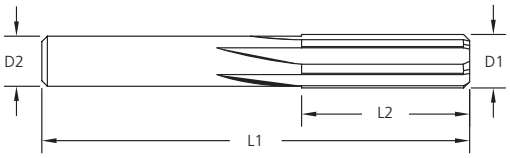
# TrueSize® Straight Flute Carbide Reamers Series 272

VHM | 45° | DIN 1420 H7 | RHC

**DIN 1420 H7**

| D¹ (mm) | Tolerance (mm) |
|---|---|
| ≤ 3.00 | + 0.004 / + 0.008 |
| › 3.00 - 6.00 | + 0.005 / + 0.010 |
| › 6.00 - 10.00 | + 0.006 / + 0.012 |
| › 10.00 - 16.00 | + 0.008 / + 0.015 |






| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27221460 | 5.451 | 5.41 | 76.0 | 25.0 | 4 |
| 27221500 | 5.461 | 5.41 | 76.0 | 25.0 | 4 |
| 27221550 | 5.474 | 5.41 | 76.0 | 25.0 | 4 |
| 27221600 | 5.486 | 5.41 | 76.0 | 25.0 | 4 |
| 27221651 | 5.500 | 5.41 | 76.0 | 25.0 | 4 |
| 27221700 | 5.512 | 5.41 | 76.0 | 25.0 | 4 |
| 27221750 | 5.525 | 5.41 | 76.0 | 25.0 | 4 |
| 27221800 | 5.537 | 5.41 | 76.0 | 25.0 | 4 |
| 27221851 | 5.550 | 5.41 | 76.0 | 25.0 | 4 |
| 27221900 | 5.563 | 5.41 | 76.0 | 25.0 | 4 |
| 27221950 | 5.575 | 5.41 | 76.0 | 25.0 | 4 |
| 27222000 | 5.588 | 5.41 | 76.0 | 25.0 | 4 |
| 27222050 | 5.601 | 5.41 | 76.0 | 25.0 | 4 |
| 27222100 | 5.613 | 5.41 | 76.0 | 25.0 | 4 |
| 27222150 | 5.626 | 5.41 | 76.0 | 25.0 | 4 |
| 27222200 | 5.639 | 5.41 | 76.0 | 25.0 | 4 |
| 27222240 | 5.649 | 5.61 | 76.0 | 25.0 | 4 |
| 27222250 | 5.652 | 5.61 | 76.0 | 25.0 | 4 |
| 27222300 | 5.664 | 5.61 | 76.0 | 25.0 | 4 |
| 27222350 | 5.677 | 5.61 | 76.0 | 25.0 | 4 |
| 27222400 | 5.690 | 5.61 | 76.0 | 25.0 | 4 |
| 27222440 | 5.700 | 5.61 | 76.0 | 25.0 | 4 |
| 27222500 | 5.715 | 5.61 | 76.0 | 25.0 | 4 |
| 27222550 | 5.728 | 5.61 | 76.0 | 25.0 | 4 |
| 27222600 | 5.740 | 5.61 | 76.0 | 25.0 | 4 |
| 27222640 | 5.751 | 5.61 | 76.0 | 25.0 | 4 |
| 27222700 | 5.766 | 5.61 | 76.0 | 25.0 | 4 |
| 27222750 | 5.779 | 5.61 | 76.0 | 25.0 | 4 |
| 27222800 | 5.791 | 5.61 | 76.0 | 25.0 | 4 |
| 27222830 | 5.799 | 5.61 | 76.0 | 25.0 | 4 |
| 27222850 | 5.804 | 5.61 | 76.0 | 25.0 | 4 |
| 27222900 | 5.817 | 5.61 | 76.0 | 25.0 | 4 |
| 27222950 | 5.829 | 5.61 | 76.0 | 25.0 | 4 |
| 27223000 | 5.842 | 5.61 | 76.0 | 25.0 | 4 |
| 27223030 | 5.850 | 5.82 | 76.0 | 25.0 | 4 |
| 27223050 | 5.855 | 5.82 | 76.0 | 25.0 | 4 |
| 27223100 | 5.867 | 5.82 | 76.0 | 25.0 | 4 |
| 27223150 | 5.880 | 5.82 | 76.0 | 25.0 | 4 |
| 27223200 | 5.893 | 5.82 | 76.0 | 25.0 | 4 |
| 27223230 | 5.900 | 5.82 | 76.0 | 25.0 | 4 |
| 27223250 | 5.906 | 5.82 | 76.0 | 25.0 | 4 |
| 27223300 | 5.918 | 5.82 | 76.0 | 25.0 | 4 |
| 27223350 | 5.931 | 5.82 | 76.0 | 25.0 | 4 |
| 27223400 | 5.944 | 5.82 | 76.0 | 25.0 | 4 |
| 27223430 | 5.951 | 5.82 | 76.0 | 25.0 | 4 |
| 27223450 | 5.956 | 5.82 | 76.0 | 25.0 | 4 |
| 27223500 | 5.969 | 5.82 | 76.0 | 25.0 | 4 |

| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27223550 | 5.982 | 5.82 | 76.0 | 25.0 | 4 |
| 27223600 | 5.994 | 5.82 | 76.0 | 25.0 | 4 |
| 27223620 | 5.999 | 5.82 | 76.0 | 25.0 | 4 |
| 27223650 | 6.007 | 5.82 | 76.0 | 25.0 | 4 |
| 27223700 | 6.020 | 5.82 | 76.0 | 25.0 | 4 |
| 27223750 | 6.033 | 5.99 | 76.0 | 25.0 | 4 |
| 27223800 | 6.045 | 5.99 | 76.0 | 25.0 | 4 |
| 27223820 | 6.050 | 5.99 | 76.0 | 25.0 | 4 |
| 27223850 | 6.058 | 5.99 | 76.0 | 25.0 | 4 |
| 27223900 | 6.071 | 5.99 | 76.0 | 25.0 | 4 |
| 27223950 | 6.083 | 5.99 | 76.0 | 25.0 | 4 |
| 27224000 | 6.096 | 5.99 | 76.0 | 25.0 | 4 |
| 27224020 | 6.101 | 5.99 | 76.0 | 25.0 | 4 |
| 27224050 | 6.109 | 5.99 | 76.0 | 25.0 | 4 |
| 27224100 | 6.121 | 5.99 | 76.0 | 25.0 | 4 |
| 27224150 | 6.134 | 5.99 | 76.0 | 25.0 | 4 |
| 27224210 | 6.149 | 5.99 | 76.0 | 25.0 | 4 |
| 27224250 | 6.160 | 5.99 | 76.0 | 25.0 | 4 |
| 27224300 | 6.172 | 5.99 | 76.0 | 25.0 | 4 |
| 27224350 | 6.185 | 5.99 | 76.0 | 25.0 | 4 |
| 27224410 | 6.200 | 5.99 | 76.0 | 25.0 | 4 |
| 27224450 | 6.210 | 5.99 | 76.0 | 25.0 | 4 |
| 27224500 | 6.223 | 5.99 | 76.0 | 25.0 | 4 |
| 27224550 | 6.236 | 6.20 | 76.0 | 25.0 | 4 |
| 27224610 | 6.251 | 6.20 | 76.0 | 25.0 | 4 |
| 27224650 | 6.261 | 6.20 | 76.0 | 25.0 | 4 |
| 27224700 | 6.274 | 6.20 | 76.0 | 25.0 | 4 |
| 27224750 | 6.287 | 6.20 | 76.0 | 25.0 | 4 |
| 27224801 | 6.300 | 6.20 | 76.0 | 25.0 | 4 |
| 27224850 | 6.312 | 6.20 | 76.0 | 25.0 | 4 |
| 27224900 | 6.325 | 6.20 | 76.0 | 25.0 | 4 |
| 27224950 | 6.337 | 6.20 | 76.0 | 25.0 | 4 |
| 27224980 | 6.345 | 6.20 | 76.0 | 25.0 | 4 |
| 27225001 | 6.350 | 6.20 | 76.0 | 25.0 | 4 |
| 27225050 | 6.363 | 6.20 | 76.0 | 25.0 | 4 |
| 27225100 | 6.375 | 6.20 | 76.0 | 25.0 | 4 |
| 27225150 | 6.388 | 6.20 | 76.0 | 25.0 | 4 |
| 27225190 | 6.398 | 6.20 | 76.0 | 25.0 | 4 |
| 27225200 | 6.401 | 6.20 | 76.0 | 25.0 | 4 |
| 27225250 | 6.414 | 6.20 | 76.0 | 25.0 | 4 |
| 27225300 | 6.426 | 6.20 | 76.0 | 25.0 | 4 |
| 27225390 | 6.449 | 6.40 | 83.0 | 28.0 | 6 |
| 27225500 | 6.477 | 6.40 | 83.0 | 28.0 | 6 |
| 27225590 | 6.500 | 6.40 | 83.0 | 28.0 | 6 |
| 27225700 | 6.528 | 6.40 | 83.0 | 28.0 | 6 |
| 27225800 | 6.553 | 6.40 | 83.0 | 28.0 | 6 |
| 27225900 | 6.579 | 6.40 | 83.0 | 28.0 | 6 |

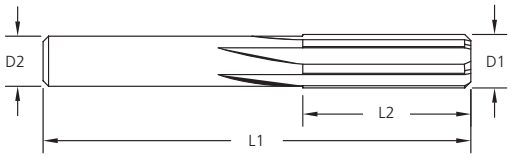
# TrueSize® Straight Flute Carbide Reamers Series 272

VHM | 45° | DIN 1420 H7 | RHC

**DIN 1420 H7**

| D¹ (mm) | Tolerance (mm) |
|---|---|
| ≤ 3.00 | + 0.004 / + 0.008 |
| › 3.00 - 6.00 | + 0.005 / + 0.010 |
| › 6.00 - 10.00 | + 0.006 / + 0.012 |
| › 10.00 - 16.00 | + 0.008 / + 0.015 |






| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27226000 | 6.604 | 6.40 | 83.0 | 28.0 | 6 |
| 27226100 | 6.629 | 6.40 | 83.0 | 28.0 | 6 |
| 27226200 | 6.655 | 6.40 | 83.0 | 28.0 | 6 |
| 27226300 | 6.680 | 6.40 | 83.0 | 28.0 | 6 |
| 27226400 | 6.706 | 6.40 | 83.0 | 28.0 | 6 |
| 27226500 | 6.731 | 6.40 | 83.0 | 28.0 | 6 |
| 27226560 | 6.746 | 6.40 | 83.0 | 28.0 | 6 |
| 27226600 | 6.756 | 6.40 | 83.0 | 28.0 | 6 |
| 27226700 | 6.782 | 6.40 | 83.0 | 28.0 | 6 |
| 27226800 | 6.807 | 6.40 | 83.0 | 28.0 | 6 |
| 27226900 | 6.833 | 6.40 | 83.0 | 28.0 | 6 |
| 27227000 | 6.858 | 6.40 | 83.0 | 28.0 | 6 |
| 27227100 | 6.883 | 6.40 | 83.0 | 28.0 | 6 |
| 27227200 | 6.909 | 6.86 | 83.0 | 28.0 | 6 |
| 27227300 | 6.934 | 6.86 | 83.0 | 28.0 | 6 |
| 27227400 | 6.960 | 6.86 | 83.0 | 28.0 | 6 |
| 27227500 | 6.985 | 6.86 | 83.0 | 28.0 | 6 |
| 27227560 | 7.000 | 6.86 | 83.0 | 28.0 | 6 |
| 27227600 | 7.010 | 6.86 | 83.0 | 28.0 | 6 |
| 27227700 | 7.036 | 6.86 | 83.0 | 28.0 | 6 |
| 27227800 | 7.061 | 6.86 | 83.0 | 28.0 | 6 |
| 27227900 | 7.087 | 6.86 | 83.0 | 28.0 | 6 |
| 27228000 | 7.112 | 6.86 | 83.0 | 28.0 | 6 |
| 27228100 | 7.137 | 6.86 | 83.0 | 28.0 | 6 |
| 27228120 | 7.142 | 6.86 | 83.0 | 28.0 | 6 |
| 27228200 | 7.163 | 6.86 | 83.0 | 28.0 | 6 |
| 27228300 | 7.188 | 6.86 | 83.0 | 28.0 | 6 |
| 27228400 | 7.214 | 6.86 | 83.0 | 28.0 | 6 |
| 27228500 | 7.239 | 6.86 | 83.0 | 28.0 | 6 |
| 27228600 | 7.264 | 6.86 | 83.0 | 28.0 | 6 |
| 27228700 | 7.290 | 7.24 | 83.0 | 28.0 | 6 |
| 27228800 | 7.315 | 7.24 | 83.0 | 28.0 | 6 |
| 27228900 | 7.341 | 7.24 | 83.0 | 28.0 | 6 |
| 27229000 | 7.366 | 7.24 | 83.0 | 28.0 | 6 |
| 27229100 | 7.391 | 7.24 | 83.0 | 28.0 | 6 |
| 27229200 | 7.417 | 7.24 | 83.0 | 28.0 | 6 |
| 27229300 | 7.442 | 7.24 | 83.0 | 28.0 | 6 |
| 27229400 | 7.468 | 7.24 | 83.0 | 28.0 | 6 |
| 27229500 | 7.493 | 7.24 | 83.0 | 28.0 | 6 |
| 27229530 | 7.501 | 7.24 | 83.0 | 28.0 | 6 |
| 27229600 | 7.518 | 7.24 | 83.0 | 28.0 | 6 |
| 27229680 | 7.539 | 7.24 | 83.0 | 28.0 | 6 |
| 27229700 | 7.544 | 7.24 | 83.0 | 28.0 | 6 |
| 27229800 | 7.569 | 7.24 | 83.0 | 28.0 | 6 |
| 27229900 | 7.595 | 7.24 | 83.0 | 28.0 | 6 |
| 27230000 | 7.620 | 7.24 | 83.0 | 28.0 | 6 |
| 27230100 | 7.645 | 7.24 | 83.0 | 28.0 | 6 |

| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27230200 | 7.671 | 7.24 | 83.0 | 28.0 | 6 |
| 27230300 | 7.696 | 7.65 | 83.0 | 28.0 | 6 |
| 27230400 | 7.722 | 7.65 | 83.0 | 28.0 | 6 |
| 27230500 | 7.747 | 7.65 | 83.0 | 28.0 | 6 |
| 27230600 | 7.772 | 7.65 | 83.0 | 28.0 | 6 |
| 27230700 | 7.798 | 7.65 | 83.0 | 28.0 | 6 |
| 27230800 | 7.823 | 7.65 | 83.0 | 28.0 | 6 |
| 27230900 | 7.849 | 7.65 | 83.0 | 28.0 | 6 |
| 27231000 | 7.874 | 7.65 | 83.0 | 28.0 | 6 |
| 27231050 | 7.887 | 7.65 | 83.0 | 28.0 | 6 |
| 27231100 | 7.899 | 7.65 | 83.0 | 28.0 | 6 |
| 27231150 | 7.912 | 7.65 | 83.0 | 28.0 | 6 |
| 27231200 | 7.925 | 7.65 | 83.0 | 28.0 | 6 |
| 27231230 | 7.932 | 7.65 | 83.0 | 28.0 | 6 |
| 27231250 | 7.938 | 7.65 | 83.0 | 28.0 | 6 |
| 27231300 | 7.950 | 7.65 | 83.0 | 28.0 | 6 |
| 27231350 | 7.963 | 7.65 | 83.0 | 28.0 | 6 |
| 27231400 | 7.976 | 7.65 | 83.0 | 28.0 | 6 |
| 27231500 | 8.000 | 7.65 | 83.0 | 28.0 | 6 |
| 27231600 | 8.026 | 7.65 | 83.0 | 28.0 | 6 |
| 27231700 | 8.052 | 7.65 | 83.0 | 28.0 | 6 |
| 27231800 | 8.077 | 7.65 | 83.0 | 28.0 | 6 |
| 27231900 | 8.103 | 8.05 | 89.0 | 32.0 | 6 |
| 27232000 | 8.128 | 8.05 | 89.0 | 32.0 | 6 |
| 27232100 | 8.153 | 8.05 | 89.0 | 32.0 | 6 |
| 27232200 | 8.179 | 8.05 | 89.0 | 32.0 | 6 |
| 27232300 | 8.204 | 8.05 | 89.0 | 32.0 | 6 |
| 27232400 | 8.230 | 8.05 | 89.0 | 32.0 | 6 |
| 27232500 | 8.255 | 8.05 | 89.0 | 32.0 | 6 |
| 27232600 | 8.280 | 8.05 | 89.0 | 32.0 | 6 |
| 27232700 | 8.306 | 8.05 | 89.0 | 32.0 | 6 |
| 27232800 | 8.331 | 8.05 | 89.0 | 32.0 | 6 |
| 27232900 | 8.357 | 8.05 | 89.0 | 32.0 | 6 |
| 27233000 | 8.382 | 8.05 | 89.0 | 32.0 | 6 |
| 27233100 | 8.407 | 8.05 | 89.0 | 32.0 | 6 |
| 27233200 | 8.433 | 8.05 | 89.0 | 32.0 | 6 |
| 27233300 | 8.458 | 8.05 | 89.0 | 32.0 | 6 |
| 27233400 | 8.484 | 8.43 | 89.0 | 32.0 | 6 |
| 27233460 | 8.499 | 8.43 | 89.0 | 32.0 | 6 |
| 27233500 | 8.509 | 8.43 | 89.0 | 32.0 | 6 |
| 27233600 | 8.534 | 8.43 | 89.0 | 32.0 | 6 |
| 27233700 | 8.560 | 8.43 | 89.0 | 32.0 | 6 |
| 27233800 | 8.585 | 8.43 | 89.0 | 32.0 | 6 |
| 27233900 | 8.611 | 8.43 | 89.0 | 32.0 | 6 |
| 27234000 | 8.636 | 8.43 | 89.0 | 32.0 | 6 |
| 27234100 | 8.661 | 8.43 | 89.0 | 32.0 | 6 |
| 27234200 | 8.687 | 8.43 | 89.0 | 32.0 | 6 |

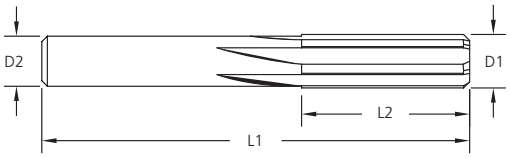
# TrueSize® Straight Flute Carbide Reamers Series 272

VHM | 45° | DIN 1420 H7 | RHC

**DIN 1420 H7**

| D¹ (mm) | Tolerance (mm) |
|---|---|
| ≤ 3.00 | + 0.004 / + 0.008 |
| › 3.00 - 6.00 | + 0.005 / + 0.010 |
| › 6.00 - 10.00 | + 0.006 / + 0.012 |
| › 10.00 - 16.00 | + 0.008 / + 0.015 |






| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27234300 | 8.712 | 8.43 | 89.0 | 32.0 | 6 |
| 27234370 | 8.730 | 8.43 | 89.0 | 32.0 | 6 |
| 27234400 | 8.738 | 8.43 | 89.0 | 32.0 | 6 |
| 27234500 | 8.763 | 8.43 | 89.0 | 32.0 | 6 |
| 27234600 | 8.788 | 8.43 | 89.0 | 32.0 | 6 |
| 27234700 | 8.814 | 8.43 | 89.0 | 32.0 | 6 |
| 27234800 | 8.839 | 8.43 | 89.0 | 32.0 | 6 |
| 27234900 | 8.865 | 8.43 | 89.0 | 32.0 | 6 |
| 27235000 | 8.890 | 8.84 | 89.0 | 32.0 | 6 |
| 27235100 | 8.915 | 8.84 | 89.0 | 32.0 | 6 |
| 27235200 | 8.941 | 8.84 | 89.0 | 32.0 | 6 |
| 27235300 | 8.966 | 8.84 | 89.0 | 32.0 | 6 |
| 27235400 | 8.992 | 8.84 | 89.0 | 32.0 | 6 |
| 27235430 | 8.999 | 8.84 | 89.0 | 32.0 | 6 |
| 27235500 | 9.017 | 8.84 | 89.0 | 32.0 | 6 |
| 27235600 | 9.042 | 8.84 | 89.0 | 32.0 | 6 |
| 27235700 | 9.068 | 8.84 | 89.0 | 32.0 | 6 |
| 27235800 | 9.093 | 8.84 | 89.0 | 32.0 | 6 |
| 27235900 | 9.119 | 8.84 | 89.0 | 32.0 | 6 |
| 27235940 | 9.129 | 8.84 | 89.0 | 32.0 | 6 |
| 27236000 | 9.144 | 8.84 | 89.0 | 32.0 | 6 |
| 27236100 | 9.169 | 8.84 | 89.0 | 32.0 | 6 |
| 27236200 | 9.195 | 8.84 | 89.0 | 32.0 | 6 |
| 27236300 | 9.220 | 8.84 | 89.0 | 32.0 | 6 |
| 27236400 | 9.246 | 8.84 | 89.0 | 32.0 | 6 |
| 27236500 | 9.271 | 9.22 | 89.0 | 32.0 | 6 |
| 27236600 | 9.296 | 9.22 | 89.0 | 32.0 | 6 |
| 27236700 | 9.322 | 9.22 | 89.0 | 32.0 | 6 |
| 27236800 | 9.347 | 9.22 | 89.0 | 32.0 | 6 |
| 27236900 | 9.373 | 9.22 | 89.0 | 32.0 | 6 |
| 27237000 | 9.398 | 9.22 | 89.0 | 32.0 | 6 |
| 27237100 | 9.423 | 9.22 | 89.0 | 32.0 | 6 |
| 27237200 | 9.449 | 9.22 | 89.0 | 32.0 | 6 |
| 27237300 | 9.474 | 9.22 | 89.0 | 32.0 | 6 |
| 27237400 | 9.500 | 9.22 | 89.0 | 32.0 | 6 |
| 27237450 | 9.512 | 9.22 | 89.0 | 32.0 | 6 |
| 27237480 | 9.520 | 9.22 | 89.0 | 32.0 | 6 |
| 27237500 | 9.525 | 9.22 | 89.0 | 32.0 | 6 |
| 27237600 | 9.550 | 9.22 | 89.0 | 32.0 | 6 |
| 27237700 | 9.576 | 9.22 | 89.0 | 32.0 | 6 |
| 27237800 | 9.601 | 9.22 | 89.0 | 32.0 | 6 |
| 27237900 | 9.627 | 9.22 | 89.0 | 32.0 | 6 |
| 27238000 | 9.652 | 9.22 | 89.0 | 32.0 | 6 |
| 27238100 | 9.677 | 9.22 | 89.0 | 32.0 | 6 |
| 27238200 | 9.703 | 9.22 | 89.0 | 32.0 | 6 |
| 27238300 | 9.728 | 9.22 | 89.0 | 32.0 | 6 |
| 27238400 | 9.754 | 9.22 | 89.0 | 32.0 | 6 |

| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27238500 | 9.779 | 9.22 | 89.0 | 32.0 | 6 |
| 27238600 | 9.804 | 9.22 | 89.0 | 32.0 | 6 |
| 27238700 | 9.830 | 9.65 | 89.0 | 32.0 | 6 |
| 27238800 | 9.855 | 9.65 | 89.0 | 32.0 | 6 |
| 27238900 | 9.881 | 9.65 | 89.0 | 32.0 | 6 |
| 27239000 | 9.906 | 9.65 | 89.0 | 32.0 | 6 |
| 27239060 | 9.921 | 9.65 | 89.0 | 32.0 | 6 |
| 27239100 | 9.931 | 9.65 | 89.0 | 32.0 | 6 |
| 27239200 | 9.957 | 9.65 | 89.0 | 32.0 | 6 |
| 27239300 | 9.982 | 9.65 | 89.0 | 32.0 | 6 |
| 27239370 | 10.000 | 9.65 | 89.0 | 32.0 | 6 |
| 27239400 | 10.008 | 9.65 | 89.0 | 32.0 | 6 |
| 27239500 | 10.033 | 9.65 | 89.0 | 32.0 | 6 |
| 27239600 | 10.058 | 9.65 | 89.0 | 32.0 | 6 |
| 27239700 | 10.084 | 9.65 | 89.0 | 32.0 | 6 |
| 27239800 | 10.109 | 9.65 | 89.0 | 32.0 | 6 |
| 27239900 | 10.135 | 9.65 | 89.0 | 32.0 | 6 |
| 27240000 | 10.160 | 9.65 | 89.0 | 32.0 | 6 |
| 27240100 | 10.185 | 9.65 | 89.0 | 32.0 | 6 |
| 27240200 | 10.211 | 9.65 | 89.0 | 32.0 | 6 |
| 27240300 | 10.236 | 9.65 | 89.0 | 32.0 | 6 |
| 27240400 | 10.262 | 9.65 | 89.0 | 32.0 | 6 |
| 27240500 | 10.287 | 9.65 | 89.0 | 32.0 | 6 |
| 27240600 | 10.312 | 9.65 | 89.0 | 32.0 | 6 |
| 27240620 | 10.317 | 9.65 | 89.0 | 32.0 | 6 |
| 27240700 | 10.338 | 9.65 | 89.0 | 32.0 | 6 |
| 27240800 | 10.363 | 9.65 | 89.0 | 32.0 | 6 |
| 27240900 | 10.389 | 9.65 | 89.0 | 32.0 | 6 |
| 27241000 | 10.414 | 9.65 | 89.0 | 32.0 | 6 |
| 27241100 | 10.439 | 9.65 | 89.0 | 32.0 | 6 |
| 27241200 | 10.465 | 9.65 | 89.0 | 32.0 | 6 |
| 27241300 | 10.490 | 9.65 | 89.0 | 32.0 | 6 |
| 27241340 | 10.500 | 9.65 | 89.0 | 32.0 | 6 |
| 27241400 | 10.516 | 9.65 | 89.0 | 32.0 | 6 |
| 27241500 | 10.541 | 9.65 | 89.0 | 32.0 | 6 |
| 27241600 | 10.566 | 10.41 | 95.0 | 35.0 | 6 |
| 27241700 | 10.592 | 10.41 | 95.0 | 35.0 | 6 |
| 27241800 | 10.617 | 10.41 | 95.0 | 35.0 | 6 |
| 27241900 | 10.643 | 10.41 | 95.0 | 35.0 | 6 |
| 27242000 | 10.668 | 10.41 | 95.0 | 35.0 | 6 |
| 27242100 | 10.693 | 10.41 | 95.0 | 35.0 | 6 |
| 27242200 | 10.719 | 10.41 | 95.0 | 35.0 | 6 |
| 27242300 | 10.744 | 10.41 | 95.0 | 35.0 | 6 |
| 27242400 | 10.770 | 10.41 | 95.0 | 35.0 | 6 |
| 27242500 | 10.795 | 10.41 | 95.0 | 35.0 | 6 |
| 27242600 | 10.820 | 10.41 | 95.0 | 35.0 | 6 |
| 27242700 | 10.846 | 10.41 | 95.0 | 35.0 | 6 |

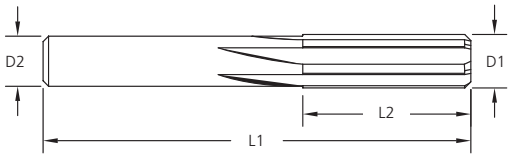
# TrueSize® Straight Flute Carbide Reamers Series 272

VHM | 45° | DIN 1420 H7 | RHC

**DIN 1420 H7**

| D¹ (mm) | Tolerance (mm) |
|---|---|
| ≤ 3.00 | + 0.004 / + 0.008 |
| › 3.00 - 6.00 | + 0.005 / + 0.010 |
| › 6.00 - 10.00 | + 0.006 / + 0.012 |
| › 10.00 - 16.00 | + 0.008 / + 0.015 |






| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27242800 | 10.871 | 10.41 | 95.0 | 35.0 | 6 |
| 27242900 | 10.897 | 10.41 | 95.0 | 35.0 | 6 |
| 27243000 | 10.922 | 10.41 | 95.0 | 35.0 | 6 |
| 27243100 | 10.947 | 10.41 | 95.0 | 35.0 | 6 |
| 27243200 | 10.973 | 10.41 | 95.0 | 35.0 | 6 |
| 27243310 | 11.000 | 10.41 | 95.0 | 35.0 | 6 |
| 27243400 | 11.024 | 10.41 | 95.0 | 35.0 | 6 |
| 27243500 | 11.049 | 10.41 | 95.0 | 35.0 | 6 |
| 27243600 | 11.074 | 10.41 | 95.0 | 35.0 | 6 |
| 27243700 | 11.100 | 10.41 | 95.0 | 35.0 | 6 |
| 27243740 | 11.110 | 10.41 | 95.0 | 35.0 | 6 |
| 27243800 | 11.125 | 10.41 | 95.0 | 35.0 | 6 |
| 27243850 | 11.138 | 10.41 | 95.0 | 35.0 | 6 |
| 27243900 | 11.151 | 10.41 | 95.0 | 35.0 | 6 |
| 27244000 | 11.176 | 10.41 | 95.0 | 35.0 | 6 |
| 27244100 | 11.201 | 10.41 | 95.0 | 35.0 | 6 |
| 27244200 | 11.227 | 10.41 | 95.0 | 35.0 | 6 |
| 27244300 | 11.252 | 10.41 | 95.0 | 35.0 | 6 |
| 27244400 | 11.278 | 10.41 | 95.0 | 35.0 | 6 |
| 27244500 | 11.303 | 10.41 | 95.0 | 35.0 | 6 |
| 27244600 | 11.328 | 11.18 | 95.0 | 35.0 | 6 |
| 27244700 | 11.354 | 11.18 | 95.0 | 35.0 | 6 |
| 27244800 | 11.379 | 11.18 | 95.0 | 35.0 | 6 |
| 27244900 | 11.405 | 11.18 | 95.0 | 35.0 | 6 |
| 27245000 | 11.430 | 11.18 | 95.0 | 35.0 | 6 |
| 27245100 | 11.455 | 11.18 | 95.0 | 35.0 | 6 |
| 27245200 | 11.481 | 11.18 | 95.0 | 35.0 | 6 |
| 27245270 | 11.499 | 11.18 | 95.0 | 35.0 | 6 |
| 27245310 | 11.509 | 11.18 | 95.0 | 35.0 | 6 |
| 27245400 | 11.532 | 11.18 | 95.0 | 35.0 | 6 |
| 27245500 | 11.557 | 11.18 | 95.0 | 35.0 | 6 |
| 27245600 | 11.582 | 11.18 | 95.0 | 35.0 | 6 |
| 27245700 | 11.608 | 11.18 | 95.0 | 35.0 | 6 |
| 27245800 | 11.633 | 11.18 | 95.0 | 35.0 | 6 |
| 27245900 | 11.659 | 11.18 | 95.0 | 35.0 | 6 |
| 27246000 | 11.684 | 11.18 | 95.0 | 35.0 | 6 |
| 27246100 | 11.709 | 11.18 | 95.0 | 35.0 | 6 |
| 27246200 | 11.735 | 11.18 | 95.0 | 35.0 | 6 |
| 27246300 | 11.760 | 11.18 | 95.0 | 35.0 | 6 |
| 27246400 | 11.786 | 11.18 | 95.0 | 35.0 | 6 |
| 27246500 | 11.811 | 11.18 | 95.0 | 35.0 | 6 |
| 27246600 | 11.836 | 11.18 | 95.0 | 35.0 | 6 |
| 27246700 | 11.862 | 11.18 | 95.0 | 35.0 | 6 |
| 27246800 | 11.887 | 11.18 | 95.0 | 35.0 | 6 |
| 27246880 | 11.908 | 11.18 | 95.0 | 35.0 | 6 |
| 27246900 | 11.913 | 11.18 | 95.0 | 35.0 | 6 |
| 27247000 | 11.938 | 11.18 | 95.0 | 35.0 | 6 |

| | Tool Dimensions | | | | |
|---|---|---|---|---|---|
| Tool No. | Ø D1 | Ø D2 | L1 | L2 | Z |
| 27247100 | 11.963 | 11.18 | 95.0 | 35.0 | 6 |
| 27247200 | 11.989 | 11.18 | 95.0 | 35.0 | 6 |
| 27247240 | 11.999 | 11.18 | 95.0 | 35.0 | 6 |
| 27247300 | 12.014 | 11.18 | 95.0 | 35.0 | 6 |
| 27247400 | 12.040 | 11.18 | 95.0 | 35.0 | 6 |
| 27247500 | 12.065 | 11.18 | 95.0 | 35.0 | 6 |
| 27247600 | 12.090 | 11.94 | 102.0 | 38.0 | 6 |
| 27247700 | 12.116 | 11.94 | 102.0 | 38.0 | 6 |
| 27247800 | 12.141 | 11.94 | 102.0 | 38.0 | 6 |
| 27247900 | 12.167 | 11.94 | 102.0 | 38.0 | 6 |
| 27248000 | 12.192 | 11.94 | 102.0 | 38.0 | 6 |
| 27248100 | 12.217 | 11.94 | 102.0 | 38.0 | 6 |
| 27248200 | 12.243 | 11.94 | 102.0 | 38.0 | 6 |
| 27248300 | 12.268 | 11.94 | 102.0 | 38.0 | 6 |
| 27248400 | 12.294 | 11.94 | 102.0 | 38.0 | 6 |
| 27248440 | 12.304 | 11.94 | 102.0 | 38.0 | 6 |
| 27248500 | 12.319 | 11.94 | 102.0 | 38.0 | 6 |
| 27248600 | 12.344 | 11.94 | 102.0 | 38.0 | 6 |
| 27248700 | 12.370 | 11.94 | 102.0 | 38.0 | 6 |
| 27248800 | 12.395 | 11.94 | 102.0 | 38.0 | 6 |
| 27248900 | 12.421 | 11.94 | 102.0 | 38.0 | 6 |
| 27249000 | 12.446 | 11.94 | 102.0 | 38.0 | 6 |
| 27249100 | 12.471 | 11.94 | 102.0 | 38.0 | 6 |
| 27249200 | 12.497 | 11.94 | 102.0 | 38.0 | 6 |
| 27249300 | 12.522 | 11.94 | 102.0 | 38.0 | 6 |
| 27249400 | 12.548 | 11.94 | 102.0 | 38.0 | 6 |
| 27249500 | 12.573 | 11.94 | 102.0 | 38.0 | 6 |
| 27249600 | 12.598 | 11.94 | 102.0 | 38.0 | 6 |
| 27249700 | 12.624 | 11.94 | 102.0 | 38.0 | 6 |
| 27249800 | 12.649 | 11.94 | 102.0 | 38.0 | 6 |
| 27249900 | 12.675 | 11.94 | 102.0 | 38.0 | 6 |
| 27249950 | 12.687 | 11.94 | 102.0 | 38.0 | 6 |
| 27249990 | 12.697 | 11.94 | 102.0 | 38.0 | 6 |
| 27250000 | 12.700 | 11.94 | 102.0 | 38.0 | 6 |
| 27250100 | 12.725 | 11.94 | 102.0 | 38.0 | 6 |
| 27251180 | 13.000 | 12.83 | 102.0 | 38.0 | 6 |
| 27251560 | 13.096 | 12.83 | 102.0 | 38.0 | 6 |
| 27253120 | 13.492 | 12.83 | 102.0 | 38.0 | 6 |
| 27254690 | 13.891 | 13.59 | 102.0 | 38.0 | 6 |
| 27255120 | 14.000 | 13.59 | 102.0 | 38.0 | 6 |
| 27256250 | 14.288 | 13.59 | 102.0 | 38.0 | 6 |
| 27257810 | 14.684 | 14.35 | 102.0 | 44.0 | 6 |
| 27259050 | 14.999 | 14.35 | 102.0 | 44.0 | 6 |
| 27259380 | 15.083 | 14.35 | 102.0 | 44.0 | 6 |
| 27260940 | 15.479 | 15.11 | 102.0 | 44.0 | 6 |
| 27262500 | 15.875 | 15.11 | 102.0 | 44.0 | 6 |
| 27262990 | 15.999 | 15.11 | 102.0 | 44.0 | 6 |

P196

# TrueSize® Solid Carbide Reamers Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane dane o Cięciu (Zalecane parametry skrawania)

| Workpiece Material Group | | Material Type | Vc (m/min) | Feed Type (Refer To Chart) |
|---|---|---|---|---|
| Steels | P | Low Carbon | 60 - 90 | M - H |
| | | Medium Carbon | 40 - 60 | M |
| | | Alloy Steels | 20 - 40 | L |
| | | Mould/Tool Steel | 20 - 40 | L |
| Stainless Steels | M | Free Machining | 45 - 75 | M |
| | | Austenitic | 45 - 75 | M |
| | | Ferritic | 25 - 40 | M |
| | | Martensitic | 25 - 40 | M |
| | | PH Stainless | 20 - 30 | L - M |
| Special Alloys | S | High Temp Alloys (Ni) | 15 - 20 | L |
| | | High Temp Alloys (Co) | 10 - 15 | L |
| | | Titanium Alloys | 10 - 15 | L - M |
| Cast Irons | K | Grey Cast Iron | 25 - 45 | L - M |
| | | Ductile Cast Iron | 40 - 60 | M |
| | | Malleable Iron | 40 - 60 | M |
| Hardened Steels | H | ‹ 25 HRc | 60 - 90 | M - H |
| | | 25 - 32 HRc | 40 - 60 | M |
| | | 32 - 43 HRc | 15 - 40 | L |
| | | 43 - 52 HRc | 10 - 15 | L |
| | | › 52 HRc | 5 - 10 | L |
| Non Ferrous | N | Aluminium Alloys | 150 - 300 | M - H |
| | | Copper & Hard Bronze | 30 - 45 | L |
| | | Brass & Soft Bronze | 50 - 80 | M |

RPM = Vc (m/min) x 318.0 ÷ Reamer Ø

## Series 272 - Recommended cutting data

Conditions de coupe recommandées | Empfohlene Schnittdaten | Dati di taglio Raccomandati | Zalecane dane o Cięciu (Zalecane parametry skrawania)

| Nominal Reamer Diameter Ø D¹ | Feed (mm/rev) | | |
|---|---|---|---|
| | L | M | H |
| 0.3mm - 1.6mm | 0.01 - 0.03 | 0.02 - 0.05 | 0.03 - 0.08 |
| 1.6mm - 3.0mm | 0.03 - 0.05 | 0.05 - 0.10 | 0.08 - 0.15 |
| 3.0mm - 6.0mm | 0.05 - 0.10 | 0.10 - 0.15 | 0.15 - 0.25 |
| 6.0mm - 12.0mm | 0.10 - 0.15 | 0.15 - 0.25 | 0.25 - 0.35 |
| 12.0mm - 16.0mm | 0.15 - 0.25 | 0.25 - 0.50 | 0.35 - 0.75 |

Feedrate Formula For Metric Reamers - Feed = RPM x mm/rev

## TrueSize® Reamer Tolerances

Résistances des alésoirs | Reibahlen – Toleranzen | Tolleranze degli alesatori | Tolerancja rozwiertaków

| Tool Dimensions | Diameter (mm) | Tolerance (mm) |
|---|---|---|
| D¹ | 0.330 - 16.000 | DIN 1420 H7 (See Below) |
| D² | 0.330 - 16.000 | + 0.00 / - 0.03 |
| L¹ | 0.330 - 16.000 | + /- 1.5 |
| L² | 0.330 - 16.000 | + /- 1.5 |



M.A. FORDMAX RANGE

# Countersinks

Fraises | Senker | Svasatori | Pogłębiacze

From the original M.A. Ford® single flute Uniflute® countersink for unrivalled economical, chatter free machining in both carbide and HSS options to multiple flute tools for increased feed rates for reduced chip loads, our wide choice and high quality countersinks provide the perfect solution.

(FR)

"Depuis la fraise originale M.A.Ford® une dent Uniflute® économiquement inégalable, ne générant pas de broutage, disponibles en carbure et HSS, en passant par les outils à goujures multiples pour des vitesses d'avance plus élevées et des copeaux réduits, notre large choix de fraises de grande qualité vous donnent accès aux meilleures solutions."

(DE)

Unsere große Auswahl an Senkern und deren hochwertige Qualität stellen die perfekte Lösung zur Verfügung: vom originalen M.A. Ford® Uniflute®-Senker mit einer Schneide zur einzigartigen, wirtschaftlichen und ratterfreien Bearbeitung in sowohl Hartmetall- als auch HSS-Ausführungen bis zu Werkzeugen mit mehreren Schneiden für erhöhte Vorschubgeschwindigkeiten und vermindertes Zerspanungsvolumen.

(IT)

La soluzione perfetta per la svasatura: ampia scelta e alta qualità. Svasatori originali M.A.Ford® Uniflute® monotagliente, disponibili sia in HSS che in metallo duro, per la svasatura efficiente e senza vibrazioni. Svasatori multitagliente per alto avanzamento con riduzione del carico per tagliente.

(PL)

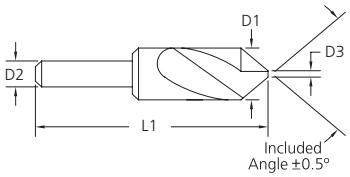
W naszej ofercie znajduja się jednostrzowe pogblebiacze Uniflute® , które oferują nieporównywalne wartości ekonomiczne i techniczne. Polecamy również opcje z wieloma rowkami wiórowymi które oferują wysokie wartości posuwu. Obydwie grupy produktow dostępne sa w wersji HSS i z węglika.


| | Page |
|---|---|
| **Uniflute® Carbide Countersink Single Flute** Series 60 Uncoated | 198 |
| **Uniflute® HSS Countersink Single Flute** Series 61 Steam Treated | 198 |
| **Uniflute® HSS Countersink Single Flute** Series 61B ALtima® Blaze Coated | 199 |
| **Uniflute® HSS Countersink Single Flute** Series 61T TiN Coated | 199 |
| **Uniflute® HSS Countersink Sets Single Flute** Series 61 Steam Treated & Series 61T TiN Coated | 200 |
| **Vibration Free HSS Countersink 6 Flute** Series 78 Uncoated | 201 |
| **Vibration Free HSS Countersink 6 Flute** Series 79 Steam Treated | 201 |
| **Vibration Free HSS Countersink 6 Flute** Series 79B ALtima® Blaze Coated & 79T TiN Coated | 202 |
| **Vibration Free HSS Countersink Set 6 Flute** Series 79 Steam Treated & 79T TiN Coated | 203 |
| **HSS Aircraft Countersink 3 Flute** Series 92 Bright Finish | 204 |
| **HSS Aircraft Countersink Set 3 Flute** Series 92 Bright Finish Set | 204 |
| **HSS Countersink 3 Flute** Series 893T TiN Coated | 205 |
| **HSS Countersink Set 3 Flute** Series 893T TiN Coated Set | 205 |
| **Technical Information** | 206 - 208 |

# Uniflute® Carbide Countersink - Single Flute Series 60 Uncoated

VHM | Z1 | 60° 82° 90° 100°





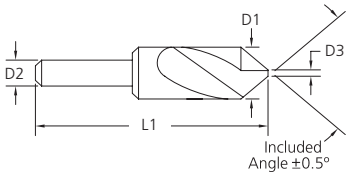

| 60° | 82° | 90° | 100° | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Tool No. | Tool No. | D1 | D2 | D3 (Max) | L1 |
| 60012501 | 60012502 | 60012503 | 60012504 | 1/8" 3.2mm | 1/8" 3.2mm | 0.030" 0.8mm | 1-1/2" 38.1mm |
| 60018701 | 60018702 | 60018703 | 60018704 | 3/16" 4.8mm | 3/16" 4.8mm | 0.045" 1.1mm | 1-1/2" 38.1mm |
| 60025001 | 60025002 | 60025003 | 60025004 | 1/4" 6.4mm | 1/4" 6.4mm | 0.045" 1.1mm | 2" 50.8mm |
| 60037501 | 60037502 | 60037503 | 60037504 | 3/8" 9.5mm | 1/4" 6.4mm | 0.06" 1.5mm | 2" 50.8mm |
| 60050001 | 60050002 | 60050003 | 60050004 | 1/2" 12.7mm | 1/4" 6.4mm | 0.06" 1.5mm | 2-3/8" 60.3mm |
| 60075001 | 60075002 | 60075003 | 60075004 | 3/4" 19.0mm | 1/2" 12.7mm | 0.120" 3.1mm | 3" 76.2mm |
| 60100001 | 60100002 | 60100003 | 60100004 | 1" 25.4mm | 1/2" 12.7mm | 0.120" 3.1mm | 3" 76.2mm |

P206

# Uniflute® HSS Countersink - Single Flute Series 61 Steam Treated

HSS | Z1 | 60° 82° 90° 100° 120°





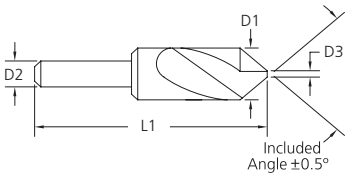

| 60° | 82° | 90° | 100° | 120° | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Tool No. | Tool No. | Tool No. | D1 | D2 | D3 (Max) | L1 |
| 61012501 | 61012502 | 61012503 | 61012504 | 61012506 | 1/8" 3.2mm | 1/8" 3.2mm | 0.030" 0.8mm | 1-1/2" 38.1mm |
| 61018701 | 61018702 | 61018703 | 61018704 | 61018706 | 3/16" 4.8mm | 3/16" 4.8mm | 0.045" 1.1mm | 1-1/2" 38.1mm |
| 61025001 | 61025002 | 61025003 | 61025004 | 61025006 | 1/4" 6.4mm | 1/4" 6.4mm | 0.045" 1.1mm | 2" 50.8mm |
| 61037501 | 61037502 | 61037503 | 61037504 | 61037506 | 3/8" 9.5mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 50.8mm |
| 61050001 | 61050002 | 61050003 | 61050004 | 61050006 | 1/2" 12.7mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 50.8mm |
| 61062501 | 61062502 | 61062503 | 61062504 | 61062506 | 5/8" 15.9mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 57.2mm |
| 61075001 | 61075002 | 61075003 | 61075004 | 61075006 | 3/4" 19.0mm | 1/2" 12.7mm | 0.120" 3.1mm | 2-3/4" 69.9mm |
| 61100001 | 61100002 | 61100003 | 61100004 | 61100006 | 1" 25.4mm | 1/2" 12.7mm | 0.120" 3.1mm | 2-3/4" 69.9mm |
| 61125001 | 61125002 | 61125003 | - | - | 1-1/4" 31.8mm | 1/2" 12.7mm | 0.120" 3.1mm | 3" 76.2mm |
| 61150001 | 61150002 | 61150003 | - | - | 1-1/2" 38.1mm | 3/4" 19.0mm | 1/4" 6.4mm | 3-1/2" 88.9mm |
| 61200001 | 61200002 | 61200003 | - | - | 2" 50.8mm | 3/4" 19.0mm | 1/2" 12.7mm | 3-3/4" 95.3mm |
| 61250001 | 61250002 | 61250003 | - | - | 2-1/2" 63.5mm | 3/4" 19.0mm | 3/4" 19.0mm | 5" 127.0mm |
| 61300001 | 61300002 | 61300003 | - | - | 3" 76.2mm | 3/4" 19.0mm | 1" 25.4mm | 5-1/4" 133.4mm |

P206

# Uniflute® HSS Countersink - Single Flute Series 61B Coated

HSS | ALtima® Blaze | Z1 | 60° 82° 90° 100° 120°





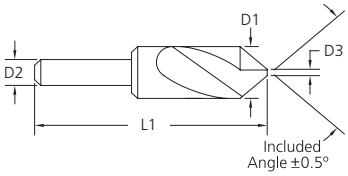

| 60° | 82° | 90° | 100° | 120° | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Tool No. | Tool No. | Tool No. | D1 | D2 | D3 (Max) | L1 |
| 61B012501 | 61B012502 | 61B012503 | 61B012504 | 61B012506 | 1/8" 3.2mm | 1/8" 3.2mm | 0.030" 0.8mm | 1-1/2" 38.1mm |
| 61B018701 | 61B018702 | 61B018703 | 61B018704 | 61B018706 | 3/16" 4.8mm | 3/16" 4.8mm | 0.045" 1.1mm | 1-1/2" 38.1mm |
| 61B025001 | 61B025002 | 61B025003 | 61B025004 | 61B025006 | 1/4" 6.4mm | 1/4" 6.4mm | 0.045" 1.1mm | 2" 50.8mm |
| 61B037501 | 61B037502 | 61B037503 | 61B037504 | 61B037506 | 3/8" 9.5mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 50.8mm |
| 61B050001 | 61B050002 | 61B050003 | 61B050004 | 61B050006 | 1/2" 12.7mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 50.8mm |
| 61B062501 | 61B062502 | 61B062503 | 61B062504 | 61B062506 | 5/8" 15.9mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 50.8mm |
| 61B075001 | 61B075002 | 61B075003 | 61B075004 | 61B075006 | 3/4" 19.0mm | 1/2" 12.7mm | 0.120" 3.1mm | 2-3/4" 69.9mm |
| 61B100001 | 61B100002 | 61B100003 | 61B100004 | 61B100006 | 1" 25.4mm | 1/2" 12.7mm | 0.120" 3.1mm | 2-3/4" 69.9mm |

P206

# Uniflute® HSS Countersink - Single Flute Series 61T Coated

HSS | TiN | Z1 | 60° 82° 90° 100° 120°






| 60° | 82° | 90° | 100° | 120° | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Tool No. | Tool No. | Tool No. | D1 | D2 | D3 (Max) | L1 |
| 61T012501 | 61T012502 | 61T012503 | 61T012504 | 61T012506 | 1/8" 3.2mm | 1/8" 3.2mm | 0.030" 0.8mm | 1-1/2" 38.1mm |
| 61T018701 | 61T018702 | 61T018703 | 61T018704 | 61T018706 | 3/16" 4.8mm | 3/16" 4.8mm | 0.045" 1.1mm | 1-1/2" 38.1mm |
| 61T025001 | 61T025002 | 61T025003 | 61T025004 | 61T025006 | 1/4" 6.4mm | 1/4" 6.4mm | 0.045" 1.1mm | 2" 50.8mm |
| 61T037501 | 61T037502 | 61T037503 | 61T037504 | 61T037506 | 3/8" 9.5mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 50.8mm |
| 61T050001 | 61T050002 | 61T050003 | 61T050004 | 61T050006 | 1/2" 12.7mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 50.8mm |
| 61T062501 | 61T062502 | 61T062503 | 61T062504 | 61T062506 | 5/8" 15.9mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 50.8mm |
| 61T075001 | 61T075002 | 61T075003 | 61T075004 | 61T075006 | 3/4" 19.0mm | 1/2" 12.7mm | 0.120" 3.1mm | 2-3/4" 69.9mm |
| 61T100001 | 61T100002 | 61T100003 | 61T100004 | 61T100006 | 1" 25.4mm | 1/2" 12.7mm | 0.120" 3.1mm | 2-3/4" 69.9mm |

P206

# Uniflute® HSS Countersink Sets - Single Flute Series 61 Steam Treated

HSS | Z1 | 60° 82° 90° 100° 120°







| **4pc Set - Series 61**<br>Set Includes - 1/4" (6.4mm), 1/2" (12.7mm), 3/4" (19.0mm) & 1" (25.4mm) | |
|---|---|
| **Set No.** | **Angle** |
| 64100001 | 60° |
| 64100002 | 82° |
| 64100003 | 90° |
| 64100004 | 100° |
| 64100006 | 120° |

| **7pc Set - Series 61**<br>Set Includes - 3/16" (4.8mm), 1/4" (6.4mm), 3/8" (9.5mm) 1/2" (12.7mm), 5/8" (15.9mm), 3/4" (19.0mm) & 1" (25.4mm) | |
|---|---|
| **Set No.** | **Angle** |
| 64100071 | 60° |
| 64100072 | 82° |
| 64100073 | 90° |
| 64100074 | 100° |
| 64100076 | 120° |

P206

## Series 61T TiN Coated

HSS | TiN | Z1 | 60° 82° 90° 100° 120°



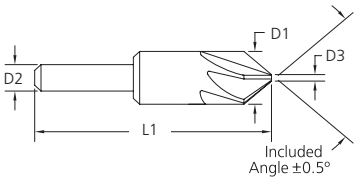

| **4pc Set - Series 61T**<br>Set Includes - 1/4"(6.4mm), 1/2"(12.7mm) 3/4"(19.0mm), 1"(25.4mm) | |
|---|---|
| **Set No.** | **Angle** |
| 64T100001 | 60° |
| 64T100002 | 82° |
| 64T100003 | 90° |

P206

# Vibration Free HSS Countersink - 6 Flute Series 78 Uncoated

VHM | Z6 | 60° 82° 90° 100° 120°





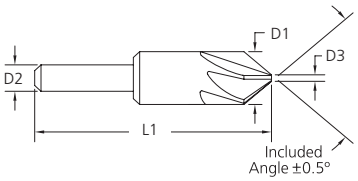

| 60° | 82° | 90° | 100° | 120° | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Tool No. | Tool No. | Tool No. | D1 | D2 | D3 (Max) | L1 |
| 78012501 | 78012502 | 78012503 | 78012504 | 78012506 | 1/8" 3.2mm | 1/8" 3.2mm | 0.030" 0.8mm | 1-1/2" 38.1mm |
| 78018701 | 78018702 | 78018703 | 78018704 | 78018706 | 3/16" 4.8mm | 3/16" 4.8mm | 0.045" 1.1mm | 1-1/2" 38.1mm |
| 78025001 | 78025002 | 78025003 | 78025004 | 78025006 | 1/4" 6.4mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 50.8mm |
| 78037501 | 78037502 | 78037503 | 78037504 | 78037506 | 3/8" 9.5mm | 1/4" 6.4mm | 0.090" 2.3mm | 2" 50.8mm |
| 78050001 | 78050002 | 78050003 | 78050004 | 78050006 | 1/2" 12.7mm | 3/8" 9.5mm | 0.150" 3.8mm | 2-1/8" 54.0mm |
| 78062501 | 78062502 | 78062503 | 78062504 | 78062506 | 5/8" 15.9mm | 3/8" 9.5mm | 0.180" 4.6mm | 2-3/8" 60.3mm |
| 78075001 | 78075002 | 78075003 | 78075004 | 78075006 | 3/4" 19.0mm | 1/2" 12.7mm | 0.210" 5.3mm | 2-3/4" 69.9mm |
| 78100001 | 78100002 | 78100003 | 78100004 | 78100006 | 1" 25.4mm | 1/2" 12.7mm | 1/4" 6.4mm | 2-3/4" 69.9mm |
| 78125001 | 78125002 | 78125003 | - | - | 1-1/4" 31.8mm | 1/2" 12.7mm | 0.370" 9.4mm | 3" 76.2mm |
| 78150001 | 78150002 | 78150003 | - | - | 1-1/2" 38.1mm | 3/4" 19.0mm | 0.430" 10.9mm | 3-1/2" 88.9mm |

P206

# Vibration Free HSS Countersink - 6 Flute Series 79 Steam Treated

HSS | Z6 | 60° 82° 90° 100° 120°





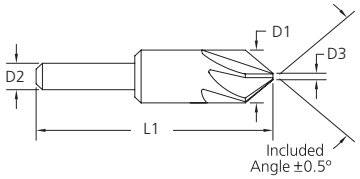

| 60° | 82° | 90° | 100° | 120° | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Tool No. | Tool No. | Tool No. | D1 | D2 | D3 (Max) | L1 |
| 79012501 | 79012502 | 79012503 | 79012504 | 79012506 | 1/8" 3.2mm | 1/8" 3.2mm | 0.030" 0.8mm | 1-1/2" 38.1mm |
| 79018701 | 79018702 | 79018703 | 79018704 | 79018706 | 3/16" 4.8mm | 3/16" 4.8mm | 0.045" 1.1mm | 1-1/2" 38.1mm |
| 79025001 | 79025002 | 79025003 | 79025004 | 79025006 | 1/4" 6.4mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 50.8mm |
| 79031201 | 79031202 | 79031203 | 79031204 | 79031206 | 5/16" 7.9mm | 1/4" 6.4mm | 0.080" 2.0mm | 2" 50.8mm |
| 79037501 | 79037502 | 79037503 | 79037504 | 79037506 | 3/8" 9.5mm | 1/4" 6.4mm | 0.090" 2.3mm | 2" 50.8mm |
| 79050001 | 79050002 | 79050003 | 79050004 | 79050006 | 1/2" 12.7mm | 3/8" 9.5mm | 0.150" 3.8mm | 2" 50.8mm |
| 79062501 | 79062502 | 79062503 | 79062504 | 79062506 | 5/8" 15.9mm | 3/8" 9.5mm | 0.180" 4.6mm | 2-1/4" 57.1mm |
| 79075001 | 79075002 | 79075003 | 79075004 | 79075006 | 3/4" 19.0mm | 1/2" 12.7mm | 0.210" 5.3mm | 2-3/4" 69.9mm |
| 79087501 | 79087502 | 79087503 | 79087504 | 79087506 | 7/8" 22.2mm | 1/2" 12.7mm | 0.230" 5.8mm | 2-3/4" 69.9mm |
| 79100001 | 79100002 | 79100003 | 79100004 | 79100006 | 1" 25.4mm | 1/2" 12.7mm | 1/4" 6.4mm | 2-3/4" 69.9mm |
| 79125001 | 79125002 | 79125003 | 79125004 | 79125006 | 1-1/4" 31.8mm | 1/2" 12.7mm | 0.370" 9.4mm | 3" 76.2mm |
| 79150001 | 79150002 | 79150003 | 79150004 | 79150006 | 1-1/2" 38.1mm | 3/4" 19.0mm | 0.430" 10.9mm | 3-1/2" 88.9mm |
| 79200001 | 79200002 | 79200003 | 79200004 | 79200006 | 2" 50.8mm | 3/4" 19.0mm | 0.620" 15.7mm | 3-3/4" 95.2mm |
| 79250001 | 79250002 | 79250003 | - | - | 2-1/2" 63.5mm | 3/4" 19.0mm | 3/4" 19.0mm | 5" 127.0mm |
| 79300001 | 79300002 | 79300003 | - | - | 3" 76.2mm | 3/4" 19.0mm | 1" 25.4mm | 5-1/4" 133.4mm |

P206

# Vibration Free HSS Countersink - 6 Flute Series 79B Coated

HSS | Z6 | 60° 82° 90° 100° 120°





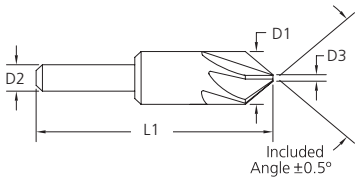

| 60° | 82° | 90° | 100° | 120° | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Tool No. | Tool No. | Tool No. | D1 | D2 | D3 (Max) | L1 |
| 79B012501 | 79B012502 | 79B012503 | 79B012504 | 79B012506 | 1/8" 3.2mm | 1/8" 3.2mm | 0.030" 0.8mm | 1-1/2" 38.1mm |
| 79B018701 | 79B018702 | 79B018703 | 79B018704 | 79B018706 | 3/16" 4.8mm | 3/16" 4.8mm | 0.045" 1.1mm | 1-1/2" 38.1mm |
| 79B025001 | 79B025002 | 79B025003 | 79B025004 | 79B025006 | 1/4" 6.4mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 50.8mm |
| 79B037501 | 79B037502 | 79B037503 | 79B037504 | 79B037506 | 3/8" 9.5mm | 1/4" 6.4mm | 0.090" 2.3mm | 2" 50.8mm |
| 79B050001 | 79B050002 | 79B050003 | 79B050004 | 79B050006 | 1/2" 12.7mm | 3/8" 9.5mm | 0.150" 3.8mm | 2" 50.8mm |
| 79B062501 | 79B062502 | 79B062503 | 79B062504 | 79B062506 | 5/8" 15.9mm | 3/8" 9.5mm | 0.180" 4.6mm | 2-1/4" 57.1mm |
| 79B075001 | 79B075002 | 79B075003 | 79B075004 | 79B075006 | 3/4" 19.0mm | 1/2" 12.7mm | 0.210" 5.3mm | 2-3/4" 69.9mm |
| 79B100001 | 79B100002 | 79B100003 | 79B100004 | 79B100006 | 1" 25.4mm | 1/2" 12.7mm | 1/4" 6.4mm | 2-3/4" 69.9mm |

P206

# Vibration Free HSS Countersink - 6 Flute Series 79T Coated

HSS | TiN | Z6 | 60° 82° 90° 100° 120° | ALtima® Blaze






| 60° | 82° | 90° | 100° | 120° | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Tool No. | Tool No. | Tool No. | D1 | D2 | D3 (Max) | L1 |
| 79T012501 | 79T012502 | 79T012503 | 79T012504 | 79T012506 | 1/8" 3.2mm | 1/8" 3.2mm | 0.030" 0.8mm | 1-1/2" 38.1mm |
| 79T018701 | 79T018702 | 79T018703 | 79T018704 | 79T018706 | 3/16" 4.8mm | 3/16" 4.8mm | 0.045" 1.1mm | 1-1/2" 38.1mm |
| 79T025001 | 79T025002 | 79T025003 | 79T025004 | 79T025006 | 1/4" 6.4mm | 1/4" 6.4mm | 0.060" 1.5mm | 2" 50.8mm |
| 79T037501 | 79T037502 | 79T037503 | 79T037504 | 79T037506 | 3/8" 9.5mm | 1/4" 6.4mm | 0.090" 2.3mm | 2" 50.8mm |
| 79T050001 | 79T050002 | 79T050003 | 79T050004 | 79T050006 | 1/2" 12.7mm | 3/8" 9.5mm | 0.150" 3.8mm | 2" 50.8mm |
| 79T062501 | 79T062502 | 79T062503 | 79T062504 | 79T062506 | 5/8" 15.9mm | 3/8" 9.5mm | 0.180" 4.6mm | 2-1/4" 57.1mm |
| 79T075001 | 79T075002 | 79T075003 | 79T075004 | 79T075006 | 3/4" 19.0mm | 1/2" 12.7mm | 0.210" 5.3mm | 2-3/4" 69.9mm |
| 79T100001 | 79T100002 | 79T100003 | 79T100004 | 79T100006 | 1" 25.4mm | 1/2" 12.7mm | 1/4" 6.4mm | 2-3/4" 69.9mm |

P206

# Vibration Free HSS Countersink - 6 Flute Sets Series 79 Steam Treated

HSS | Z6 | 60° 82° 90° 100° 120°







| **4pc Set - Series 79**<br>Set Includes - 1/4"(6.4mm), 1/2"(12.7mm)<br>3/4"(19.0mm), 1"(25.4mm) | |
|---|---|
| **Set No.** | **Angle** |
| 79000011 | 60° |
| 79000012 | 82° |
| 79000013 | 90° |
| 79000014 | 100° |

| **7pc Set - Series 79**<br>Set Includes - 1/4"(6.4mm), 5/16"(7.9mm), 3/8"(9.5mm)<br>1/2"(12.7mm), 5/8"(15.9mm), 3/4"(19.0mm), 1"(25.4mm) | |
|---|---|
| **Set No.** | **Angle** |
| 79000001 | 60° |
| 79000002 | 82° |
| 79000003 | 90° |
| 79000004 | 100° |

P206

# Vibration Free HSS Countersink - 6 Flute Set Series 79T Coated

HSS | TiN | Z6 | 60° 82° 90° 100° 120°

| **4pc Set - Series 79T**<br>Set Includes - 1/4"(6.4mm), 1/2"(12.7mm)<br>3/4"(19.0mm), 1"(25.4mm) | |
|---|---|
| **Set No.** | **Angle** |
| 79T000011 | 60° |
| 79T000012 | 82° |
| 79T000013 | 90° |

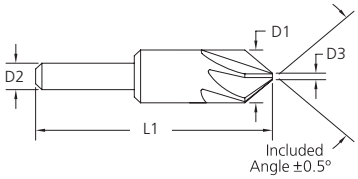
P206



# HSS Aircraft Countersink - 3 Flute Series 92 Bright Finish

HSS | Z3 | 60° 82° 90° 100° 120°






| 60° | 82° | 90° | 100° | 120° | Tool Dimensions | | | |
|---|---|---|---|---|---|---|---|---|
| Tool No. | Tool No. | Tool No. | Tool No. | Tool No. | D1 | D2 | D3 (Max) | L1 |
| 92025001 | 92025002 | 92025003 | 92025004 | 92025006 | 1/4" 6.4mm | 1/4" 6.4mm | 0.070" 1.8mm | 1-1/4" 31.8mm |
| 92037501 | 92037502 | 92037503 | 92037504 | 92037506 | 3/8" 9.5mm | 1/4" 6.4mm | 0.110" 2.8mm | 1-5/8" 41.3mm |
| 92050001 | 92050002 | 92050003 | 92050004 | 92050006 | 1/2" 12.7mm | 1/4" 6.4mm | 0.150" 3.8mm | 2" 50.8mm |
| 92062501 | 92062502 | 92062503 | 92062504 | 92062506 | 5/8" 15.9mm | 1/4" 6.4mm | 0.190" 4.8mm | 2-1/4" 57.1mm |
| 92075001 | 92075002 | 92075003 | 92075004 | 92075006 | 3/4" 19.0mm | 1/2" 12.7mm | 0.230" 5.8mm | 3" 76.2mm |
| 92087501 | 92087502 | 92087503 | 92087504 | 92087506 | 7/8" 22.2mm | 1/2" 12.7mm | 0.260" 6.6mm | 3" 76.2mm |
| 92100001 | 92100002 | 92100003 | 92100004 | 92100006 | 1" 25.4mm | 1/2" 12.7mm | 0.300" 7.6mm | 3-1/4" 82.5mm |
| 92112501 | 92112502 | 92112503 | 92112504 | 92112506 | 1-1/8" 28.6mm | 1/2" 12.7mm | 0.340" 8.6mm | 3-1/4" 82.5mm |
| 92125001 | 92125002 | 92125003 | 92125004 | 92125006 | 1-1/4" 31.8mm | 5/8" 15.9mm | 0.380" 9.6mm | 3-1/2" 88.9mm |
| 92150001 | 92150002 | 92150003 | 92150004 | 92150006 | 1-1/2" 38.1mm | 3/4" 19.0mm | 0.450" 11.4mm | 3-7/8" 98.4mm |
| 92200001 | 92200002 | 92200003 | 92200004 | 92200006 | 2" 50.8mm | 3/4" 19.0mm | 0.600" 15.2mm | 4-1/4" 107.9mm |

P206

# HSS Aircraft Countersink Set - 3 Flute Series 92 Bright Finish

HSS | Z3 | 60° 82° 90° 100° 120°



| 5pc Set - Series 92<br>Set Includes - 1/4"(6.4mm), 3/8"(9.5mm), 1/2"(12.7mm) 5/8"(15.9mm) & 3/4"(19.0mm) | |
|---|---|
| Set No. | Angle |
| 92000011 | 60° |
| 92000012 | 82° |
| 92000013 | 90° |
| 92000014 | 100° |
| 92000016 | 120° |

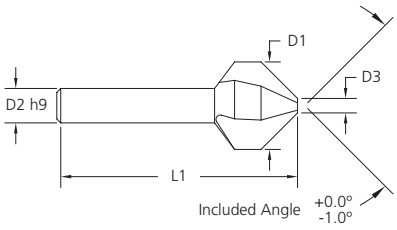



P206

# HSS Countersink - 3 Flute Series 893T Coated

HSS | TiN | Z3 | 90° | DIN 335






| 90° | | Tool Dimensions | | | |
|---|---|---|---|---|---|
| **Tool No.** | **Fastner Size** | **D1** | **D2** | **D3 (Max)** | **L1** |
| 893 0430T | M2 | 4.3 | 4.0 | 1.3 | 40.0 |
| 893 0500T | M2.5 | 5.0 | 4.0 | 1.5 | 40.0 |
| 893 0600T | M3 | 6.0 | 5.0 | 1.5 | 45.0 |
| 893 0630T | M3 | 6.3 | 5.0 | 1.5 | 45.0 |
| 893 0700T | M3.5 | 7.0 | 6.0 | 1.8 | 50.0 |
| 893 0800T | M4 | 8.0 | 6.0 | 2.0 | 50.0 |
| 893 0830T | M4 | 8.3 | 6.0 | 2.0 | 50.0 |
| 893 1000T | M5 | 10.0 | 6.0 | 2.5 | 50.0 |
| 893 1040T | M5 | 10.4 | 6.0 | 2.5 | 50.0 |
| 893 1150T | M6 | 11.5 | 8.0 | 2.8 | 56.0 |
| 893 1240T | M6 | 12.4 | 8.0 | 2.8 | 56.0 |
| 893 1500T | M8 | 15.0 | 10.0 | 3.2 | 60.0 |
| 893 1650T | M8 | 16.5 | 10.0 | 3.2 | 60.0 |
| 883 1900T | M10 | 19.0 | 10.0 | 3.5 | 63.0 |
| 893 2050T | M10 | 20.5 | 10.0 | 3.5 | 63.0 |
| 893 2300T | M12 | 23.0 | 10.0 | 3.8 | 67.0 |
| 893 2500T | M12 | 25.0 | 10.0 | 3.8 | 67.0 |
| 893 3100T | M16 | 31.0 | 12.0 | 4.2 | 71.0 |

P206

# HSS Countersink Set - 3 Flute Series 893T

HSS | TiN | Z3 | 90° | DIN 335

| **6pc Set - Series 893T**<br>Set Includes - 6.3mm, 8.3mm, 10.4mm<br>12.4mm, 16.5mm & 20.5mm | |
|---|---|
| **Set No.** | **Angle** |
| 893T 6PC 90 DEG | 90° |

P190



# HSS & Carbide Countersinks

## Uniflute® Countersink Feed Rates

Uniflute® countersinks are designed with cam relief, therefore feed rates should not exceed 0.125mm per revolution on larger diameter holes. Reduced feeds are recommended for smaller diameter holes. A controlled feed results in vibration-free finishes associated with Uniflute® countersinks.

## Multiple Flute Countersink Feed Rates

Multiple flute countersinks are designed for increased feed rates. Because there is more than one cutting edge, tooth loads are not excessive so vibration can be controlled, allowing higher feedrates.

## Speeds

To determine optimum speed, start at the lower end of the cutting speed range shown in the chart below, increasing the speed until performance is maximized. When a countersink is operated at excessive RPM, vibration mayresult and the cutting edges can overheat and become prematurely worn.

| | | | Vc (m/min) | | | |
|---|---|---|---|---|---|---|
| **Workpiece Material Group** | | **Material Type** | **HSS** | **HSS TiN Coated** | **HSS ALtima® Blaze Coated** | **Carbide** |
| **Steels** | P | Low Carbon | 25 - 30 | 30 - 40 | 40 - 50 | 40 - 50 |
| | | Medium Carbon | 20 - 25 | 25 - 30 | 35 - 40 | 35 - 45 |
| | | Alloy Steels | 15 - 20 | 20 - 25 | 25 - 30 | 20 - 30 |
| **Stainless Steels** | M | Free Machining | 10 - 25 | 10 - 30 | 15 - 40 | 25 - 40 |
| | | Difficult Stainless | 5 - 10 | 5 - 20 | 10 - 25 | 15 - 25 |
| **Special Alloys** | S | High Temperature Alloys | 5 - 8 | 5 - 10 | 5 - 10 | 8 - 15 |
| | | Titanium Alloys | 15 - 20 | 20 - 25 | 25 - 30 | 20 - 30 |
| **Cast Irons** | K | Cast Iron | 15 - 30 | 20 - 40 | 25 - 50 | 30 - 55 |
| | | Malleable Iron | 25 - 30 | 30 - 35 | 40 - 45 | 30 - 45 |
| **Hardened Steels** | H | 45 - 50 HRc | 5 - 10 | 5 - 10 | 8 - 10 | 8 - 15 |
| | | 50 - 55 HRc | 2 - 5 | 3 - 5 | 5 - 10 | 5 - 10 |
| **Non Ferrous** | N | Aluminium Alloys | 45 - 75 | 60 - 100 | 75 - 120 | 90 - 150 |
| | | Brass / Bronze | 25 - 40 | 30 - 50 | 35 - 60 | 45 - 80 |

**Conversion Formula**

RPM = Vc (m/min) x 318.0 ÷ Countersink Ø *

* Countersink Ø Must Be Calculated in mm
(When making the calculation, use the diameter on the countersink where the cutting is actually taking place)

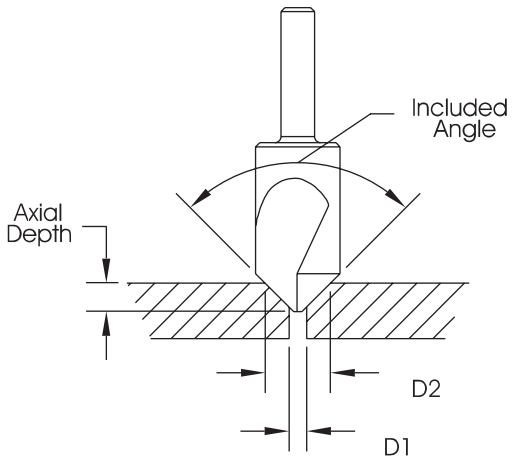
# HSS & Carbide Countersinks

### Minimum Body Diameter for 90° Flat Head Cap Screws (mm)

| Cap Screw Size (mm) | Countersink Diameter (mm) |
|---|---|
| M3 | 7.0 |
| M4 | 10.0 |
| M5 | 12.0 |
| M6 | 14.0 |
| M8 | 19.0 |
| M10 | 23.0 |
| M12 | 25.0 |
| M16 | 31.0 |

### Size Diameter Gain for every 0.025mm of Axial Depth in to a Pre-Drilled Hole

| Included Angle | Axial Depth (mm) | Diameter Gain (mm) |
|---|---|---|
| 30° | 0.025 | 0.0127 |
| 45° | 0.025 | 0.0203 |
| 60° | 0.025 | 0.0254 |
| 82° | 0.025 | 0.0432 |
| 90° | 0.025 | 0.0508 |
| 100° | 0.025 | 0.0711 |
| 120° | 0.025 | 0.0864 |




DIAMETER GAIN = D2-D1

# HSS & Carbide Countersinks

All M.A. Ford® HSS countersinks are heat treated in an electronically controlled vacuum furnace. This assures precise hardening and eliminates the possibility of decarburization. All heat treating is done in our own facilities for maximum control and assurance of desired hardness and toughness.

Most M.A. Ford® HSS countersinks receive an additional heat treat process known as the Steam Homogeneous Process. This process is like a final tempering, relieving internal grinding stresses. The result is a much tougher cutting edge that stays sharper, longer. Additionally, the Steam Homogeneous Process provides a tough, hard, porous oxide film on the tool that is sufficient enough to retain cutting oil, further reducing frictional heat and extending tool life.

## Coated Countersinks



**ALtima® Blaze**



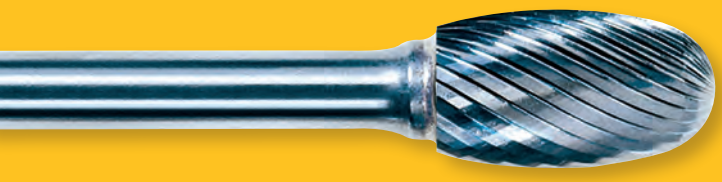
**TiN coating**

## Coating Properties

| | TiN | ALtima® Blaze |
|---|---|---|
| Micro Hardness (HV) | 2300 | 3200 |
| Max. Working Temperature | 600° C<br>1112° F | 1100° C<br>2012° F |
| Friction Coefficient | 0.40 | 0.35 |

**ALtima® Blaze**
features high temperature hardness and oxidation resistance that provides extreme wear resistance under all machining conditions.

**TiN**
provides a higher surface hardness and increased lubricity over an uncoated tool.



M.A. FORDMAX RANGE

# Edgehog®

## Carbide Burrs

Fraise Lime Rotative Carbure | Hartmetall-Frässtifte
Lime rotative in MD | Zadziory

For aggressive cutting action, smooth operation and long tool life, M.A. Ford® Edgehog® carbide burrs are by far the most effective solution for even the most demanding de-burring and pre-finishing applications. With more than 160 different tool shapes and sizes available in our Edgehog range, including cylindrical, conical, ball and countersink styles, there's a burr to meet virtually every application.

(FR)
"Pour les actions de coupe agressives, un bon fonctionnement et une longue durée de vie de l'outil, les fraises en carbure M.A. Ford® Edgehog® sont de loin la solution la plus efficace pour les applications d'ébavurage et de pré-finition même les plus exigeantes. Avec plus de 160 différentes formes et tailles d'outils disponibles dans notre gamme Edgehog, incluant les formes de fraises cylindriques, coniques, ronds: il existe un outil d'ébavurage pour pratiquement n'importe quel type d'application."

(DE)
Bei sehr intensiven Schnittvorgängen und für eine reibungslose Funktion sowie lange Werkzeugstandzeiten stellen die Edgehog®-Hartmetallentgrater von M.A. Ford® bei Weitem die effektivste Lösung sogar bei den anspruchsvollsten Entgratungs- und Nachbearbeitungsanwendungen dar. Unser Edgehog-Sortiment umfasst mehr als 160 verschiedene Werkzeugformen und -größen, einschließlich zylindrische, konische, kugelförmige sowie Senker-Formen, und daher steht für nahezu jede Anwendung ein Entgrater zur Verfügung.

(IT)
Per un taglio aggressivo ma scorrevole ed una lunga vita utensile, le lime rotative in metallo duro M.A.Ford® Edgehog® sono certamente la soluzione più efficace, anche per le operazioni di sbavatura e pre-finitura più impegnative. Con più di 160 utensili di diverse geometrie (tra cui cilindriche, coniche, sferiche e tipo svasatore) e misure disponibili, nella gamma Edgehog c'è la lima rotative idonea per qualsiasi applicazione.

(PL)
Pilniki obrotowe z węglika M.A. Ford® Edgehog® umożliwiają pracę w wymagajacych warunkach przy zachowaniu długiej żywotności narzędzia. Są zdecydowanie najbardziej efektywnym rozwiązaniem dla najbardziej wymagających operacji szlifowania. W naszej ofercie M.A. Ford® Edgehog® znajduje się ponad 160 narzędzi o różnych średnicach i kształtach(cylindryczne, kulowe, stożkowe.


| | Page |
|---|---|
| **Edgehog® Carbide Burrs** Series SA | 210 |
| **Edgehog® Carbide Burrs** Series SB | 211 |
| **Edgehog® Carbide Burrs** Series SC | 212 |
| **Edgehog® Carbide Burrs** Series SD | 213 |
| **Edgehog® Carbide Burrs** Series SE | 214 |
| **Edgehog® Carbide Burrs** Series SF | 215 |
| **Edgehog® Carbide Burrs** Series SG | 216 |
| **Edgehog® Carbide Burrs** Series SH | 217 |
| **Edgehog® Carbide Burrs** Series SJ | 218 |
| **Edgehog® Carbide Burrs** Series SK | 219 |
| **Edgehog® Carbide Burrs** Series SL | 220 |
| **Edgehog® Carbide Burrs** Series SM | 221 |
| **Edgehog® Carbide Burrs** Series SN | 222 |
| **Technical Information** | 223 - 224 |

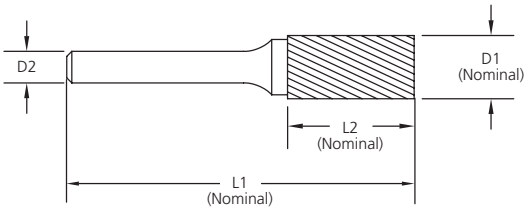
# Edgehog® Carbide Burrs Series SA



Type A

**Cylinder**






## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SA-41M | SA-41M-D | SA-41M-F | - | 1.6 | 3.0 | 38.0 | 6.0 |
| SA-42M | SA-42M-D | SA-42M-F | - | 2.4 | 3.0 | 38.0 | 11.1 |
| SA-43M | SA-43M-D | SA-43M-F | - | 3.0 | 3.0 | 38.0 | 14.3 |
| SA-52M | SA-52M-D | SA-52M-F | - | 4.0 | 3.0 | 38.0 | 12.7 |
| SA-53M | SA-53M-D | SA-53M-F | - | 4.8 | 3.0 | 38.0 | 12.7 |
| SA-51M | SA-51M-D | SA-51M-F | - | 6.4 | 3.0 | 51.0 | 12.7 |

## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SA-11M | SA-11M-D | - | - | 3.0 | 6.0 | 50.0 | 12.7 |
| SA-13M | - | - | - | 4.0 | 6.0 | 50.0 | 16.0 |
| - | SA-14M-D | - | - | 4.8 | 6.0 | 50.0 | 16.0 |
| SA-1M | SA-1M-D | SA-1M-F | - | 6.0 | 6.0 | 50.0 | 16.0 |
| SA-2M | SA-2M-D | - | - | 8.0 | 6.0 | 64.0 | 19.0 |
| SA-3M | SA-3M-D | SA-3M-F | SA-3NFM | 9.5 | 6.0 | 64.0 | 19.0 |
| SA-3MZ | SA-3MZ-D | SA-3MZ-F | - | 10.0 | 6.0 | 65.0 | 20.0 |
| SA-4M | SA-4M-D | - | - | 11.0 | 6.0 | 70.0 | 25.0 |
| SA-5MZ | SA-5MZ-D | - | - | 12.0 | 6.0 | 70.0 | 25.0 |
| SA-5M | SA-5M-D | SA-5M-F | SA-5NFM | 12.7 | 6.0 | 70.0 | 25.0 |
| SA-6M | SA-6M-D | SA-6M-F | SA-6NFM | 16.0 | 6.0 | 70.0 | 25.0 |
| SA-15M | - | - | - | 19.0 | 6.0 | 58.0 | 12.7 |
| SA-7M | SA-7M-D | SA-7M-F | - | 19.0 | 6.0 | 70.0 | 25.0 |
| SA-9M | SA-9M-D | SA-9M-F | - | 25.0 | 6.0 | 70.0 | 25.0 |



## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SA-43L76M | SA-43L76M-D | - | - | 3.0 | 3.0 | 76.0 | 14.3 |

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P223

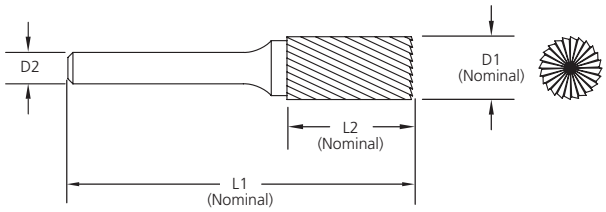
# Edgehog® Carbide Burrs Series SB



Type B

**Cylinder - With End Cut**






## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SB-51M | SB-51M-D | SB-51M-F | - | 6.4 | 3.0 | 43.0 | 4.8 |

## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SB-11M | SB-11M-D | - | - | 3.0 | 6.0 | 50.0 | 12.7 |
| SB-13M | SB-13M-D | - | - | 4.0 | 6.0 | 50.0 | 16.0 |
| - | SB-14M-D | - | - | 4.8 | 6.0 | 50.0 | 16.0 |
| SB-1M | SB-1M-D | SB-1M-F | - | 6.0 | 6.0 | 50.0 | 16.0 |
| SB-2M | SB-2M-D | SB-2M-F | - | 8.0 | 6.0 | 64.0 | 19.0 |
| SB-3M | SB-3M-D | SB-3M-F | SB-3NFM | 9.5 | 6.0 | 64.0 | 19.0 |
| SB-3MZ | SB-3MZ-D | SB-3MZ-F | - | 10.0 | 6.0 | 65.0 | 20.0 |
| SB-4M | SB-4M-D | - | - | 11.0 | 6.0 | 70.0 | 25.0 |
| SB-5MZ | SB-5MZ-D | SB-5MZ-F | - | 12.0 | 6.0 | 70.0 | 25.0 |
| SB-5M | SB-5M-D | - | SB-5NFM | 12.7 | 6.0 | 70.0 | 25.0 |
| SB-6M | SB-6M-D | - | - | 16.0 | 6.0 | 70.0 | 25.0 |
| - | SB-16M-D | - | - | 19.0 | 6.0 | 64.0 | 19.0 |
| - | SB-7M-D | SB-7M-F | - | 19.0 | 6.0 | 70.0 | 25.0 |
| SB-9M | SB-9M-D | - | - | 25.0 | 6.0 | 70.0 | 25.0 |

P223

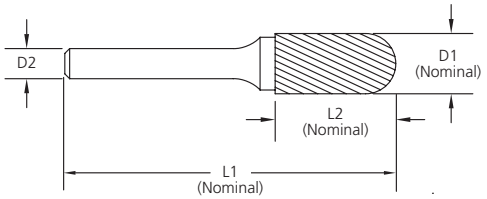
# Edgehog® Carbide Burrs Series SC



Type C

**Ball Nosed Cylinder**






## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SC-41M | SC-41M-D | SC-41M-F | - | 2.4 | 3.0 | 38.0 | 11.1 |
| SC-42M | SC-42M-D | SC-42M-F | - | 3.0 | 3.0 | 38.0 | 14.3 |
| SC-52M | SC-52M-D | SC-52M-F | - | 4.0 | 3.0 | 38.0 | 12.7 |
| SC-53M | SC-53M-D | SC-53M-F | - | 4.8 | 3.0 | 38.0 | 12.7 |
| SC-51M | SC-51M-D | SC-51M-F | - | 6.4 | 3.0 | 51.0 | 12.7 |

## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| - | SC-11M-D | - | - | 3.0 | 6.0 | 50.0 | 12.7 |
| SC-13M | SC-13M-D | - | - | 4.0 | 6.0 | 50.0 | 16.0 |
| SC-14M | SC-14M-D | - | - | 4.8 | 6.0 | 50.0 | 16.0 |
| SC-1M | SC-1M-D | SC-1M-F | - | 6.0 | 6.0 | 50.0 | 16.0 |
| SC-2M | SC-2M-D | SC-2M-F | - | 8.0 | 6.0 | 64.0 | 19.0 |
| SC-3M | SC-3M-D | SC-3M-F | SC-3NFM | 9.5 | 6.0 | 64.0 | 19.0 |
| SC-3MZ | SC-3MZ-D | SC-3MZ-F | - | 10.0 | 6.0 | 65.0 | 20.0 |
| SC-4M | SC-4M-D | - | - | 11.0 | 6.0 | 70.0 | 25.0 |
| SC-5MZ | SC-5MZ-D | SC-5MZ-F | - | 12.0 | 6.0 | 70.0 | 25.0 |
| SC-5M | SC-5M-D | SC-5M-F | SC-5NFM | 12.7 | 6.0 | 70.0 | 25.0 |
| SC-6M | SC-6M-D | SC-6M-F | SC-6NFM | 16.0 | 6.0 | 70.0 | 25.0 |
| SC-7M | SC-7M-D | - | - | 19.0 | 6.0 | 70.0 | 25.0 |
| SC-9M | SC-9M-D | - | - | 25.0 | 6.0 | 70.0 | 25.0 |



## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SC-42L76M | SC-42L76M-D | - | - | 3.0 | 3.0 | 76.0 | 14.3 |



## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SC-1L6M | - | - | - | 6.0 | 6.0 | 166.0 | 16.0 |
| SC-3L6M | - | - | - | 9.5 | 6.0 | 169.0 | 19.0 |
| SC-5L6M | SC-5L6M-D | SC-5L6M-F | - | 12.7 | 6.0 | 175.0 | 25.0 |

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P223

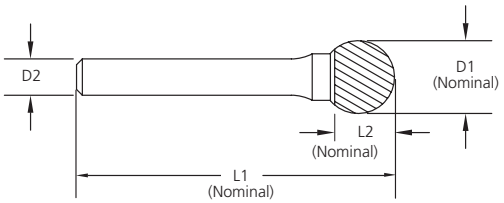
# Edgehog® Carbide Burrs Series SD



Type D

**Ball**






## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SD-41M | SD-41M-D | SD-41M-F | - | 2.4 | 3.0 | 38.0 | 2.0 |
| SD-42M | SD-42M-D | SD-42M-F | - | 3.0 | 3.0 | 38.0 | 2.8 |
| SD-53M | SD-53M-D | SD-53M-F | - | 4.8 | 3.0 | 38.0 | 4.0 |
| SD-51M | SD-51M-D | SD-51M-F | - | 6.4 | 3.0 | 44.0 | 5.6 |

## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SD-11M | SD-11M-D | - | - | 3.0 | 6.0 | 50.0 | 2.8 |
| SD-14M | SD-14M-D | SD-14M-F | - | 4.8 | 6.0 | 50.0 | 4.0 |
| SD-1M | SD-1M-D | SD-1M-F | - | 6.0 | 6.0 | 50.0 | 5.0 |
| SD-2M | SD-2M-D | - | - | 8.0 | 6.0 | 51.0 | 6.0 |
| SD-3M | SD-3M-D | SD-3M-F | SD-3NFM | 9.5 | 6.0 | 53.0 | 7.0 |
| SD-3MZ | SD-3MZ-D | SD-3MZ-F | - | 10.0 | 6.0 | 54.0 | 7.0 |
| SD-4M | SD-4M-D | SD-4M-F | - | 11.0 | 6.0 | 54.0 | 8.0 |
| SD-5MZ | - | - | - | 12.0 | 6.0 | 56.0 | 9.5 |
| SD-5M | SD-5M-D | SD-5M-F | SD-5NFM | 12.7 | 6.0 | 56.0 | 10.0 |
| SD-6M | SD-6M-D | SD-6M-F | SD-6NFM | 16.0 | 6.0 | 59.0 | 13.0 |
| SD-7M | SD-7M-D | - | - | 19.0 | 6.0 | 62.0 | 16.0 |
| SD-9M | SD-9M-D | - | - | 25.0 | 6.0 | 68.0 | 21.0 |



## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SD-42L76M | SD-42L76M-D | - | - | 3.0 | 3.0 | 76.0 | 2.8 |



## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| - | SD-1L6M-D | - | - | 6.0 | 6.0 | 155.0 | 5.0 |
| - | SD-2L6M-D | - | - | 8.0 | 6.0 | 159.0 | 6.0 |
| SD-3L6M | SD-3L6M-D | SD-3L6M-F | - | 9.5 | 6.0 | 161.0 | 7.0 |
| SD-5L6M | SD-5L6M-D | SD-5L6M-F | - | 12.7 | 6.0 | 164.0 | 10.0 |

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P223

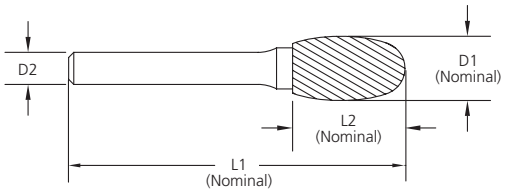
# Edgehog® Carbide Burrs Series SE



Type E

**Oval**






## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SE-41M | SE-41M-D | SE-41M-F | - | 3.0 | 3.0 | 38.0 | 5.6 |
| SE-53M | SE-53M-D | - | - | 4.8 | 3.0 | 38.0 | 7.0 |
| SE-51M | SE-51M-D | SE-51M-F | - | 6.4 | 3.0 | 48.0 | 9.5 |

## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SE-1M | SE-1M-D | - | - | 6.0 | 6.0 | 50.0 | 9.5 |
| - | SE-2M-D | - | - | 8.0 | 6.0 | 60.0 | 16.0 |
| SE-3M | SE-3M-D | SE-3M-F | SE-3NFM | 9.5 | 6.0 | 60.0 | 16.0 |
| SE-5M | SE-5M-D | SE-5M-F | SE-5NFM | 12.7 | 6.0 | 67.0 | 22.0 |
| SE-6M | SE-6M-D | - | SE-6NFM | 16.0 | 6.0 | 70.0 | 25.0 |
| SE-7M | SE-7M-D | - | - | 19.0 | 6.0 | 70.0 | 25.0 |



## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SE-41L76M | - | - | - | 3.0 | 3.0 | 76.0 | 5.6 |



## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SE-3L6M | SE-3L6M-D | - | - | 9.5 | 6.0 | 166.0 | 16.0 |
| SE-5L6M | SE-5L6M-D | - | - | 12.7 | 6.0 | 172.0 | 22.0 |

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

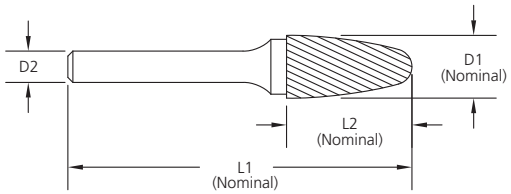
P223

# Edgehog® Carbide Burrs Series SF

Type F

**Ball Nosed Tree**






## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SF-41M | SF-41M-D | SF-41M-F | - | 3.0 | 3.0 | 38.0 | 6.0 |
| SF-42M | SF-42M-D | SF-42M-F | - | 3.0 | 3.0 | 38.0 | 12.7 |
| SF-53M | SF-53M-D | SF-53M-F | - | 4.8 | 3.0 | 38.0 | 12.7 |
| SF-51M | SF-51M-D | SF-51M-F | - | 6.4 | 3.0 | 51.0 | 12.7 |

## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Standard Cut Tool No. | Alt Diamond Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SF-11M | SF-11M-D | SF-11M-F | - | 3.0 | 6.0 | 50.0 | 12.7 |
| SF-1M | SF-1M-D | SF-1M-F | - | 6.0 | 6.0 | 50.0 | 16.0 |
| SF-3M | SF-3M-D | - | SF-3NFM | 9.5 | 6.0 | 64.0 | 19.0 |
| SF-4M | SF-4M-D | - | - | 11.0 | 6.0 | 70.0 | 25.0 |
| SF-5MZ | SF-5MZ-D | SF-5MZ-F | - | 12.0 | 6.0 | 70.0 | 25.0 |
| SF-13M | SF-13M-D | SF-13M-F | - | 12.7 | 6.0 | 64.0 | 19.0 |
| SF-5M | SF-5M-D | SF-5M-F | SF-5NFM | 12.7 | 6.0 | 70.0 | 25.0 |
| SF-6M | SF-6M-D | SF-6M-F | SF-6NFM | 16.0 | 6.0 | 70.0 | 25.0 |
| SF-7M | SF-7M-D | SF-7M-F | - | 19.0 | 6.0 | 70.0 | 25.0 |
| SF-14M | SF-14M-D | - | - | 19.0 | 6.0 | 76.0 | 31.0 |



## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SF-42L76M | SF-42L76M-D | - | - | 3.0 | 3.0 | 76.0 | 12.7 |



## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SF-1L6M | SF-1L6M-D | SF-1L6M-F | - | 6.0 | 6.0 | 166.0 | 16.0 |
| SF-3L6M | SF-3L6M-D | - | - | 9.5 | 6.0 | 169.0 | 19.0 |
| SF-5L6M | SF-5L6M-D | - | - | 12.7 | 6.0 | 175.0 | 25.0 |

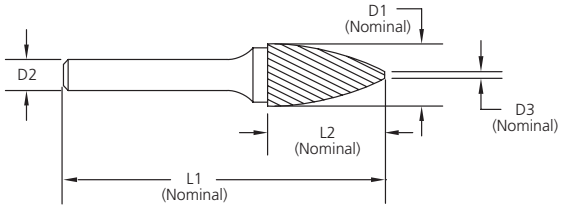
Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P223

# Edgehog® Carbide Burrs Series SG

Type G — Tree






## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 | D3 |
|---|---|---|---|---|---|---|---|---|
| SG-41M | SG-41M-D | SG-41M-F | - | 3.0 | 3.0 | 38.0 | 6.0 | 0.46 |
| SG-42M | SG-42M-D | SG-42M-F | - | 3.0 | 3.0 | 38.0 | 8.0 | 0.46 |
| SG-43M | SG-43M-D | SG-43M-F | - | 3.0 | 3.0 | 38.0 | 9.5 | 0.46 |
| SG-53M | SG-53M-D | SG-53M-F | - | 4.8 | 3.0 | 38.0 | 12.7 | 0.64 |
| SG-51M | SG-51M-D | SG-51M-F | - | 6.4 | 3.0 | 51.0 | 12.7 | 0.76 |

## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 | D3 |
|---|---|---|---|---|---|---|---|---|
| SG-1M | SG-1M-D | SG-1M-F | - | 6.0 | 6.0 | 50.0 | 16.0 | 0.76 |
| SG-2M | SG-2M-D | SG-2M-F | - | 8.0 | 6.0 | 64.0 | 19.0 | 1.02 |
| SG-3M | SG-3M-D | SG-3M-F | - | 9.5 | 6.0 | 64.0 | 19.0 | 1.02 |
| SG-3MZ | SG-3MZ-D | SG-3MZ-F | - | 10.0 | 6.0 | 65.0 | 20.0 | 1.14 |
| SG-5MZ | SG-5MZ-D | SG-5MZ-F | - | 12.0 | 6.0 | 70.0 | 25.0 | 1.27 |
| SG-13M | SG-13M-D | SG-13M-F | - | 12.7 | 6.0 | 64.0 | 19.0 | 1.27 |
| SG-5M | SG-5M-D | SG-5M-F | - | 12.7 | 6.0 | 70.0 | 25.0 | 1.27 |
| SG-6M | SG-6M-D | SG-6M-F | - | 16.0 | 6.0 | 70.0 | 25.0 | 1.27 |
| SG-7M | SG-7M-D | SG-7M-F | - | 19.0 | 6.0 | 70.0 | 25.0 | 1.27 |
| SG-15M | SG-15M-D | SG-15M-F | - | 19.0 | 6.0 | 84.0 | 38.0 | 1.78 |



## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 | D3 |
|---|---|---|---|---|---|---|---|---|
| SG-42L76M | SG-42L76M-D | - | - | 3.0 | 3.0 | 76.0 | 8.0 | 0.46 |
| SG-43L76M | SG-43L76M-D | - | - | 3.0 | 3.0 | 76.0 | 9.5 | 0.46 |



## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 | D3 |
|---|---|---|---|---|---|---|---|---|
| SG-1L6M | SG-1L6M-D | SG-1L6M-F | - | 6.0 | 6.0 | 166.0 | 16.0 | 0.76 |
| - | SG-3L6M-D | SG-3L6M-F | - | 9.5 | 6.0 | 169.0 | 19.0 | 1.02 |
| - | SG-5L6M-D | SG-5L6M-F | - | 12.7 | 6.0 | 175.0 | 25.0 | 1.27 |

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P223

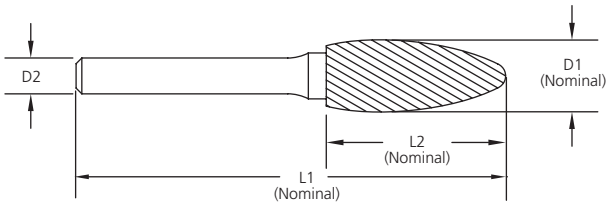
# Edgehog® Carbide Burrs Series SH



Type H

**Flame**






## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SH-41M | SH-41M-D | SH-41M-F | - | 3.0 | 3.0 | 38.0 | 6.0 |
| SH-53M | SH-53M-D | SH-53M-F | - | 4.8 | 3.0 | 38.0 | 9.5 |

## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SH-1M | SH-1M-D | SH-1M-F | - | 6.0 | 6.0 | 50.0 | 16.0 |
| SH-2M | SH-2M-D | SH-2M-F | - | 8.0 | 6.0 | 64.0 | 19.0 |
| SH-5M | SH-5M-D | SH-5M-F | - | 12.7 | 6.0 | 76.0 | 31.0 |
| SH-6M | SH-6M-D | SH-6M-F | - | 16.0 | 6.0 | 81.0 | 36.0 |
| SH-7M | SH-7M-D | SH-7M-F | - | 19.0 | 6.0 | 86.0 | 41.0 |



## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SH-41L76M | SH-41L76M-D | - | - | 3.0 | 3.0 | 76.0 | 6.0 |



## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Standard Cut Tool No. | Alt Diamond Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SH-2L6M | SH-2L6M-D | SH-2L6M-F | - | 8.0 | 6.0 | 169.0 | 19.0 |
| SH-5L6M | SH-5L6M-D | SH-5L6M-F | - | 12.7 | 6.0 | 181.0 | 31.0 |

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P223

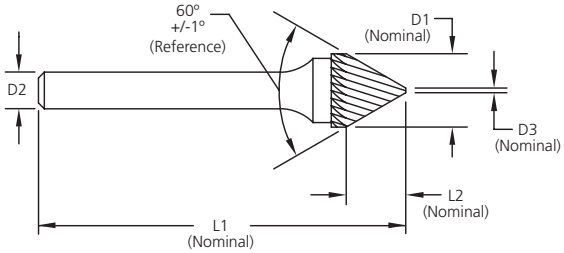
# Edgehog® Carbide Burrs Series SJ



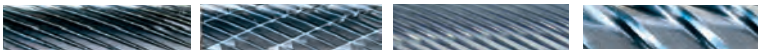
Type J

**Countersink 60°**





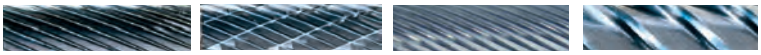

## 3mm Shank Burrs



| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SJ-42M | SJ-42M-D | SJ-42M-F | - | 3.0 | 3.0 | 38.0 | 2.4 |
| - | SJ-82M-D* | - | - | 3.0 | 3.0 | 38.0 | 2.4 |

* SJ-82M-D is double ended

## 6mm Shank Burrs



| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SJ-1M | SJ-1M-D | - | - | 6.0 | 6.0 | 50.0 | 4.8 |
| SJ-3M | SJ-3M-D | - | - | 9.5 | 6.0 | 55.0 | 8.0 |
| SJ-5M | SJ-5M-D | - | - | 12.7 | 6.0 | 58.0 | 11.0 |
| SJ-6M | SJ-6M-D | - | - | 16.0 | 6.0 | 62.0 | 12.7 |
| SJ-7M | SJ-7M-D | - | - | 19.0 | 6.0 | 64.0 | 14.0 |
| SJ-9M | SJ-9M-D | - | - | 25.0 | 6.0 | 70.0 | 21.0 |

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P223

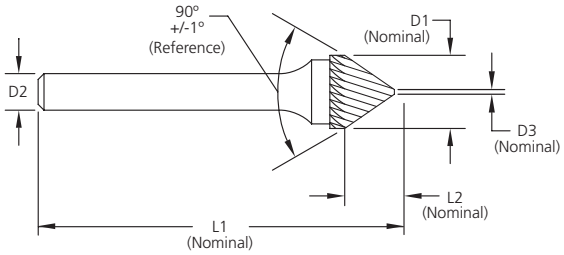
# Edgehog® Carbide Burrs Series SK



Type K

**Countersink 90°**






## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SK-42M | SK-42M-D | - | - | 3.0 | 3.0 | 38.0 | 1.6 |
| SK-82M* | SK-82M-D* | - | - | 3.0 | 3.0 | 38.0 | 1.6 |

* SK-82M is double ended

## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 |
|---|---|---|---|---|---|---|---|
| SK-1M | SK-1M-D | - | - | 6.0 | 6.0 | 50.0 | 3.0 |
| SK-3M | SK-3M-D | - | - | 9.5 | 6.0 | 52.0 | 4.8 |
| SK-5M | SK-5M-D | - | - | 12.7 | 6.0 | 53.0 | 6.4 |
| SK-6M | SK-6M-D | - | - | 16.0 | 6.0 | 56.0 | 8.0 |
| SK-7M | SK-7M-D | - | - | 19.0 | 6.0 | 58.0 | 9.5 |
| SK-9M | SK-9M-D | - | - | 25.0 | 6.0 | 61.0 | 12.7 |

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P223

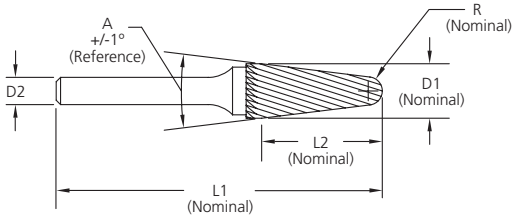
# Edgehog® Carbide Burrs Series SL



Type L

**Ball Nosed Cone**






## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 | A° |
|---|---|---|---|---|---|---|---|---|
| SL-41M | SL-41M-D | SL-41M-F | - | 3.0 | 3.0 | 38.0 | 9.5 | 8° |
| SL-42M | SL-42M-D | SL-42M-F | - | 3.0 | 3.0 | 38.0 | 12.7 | 8° |
| SL-53M | SL-53M-D | SL-53M-F | - | 4.8 | 3.0 | 38.0 | 12.7 | 14° |

## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 | A° |
|---|---|---|---|---|---|---|---|---|
| SL-1M | SL-1M-D | SL-1M-F | - | 6.0 | 6.0 | 50.0 | 16.0 | 14° |
| SL-2M | SL-2M-D | SL-2M-F | - | 8.0 | 6.0 | 71.0 | 24.0 | 14° |
| SL-3M | SL-3M-D | SL-3M-F | SL-3NFM | 9.5 | 6.0 | 75.0 | 28.0 | 14° |
| SL-4M | SL-4M-D | SL-4M-F | SL-4NFM | 12.7 | 6.0 | 76.0 | 30.0 | 14° |
| - | SL-6M-D | SL-6M-F | SL-6NFM | 16.0 | 6.0 | 80.0 | 33.0 | 14° |
| SL-7M | SL-7M-D | SL-7M-F | - | 19.0 | 6.0 | 86.0 | 39.0 | 14° |



## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 | A° |
|---|---|---|---|---|---|---|---|---|
| SL-42L76M | SL-42L76M-D | - | - | 3.0 | 3.0 | 76.0 | 12.7 | 8° |



## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 | A° |
|---|---|---|---|---|---|---|---|---|
| - | - | SL-2L6M-F | - | 8.0 | 6.0 | 176.0 | 24.0 | 14° |
| SL-3L6M | SL-3L6M-D | SL-3L6M-F | - | 9.5 | 6.0 | 180.0 | 28.0 | 14° |
| SL-4L6M | SL-4L6M-D | SL-4L6M-F | - | 12.7 | 6.0 | 182.0 | 30.0 | 14° |

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P223

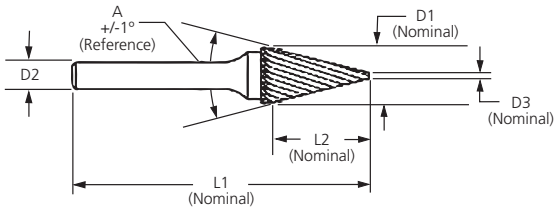
# Edgehog® Carbide Burrs Series SM



Type M

**Cone**






## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | D1 | D2 | L1 | L2 | A° | D³ |
| SM-45M | SM-45M-D | SM-45M-F | - | 3.0 | 3.0 | 38.0 | 4.8 | 32° | 0.46 |
| SM-41M | SM-41M-D | SM-41M-F | - | 3.0 | 3.0 | 38.0 | 9.5 | 12° | 1.09 |
| SM-42M | SM-42M-D | SM-42M-F | - | 3.0 | 3.0 | 38.0 | 11.1 | 14° | 0.36 |
| SM-43M | SM-43M-D | SM-43M-F | - | 3.0 | 3.0 | 38.0 | 16.0 | 7° | 1.14 |
| SM-53M | SM-53M-D | SM-53M-F | - | 4.8 | 3.0 | 38.0 | 12.7 | 16° | 0.97 |
| SM-51M | SM-51M-D | SM-51M-F | - | 6.4 | 3.0 | 54.0 | 12.7 | 22° | 1.32 |

## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | D1 | D2 | L1 | L2 | A° | D³ |
| SM-1M | SM-1M-D | SM-1M-F | - | 6.0 | 6.0 | 50.0 | 12.7 | 22° | 1.17 |
| SM-2M | SM-2M-D | SM-2M-F | - | 6.0 | 6.0 | 50.0 | 19.0 | 14° | 1.42 |
| SM-3M | SM-3M-D | SM-3M-F | - | 6.0 | 6.0 | 50.0 | 25.0 | 10° | 1.65 |
| SM-4M | SM-4M-D | SM-4M-F | - | 9.5 | 6.0 | 63.0 | 16.0 | 28° | 1.32 |
| SM-5M | SM-5M-D | SM-5M-F | - | 12.7 | 6.0 | 69.0 | 22.0 | 28° | 1.32 |
| SM-6M | SM-6M-D | SM-6M-F | - | 16.0 | 6.0 | 72.0 | 25.0 | 31° | 1.52 |



## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | D1 | D2 | L1 | L2 | A° | D³ |
| SM-42L76M | SM-42L76M-D | - | - | 3.0 | 3.0 | 76.0 | 11.0 | 14° | 0.36 |

Note: Burrs 12.0mm and above are available with an 8.0mm shank on request as a non-stock standard.

P223

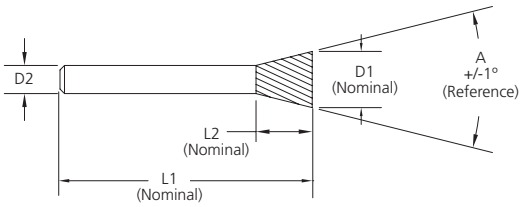
# Edgehog® Carbide Burrs Series SN



Type N

**Inverted Cone**






## 3mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 | A° |
|---|---|---|---|---|---|---|---|---|
| SN-41M | SN-41M-D | SN-41M-F | - | 2.4 | 3.0 | 38.0 | 3.0 | 10° |
| SN-42M | SN-42M-D | SN-42M-F | - | 3.0 | 3.0 | 38.0 | 4.8 | 10° |
| SN-53M | SN-53M-D | SN-53M-F | - | 4.8 | 3.0 | 38.0 | 6.4 | 10° |
| SN-51M | SN-51M-D | SN-51M-F | - | 6.4 | 3.0 | 44.0 | 6.4 | 10° |

## 6mm Shank Burrs

| Standard Cut Tool No. | Alt Diamond Tool No. | Fine Cut Tool No. | Shear Cut Tool No. | Tool Dimensions D1 | D2 | L1 | L2 | A° |
|---|---|---|---|---|---|---|---|---|
| - | SN-1M-D | SN-1M-F | - | 6.0 | 6.0 | 50.0 | 8.0 | 10° |
| SN-2M | SN-2M-D | SN-2M-F | - | 9.5 | 6.0 | 55.0 | 9.5 | 13° |
| SN-4M | SN-4M-D | SN-4M-F | - | 12.7 | 6.0 | 58.0 | 12.7 | 28° |
| SN-6M | SN-6M-D | SN-6M-F | - | 16.0 | 6.0 | 64.0 | 19.0 | 18° |
| - | SN-7M-D | SN-7M-F | - | 19.0 | 6.0 | 61.0 | 16.0 | 30° |

P223

# Edgehog® Carbide Burrs

## Burr Fluting Chart | Tableau de denture par fraise | Tabelle der Fräserschneiden | Numero di taglienti | Tabela pilników obrotowych

| Number Of Flutes ( ± 10% ) | | | |
|---|---|---|---|
| Burr Ø | Standard Cut | Fine Cut | Shear Cut |
| 1.6 | 10 | 12 | - |
| 2.0 | 10 | 12 | - |
| 2.4 | 12 | 16 | - |
| 3.0 | 12 | 20 | - |
| 4.0 | 14 | 24 | - |
| 4.8 | 15 | 24 | - |
| 6.0 | 16 | 25 | - |
| 8.0 | 18 | 30 | - |
| 9.5 | 20 | 30 | 6 |
| 11.0 | 22 | 30 | - |
| 12.7 | 24 | 35 | 8* |
| 16.0 | 26 | 40 | 8** |
| 19.0 | 30 | 40 | - |
| 25.0 | 35 | 45 | - |

* Except SL-4NFM - 6 Flutes
** Except SD-6NFM, SE-6NFM and SF-6NFM - 10 Flutes.

Alternate Diamond Grind - LH Fluting 40% of RH Fluting
Diamond Grind - LH Fluting 80% of RH Fluting.

## Recommended Operating Speeds

Vitesses d'utilisation recommandées | Empfohlene Betriebsdrehzahlen | Velocità di utilizzo consigliate | Zalecane prędkości pracy

| Burr Diameter Ø mm | Operating Speed RPM | |
|---|---|---|
| | From | To |
| 3.0 | 45,000 | 90,000 |
| 6.0 | 23,000 | 45,000 |
| 9.5 | 19,000 | 30,000 |
| 12.7 | 15,000 | 22,000 |
| 16.0 | 12,000 | 18,000 |
| 19.0 | 7,500 | 15,000 |

The speed guidelines above are general recommendations.
Speeds may require adjusting based on material and application.

## Burr Application By Material | Type de denture de fraises par matière | Frässtift-Anwendungsgebiete nach Material | Scelta dell'utensile in funzione del materiale | Zastosowanie frezu (pilnika obrotowego) według materiału

| Material | Standard Cut | Alt Diamond Cut | Fine Cut | Shear Cut |
|---|---|---|---|---|
| Aluminium | • | • | - | • |
| Brass, Bronze, Copper | • | • | - | - |
| Carbon | • | - | - | - |
| Cast Iron | • | - | - | - |
| Fibreglass | • | - | - | - |
| Hard Rubber | • | - | - | • |
| Magnesium | - | - | - | • |
| Masonite | • | - | - | • |
| Plastics | • | - | - | • |
| Steels - 40-60HRc | • | • | • | - |
| Steels, Alloy Steels | • | • | - | - |
| Nickel/Chrome Steels | • | • | - | - |
| Stainless Steels | • | • | • | - |
| Steel Weldments | • | • | - | - |
| Titanium | • | • | - | - |
| Wood | - | - | - | • |
| Zinc | - | - | - | • |

# Edgehog® Carbide Burrs

## Problems and Solutions | Problèmes et Solutions | Probleme und Lösungen | Problemi e Soluzioni | Problemy i Rozwiązania

Possible Causes | Causes Possibles | Mögliche Ursachen | Cause Possibili | Możliwe Przyczyny

Problem | Problème | Problem | Problema | Problem

| | Excessive Force | Shank Friction With Workpiece | Worn Burr | Incorrect Collet Location | Worn Grinder Bearings | Poor Shank Straight-ness | Unstable Workpiece | Working in Soft Materials | Cutting Abrasive Material | Low Setup Rigidity |
|---|---|---|---|---|---|---|---|---|---|---|
| Broken Brazed Joint | ● | ● | ● | - | - | - | - | - | - | - |
| Poor Burr Control | - | - | - | ● | ● | ● | ● | - | - | ● |
| Flutes Clogging | - | - | - | - | - | - | - | ● | - | - |
| Excessive Vibration | - | - | - | ● | ● | ● | ● | - | - | ● |
| Poor Finish | - | - | - | ● | ● | ● | ● | ● | - | ● |
| Poor Tool Life | - | ● | - | ● | ● | ● | ● | - | ● | ● |

Possible Causes | Causes Possibles | Mögliche Ursachen | Cause Possibili | Możliwe Przyczyny

Problem | Problème | Problem | Problema | Problem

| | Reduce Cutting Pressure | Ensure Shank / Workpiece Clearance | Replace Worn Burr | Check Burr Location & Replace Collet if Necessary | Check & Replace Grinder Bearings if Necessary | Check Shank Straightness - Replace Burr if Necessary | Improve Workpiece Stability | Use a Coarser Cut Burr |
|---|---|---|---|---|---|---|---|---|
| Broken Brazed Joint | ● | ● | ● | - | - | - | - | - |
| Poor Burr Control | - | - | - | ● | ● | ● | ● | - |
| Flutes Clogging | - | - | - | - | - | - | - | ● |
| Excessive Vibration | - | - | - | ● | ● | ● | ● | - |
| Poor Finish | - | - | - | ● | ● | ● | ● | - |
| Poor Tool Life | - | ● | - | ● | ● | ● | - | - |

Possible Causes | Causes Possibles | Mögliche Ursachen | Cause Possibili | Możliwe Przyczyny

Problem | Problème | Problem | Problema | Problem

| | Use Lubricant or Anti-Sticking Agent | Increase RPM | Reduce RPM | Make Lighter Cuts | Change to a Finer Cut Burr | Faster Feed | Slower Feed |
|---|---|---|---|---|---|---|---|
| Broken Brazed Joint | - | - | - | - | - | - | - |
| Poor Burr Control | - | - | - | - | - | - | - |
| Flutes Clogging | ● | ● | ● | ● | - | - | - |
| Excessive Vibration | - | ● | ● | - | - | ● | ● |
| Poor Finish | - | ● | ● | - | ● | ● | ● |
| Poor Tool Life | ● | - | ● | - | ● | ● | ● |

# Material cross reference chart

Tableau de correspondance des matières | Tabelle mit Materialbezeichnungen | Tabella di comparazione dei materiali | Tabela materiałów

| | UK | German | DIN | French | Swedish | Spanish | USA |
|---|---|---|---|---|---|---|---|
| FREE MACHINING STEEL | 1.0718 | 9SMnPB28 | S250Pb | 1914 | F.2112 - 11SMnPb28 | 12L13 | |
| | 210M15 | 1.0721 | 10S20 | 10F1 | | F.2121 - 10 S 20 | 1108 |
| | 210A15 | 1.0723 | 15S20 | | 1922 | F.210F. | |
| | 240M07 | 1.0736 | 9SMn36 | S300 | | F.2113- 12 SMn 35 | 1215 |
| | | 1.0737 | 9MnPb36 | S300Pb | 1926 | F.2114 - 12 SMnPb 35 | 12L14 |
| | | 1.7022 | 10SPb20 | 10PbF2 | | F.2122 - 10 SPb 20 | 11L08 |
| LOW CARBON STEEL | 045M10 | 1.0301 | C10 | AF34C10/XC10 | | | 1010 |
| | 080M15;040A15 | 1.0401 | C15 | AF37C12/XC18 | 1350 | F.111 | 1015 |
| | 050A20/055M15 | 1.0402 | C22 | AF42C20/XC25 | 1450 | F.112 | 1020 |
| | 070M26 | 1.0406 | C25 | AF50C30 | | F.221 | 1025 |
| | 220M07 | 1.0711 | 9S20 | | | | 1212 |
| | 230M07 | 1.0715 | 9SMn28 | S250 | 1912 | F.2111 - 11SMn28 | 1213 |
| | 040A10 | 1.1121 | Ck10 | XC10 | 1265 | F.1510 - C 10 k | 1010 |
| | 120M19 | 1.1133 | 20Mn5 | 20M5 | | F.1515 - 20 Mn 6 | 1022/1518 |
| | 080M15 | 1.1141 | Ck15 | XC15 / C15E | 1370 | F.1511 - C 16 k | 1015 |
| | 050A20 | 1.1151 | Ck22 | XC25 / C22E | | F.1120 - C 25 k | 10201023 |
| | 070M26 | 1.1158 | Ck25 | XC25 / C25E | | F.1120 - C 25 k | 1025 |
| | | 1.5419 | 22Mo4 | | | | 4419 |
| | | 1.5622 | 14Ni6 | 15N6 / 15Ni6 | | F.2641 - 15 Ni 6 | A350-LF5 |
| | 655M13/A12 | 1.5752 | 14NiCr14 | 12NC15 | | | 3310/9314 |
| | 523M15 | 1.7015 | 15Cr3 | 12C3 | | | 5015 |
| STRUCTURAL STEEL | 4360-40C | 1.0038 | RSt37-2 | E24-2NE / S235JRG2 | 1312 | | A570 (36) |
| | 4360-43B | 1.0044 | St44-2 | E28-2 / S275JR | 1412 | A 430B | A570 (40) |
| | 4360-50B | 1.005 | St50-2 | A50-2 / E295 | 2172 | | A570 (50) |
| | 4360-55E | 1.006 | St60-2 | A60-2 / E335 | | | |
| | 4360-40C/D-1449-37C | 1.0116 | St37-3 | E24-3;-4 / S235J2G3 | 1313 | A360 C;D | A284/A573/A611 |
| | 1449 -2/3/4CR | 1.033 | St12 | DC01 | | AP 00 | A366/1012/A619 |
| | 1449 2CR; 3CR | 1.0333 | St13 | | | AP 02 | 1008 |
| | 1449 1CR; 2CR | 1.0338 | St14 | DC04 | | AP 04 | A620 |
| | 1501Gr.161-360/400 | 1.0345 | H I | A37CP;AP / P235GH | 1330 | A 37 RC I;RA II | A516Gr.65;-55; |
| | 3CR | 1.0347 | RRSt13 | DC03 | | | A619 |
| | 161-400; | 1.0425 | H II | A42CP;AP / P265GH | 1430 | A42 RC I | |
| | | 1.0473 | 19Mn6 | A52CP;AP / P335GH | 2101/2102 | A 47 RB II | A537 |
| | | 1.0481 | 17Mn4 | A48CP;AP / P295GH | | A 47 RC I; RA II | A516 (70) |
| | | 1.0562 | StE355 | E355R/FP / S355N | 2132 | AE 355 KG; DD | A633 (C) |
| | 4360-50B;50C;50D | 1.057 | St52-3 | E36-3;E36-4 / S355J2G3 | 2132 | A 510 C;D | |
| | 1501-240 | 1.5415 | 15Mo3 | 15D3 / 15Mo3 | 2912 | F.2601 - 16 Mo 3 | A204 (A) |
| | 1503-245-420 | 1.5423 | 16Mo5 | | | F.2602 - 16 Mo 5 | 4520 |
| | 1501-503-690 | 1.5637 | 10Ni14 | 12N14 / 12Ni14 | | F.152 | A350-LF3 |
| | | 1.5713 | 13NiCr6 | 10NC6 | | | 3115 |
| | | 1.5732 | 14NiCr10 | 14NC11 | | F.1540 - 15 NiCr 11 | 3415 |
| | 620Gr.27;31 | 1.7335 | 13CrMo44 | 15CD3.05 | 2216 | F.2631 - 14 CrMo 4 5 | A182-F11;F12 |
| | 4360-55E | 1.8902 | StE420 | E420RIFP / S420N | | AE 420 KG | A633Gr.E |
| | | 1.8905 | StE460 | E460RIFP / S460N | | AE 460 KG | A633Gr.E |
| | | 1.007 | St70-2 | A70-2 / E360 | | | |
| | 620Gr.27 | 1.7337 | 16CrMo44 | 15CD4.5 | 2216 | | A387 (12) |
| | 622Gr.31;45 | 1.738 | 10CrMo910 | 12CD9.10 / 10CrMo9-10 | 2218 | TU.H | A182F22 |
| | 660/440 | 1.7715 | 14MoV63 | | | F.2621 - 13 MoCrV6 | |
| MEDIUM CARBON STEEL | 060A35 | 1.0501 | C35 | AF55C35 /XC38 | 1550 | F.113 | 1035 |
| | 212M36 | 1.0726 | 35S20 | 35MF6 | 1957 | F.210G. | 1140 |
| | 120M36/150M28 | 1.1165 | 30Mn5 | 35M5 / 30Mn5 | | F.1203 - 36 Mn5 | 1330 |
| | | 1.1166 | 34Mn5 | 35M5 / 34Mn5 | | F.8211 - 30 Mn5 | 1536 |
| | 150M36 | 1.1167 | 36Mn5 | 40M5 / 36Mn5 | 2120 | F.1203 - 36 Mn5 | 1335 |
| | 150M28 | 1.117 | 28Mn6 | 20M5 / 28Mn6 | | | 1330 |
| | 080M36 | 1.118 | Cm35 | XC32 / C35R | 1572 | F.1135 - C 35 k-1 | 1035 |
| | 080M36 | 1.1181 | Ck35 | XC38H1 / C35E | 1572 | F.1130 - C 35 k | 1035 |
| | 060A35 | 1.1183 | Cf35 | XC38H1TS | 1572 | | 1035 |
| | 080M46 | 1.0503 | C45 | AF65C45 /C45 | 1650 | F.114 | 1045 |
| | 070M55 | 1.0535 | C55 | C55 | 1655 | | 1055 |
| | 080A62 | 1.0601 | C60 | AF70C55 / C60 | | F.115 | 1060 |
| | 070A72 | 1.0605 | C75 | C75 | | | |
| | 212M44 | 1.0727 | 45S20 | 45MF4 | 1973 | | 1146 |
| | 250A53 | 1.0903 | 51Si7 | 51S7 | 2090 | F.1450 - 50 Si 7 | 9255 |
| | 250A53 | 1.0904 | 55Si7 | 55S7 | 2085 | F.1440- 56 Si 7 | 9255 |
| | 150M36 | 1.1157 | 40Mn4 | 35M5 | | | 1039 |
| | 060A40/080A40 | 1.1186 | Ck40 | XC42H1 / C40E | | | 1040 |
| | 080M46/060A47 | 1.1191 | Ck45 | XC42H1 / C45/XC45 | 1672 | F.1140 - C 45 k | 1045 |
| | 060A47 | 1.1193 | Cf45 | XC42H1TS | 1672 | | 1045 |
| | 080M46 | 1.1201 | Cm45 | XC42H1 /C45R | 1660 | F.1145 - C 45 k | 1045 |
| | 060A57/070M55 | 1.1203 | Ck55 | XC55H1 / C55E | | F.1150 - C 55 k | 1055 |
| | 080M50 | 1.1206 | Ck50 | XC48H1 / C50E | | | 1050 |
| | 070M55 | 1.1209 | Cm55 | XC55H1 / C55R / 3C55 | | F.1150 - C 55 k | 1055 |
| | 060A52 | 1.1213 | Cf53 | XC48H1TS | 1674 | | 1050 |
| | 060A62 | 1.1221 | Ck60 | XC60 / C60E/2C60 | 1665/1678 | F.511/F.512 | 1060 |
| | 060A67 | 1.1231 | Ck67 | XC68 | 1770 | | 1070 |
| | 250A58 | 1.0909 | 60Si7 | 60S7 | | F.1441 - 60 Si 7 | 9260 |
| | 250A61 | 1.0961 | 60SiCr7 | 60SC7 | | F.1442 - 60 SiCr 8 | 9262 |

# Material cross reference chart

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| | UK | German | DIN | French | Swedish | Spanish | USA |
|---|---|---|---|---|---|---|---|
| ALLOY STEEL | 805M20 | 1.6523 | 21NiCrMo2 | 20NCD2 | 2506 | F.1522 - 20 NiCrMo 2 | 8620 |
| | 805A20 | 1.6543 | 21NiCrMo22 | | | F.1534 - 20 NiCrMo 3 | 8720 |
| | 060A78 | 1.1248 | Ck75 | XC75 / C75E | 1774/1778 | F.513/514/515 | 1080/1078 |
| | 640A35 | 1.571 | 36NiCr6 | 35NC6 | | | 3135 |
| | 640M40 | 1.5711 | 40NiCr6 | | | | 3140 |
| | 311-Type7 | 1.6546 | 40NiCrMo22 | 40NCD2 | | F.1204 - 40 NiCrMo2 | 8740 |
| | 820A16 | 1.6587 | 17CrNiMo8 | 18NCD6 | | F.1560 - 14 NiCrMo13 | |
| | 832M13 | 1.6657 | 14NiCrMo134 | 16NCD13 | | F.1569 - 14 NiCrMo 131 | |
| | | 1.7006 | 46Cr2 | 42C2 / 46Cr2 | | | 5045/5046 |
| | 530A32 | 1.7033 | 34Cr4 | 32C4 / 34Cr4 | | F.8221 - 35 Cr 4/F.224 | 5132 |
| | 530A36 | 1.7034 | 37Cr4 | 38C4 / 37Cr4 | | F.1201 - 38 Cr 4 | 5135 |
| | 527M17 | 1.7131 | 16MnCr5 | 16MC5 | 2511 | F.1515 - 16 MnCr 5 | 5115 |
| | | 1.7147 | 20MnCr5 | 20MC5 | | F.150.D | 5120 |
| | 1717CDS110 | 1.7218 | 25CrMo4 | 25CD4 / 25CrMo4 | 2225 | F.8330 - AM 25 CrMo4 | 4130 |
| | 905M31 | 1.8507 | 34CrAlMo5 | 30CAD6.12 | | F.1741 - 34 CrAlMo5 | A355Cl.D |
| | 905M39 | 1.8509 | 41CrAlMo7 | 40CAD6.12 | 2940 | F.1740 - 41 CrAlMo7 | A355Cl.A |
| | 708A37 | 1.233 | 35CrMo4 | 34CD4 / 35CrMo4 | 2234 | | 4135 |
| | 708M40 | 1.2332 | 47CrMo4 | 42CD4 | 2244 | | 4142 |
| | 530M40/530A40 | 1.7035 | 41Cr4 | 42C4 / 41Cr4 | | F.1202 -42 Cr4 | 5140 |
| | 530A40 | 1.7045 | 42Cr4 | 42C4TS | 2245 | F.1202 - 42 Cr 4 | 5140 |
| | 527A60 | 1.7176 | 55Cr3 | 55C3 | 2253 | F.1431 - 55 Cr3 | 5155 |
| | 708A37 | 1.722 | 34CrMo4 | 35CD4 / 34CrMo4 | 2234 | F.8231 - AM 34 CrMo4 | 4135/4137 |
| | 708M40 | 1.7223 | 41CrMo4 | 42CD4TS | 2244 | F.8232 - 42 CrMo4 | 4142/4140 |
| | 708M40 | 1.7225 | 42CrMo4 | 42CD4 / 42CrMo4 | 2244 | F.8232 - 42 CrMo4 | 4140 |
| | 708A47 | 1.7228 | 50CrMo4 | 50CrMo4 | | | 4150 |
| | 735A50 | 1.8159 | 50CrV4 | 50CV4 / 51CrV4 | 2230 | F.1430 - 51 CrV4 | 6150 |
| | 060A96 | 1.1274 | Ck101 | XC100 | 1870 | | 1095 |
| HIGH STRENGTH ALLOY STEEL | 816M40 | 1.6511 | 36CrNiMo4 | 40NCD3 / 36CrNiMo4 | | F.1280 - 35 NiCrMo4 | 9840 |
| | 817M40 | 1.6562 | 40NiCrMo73 | | | | 4340 |
| | 311-Type6 | 1.6565 | 40NiCrMo6 | | | F.1272 - 40 NiCrMo 7 | 4340 |
| | 823M30 | 1.658 | 30CrNiMo8 | 30CND8 / 30CrNiMo8 | | | |
| | 817M40 | 1.6582 | 34CrNiMo8 | 35NCD6 / 34CrNiMo6 | 2541 | F.1272 - 40 NiCrMo 7 | 4340 |
| | 830M31 | 1.6746 | 32NiCrMo145 | 35NCD14 | | F.1262 - 32 NiCrMo 12 | |
| | 835M30 | 1.6747 | 30NiCrMo166 | 35NCD16 | | F.1260 - 32 NiCrMo16 | |
| | 722M24 | 1.8515 | 31CrMoV139 | 30CD12 | 2240 | F.1712 - 31 CrMo 12 | |
| | 722M24 | 1.7361 | 32CrMo12 | 30CD12 | 2240 | F.124.A | |
| TOOL STEELS | | 1.1525 | C80W1 | Y190;Y180 | | | W108 |
| | | 1.1545 | C105W1 | Y1105 | 1880 | | W110 |
| | BW1B | 1.1625 | C80W2 | | | F.1507 C80 | W1 |
| | | 1.1663 | C125W | Y2120 | | F.5123 C120 | W112 |
| | BW1A | 1.175 | C75W | | | | W1 |
| | BL3 | 1.2067 | 100Cr6 | Y100C6 | | F.5230 100 Cr6 | L3 |
| | | 1.221 | 115CrV3 | | | | L2 |
| | BO1 | 1.251 | 100MnCrW4 | | 2140 | F.5220 95 MnCrW5 | O1 |
| | BS1 | 1.2542 | 45WCrV7 | | 2710 | F.5241 45 WCrSi 8 | S1 |
| | BW2 | 1.2833 | 100V1 | Y1105V | | | W210 |
| | BO2 | 1.2842 | 90MnCrV8 | 90MV8 | | | 2 |
| | 534A99 | 1.3505 | 100Cr6 | 100C6 | 2258 | F.1310 - 100 Cr 6 | 52100 |
| | | 1.2713 | 55NiCrMoV6 | 55NCDV7 | | F.528 | L6 |
| | Grade2A | 0.962 | G-X260NiCr42 | | | | A532IBNiCr-LC |
| | Grade2B | 0.9625 | G-X330NiCr42 | | | | A532IANiCr-HC |
| | Grade2C;D;E | 0.963 | G-X300CrNiSi952 | | | | A532IDNi-HiCr |
| | Grade3A;B | 0.964 | G-X300CrMoNi1521 | | | | |
| | Grade3C | 0.9645 | G-X260CrMoNi2021 | | | | A532IID20%CrMo-LC |
| | Grade3D | 0.965 | G-X260Cr27 | | | | A532IIIA25%Cr |
| | Grade3E | 0.9655 | G-X300CrMo271 | | | | A532IIIA25%Cr |
| | BD3 | 1.208 | X210Cr12 | Z200C12 | | F.5212 X210 Cr12 | D3 |
| | BH11 | 1.2343 | X38CrMoV51 | Z38CDV5 | | F.5317 X37 CrMoV5 | H11 |
| | BH13 | 1.2344 | X40CrMoV51 | Z40CDV5 | 2242 | F.5318 X40 CrMoV5 | H13 |
| | BA2 | 1.2363 | X100CrMoV51 | Z100CDV5 | 2260 | F.5227 X100 CrMoV5 | A2 |
| | BH10 | 1.2365 | X32CrMoV33 | 32DCV28 | | F.5313 CrMoV 12 | H10 |
| | BD2 | 1.2379 | X155CrVMo121 | Z160CDV12 | | | D2 |
| | | 1.2436 | X210CrW12 | | 2312 | F.5213 X210 CrW12 | |
| | | 1.2567 | X30WCrV53 | Z32WCV5 | | | |
| | BH21 | 1.2581 | X30WCrV93 | Z30WCV9 | | F.5323 X30 WCrV9 | H21 |
| | | 1.2601 | X165CrMoV12 | | 2310 | F.5211 X160 CrMoV12 | |
| | BH12 | 1.2606 | X37CrMoW51 | Z35CWDV5 | | | H12 |
| | BT15 | 1.3202 | S12-1-4-5 | | | F.5563 12-1-5-5 | T15 |
| | | 1.3207 | S10-4-3-10 | Z130WKCDV10-10-04-03 | | F.553 10-4-3-10 | |
| | | 1.3243 | S6-5-2-5 | Z85WDKCV06-05-05-04-02 | 2723 | F.5613 6-5-2-5 | |
| | | 1.3246 | S7-4-2-5 | Z110WKCDV07-05-04-04-02 | | F.5613 6-5-2-5 | M41 |
| | BT42 | 1.3247 | S2-10-1-8 | Z110DKCWV09-08-04-02-01 | | F.5615 7-4-2-5 | M42 |
| | BM34 | 1.3249 | S2-9-2-8 | | | F.5611 2-9-2-8 | M33/M34 |
| | BT4 | 1.3255 | S18-1-2-5 | Z80WKCV18-05-04-01 | | F.5530 18-1-1-5 | T4 |
| | BT5 | 1.3265 | S18-1-2-10 | | | F.5540 18-0-2-10 | T5 |
| | | 1.3342 | SC6-5-2 | Z90WDCV06-05-04-03 | | | M3 |
| | BM2 | 1.3343 | S6-5-2 | Z85WDCV06-05-04-02 | 2722 | F.5603 6-5-2 | M2 |

# Material cross reference chart

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| | UK | German | DIN | French | Swedish | Spanish | USA |
|---|---|---|---|---|---|---|---|
| TOOL STEELS | | 1.3344 | S6-5-3 | Z130WDCV06-05-04-04 | | F.5605 6-5-3 | M3Class2 |
| | BM1 | 1.3346 | S2-9-1 | Z85DCWV08-04-02-01 | | | H41/M1 |
| | | 1.3348 | S2-9-2 | Z100DCWV09-04-02-02 | 2782 | F.5607 2-9-2 | M7 |
| | BT1 | 1.3355 | S18-0-1 | Z80WCV18-04-01 | | F.5520 18-0-1 | T1 |
| | | 1.3401 | X120Mn12 | Z120M12 / Z120Mn12 | | F.82551-AM-X 120 Mn 12 | A128(A) |
| STAINLESS STEEL | 443S65 | 1.4747 | X80CrNiSi20 | Z80CSN20.02 | | F.3222-X 80CrSiNi20-02 | HNV6 |
| | 403S17 | 1.4 | X6Cr13 | Z6013 / Z6Cr13 | 2301 | F.3110-X6 Cr 13 | 403 |
| | 403S17 | 1.4001 | X7Cr14 | Z3014 | 2301 | F.8401-AM-X12 Cr 13 | 410S |
| | 405S17 | 1.4002 | X6CrAl13 | Z6CA13 / Z6CrAl13 | 2302 | F.3111-X6 CrAl13 | 405 |
| | 416S21 | 1.4005 | X12CrS13 | Z12CF13 / Z12CrS13 | 2380 | F.3411-X12 CrS13 | 416 |
| | 410S21 | 1.4006 | X10Cr13 | Z12C13 / Z12Cr13 | 2302 | F.3401-X12 Cr 13 | 410/CA-15 |
| | 410C21 | 1.4008 | G-X8Cr14 | Z12CN13M | | | 410 |
| | 430S15 | 1.4016 | X6Cr17 | Z8C17 / Z6Cr17 | 2320 | F.3113-X8 Cr17 | 430 |
| | 420S37 | 1.4021 | X20Cr13 | Z20C13 / Z20Cr13 | 2303 | F.3402-X20 Cr 13 | 420 |
| | 420S45 | 1.4028 | X30Cr13 | Z20C13 / Z20Cr13 | 2304 | F.3403-X30 Cr 13 | 420 |
| | | 1.4031 | X38Cr13 | Z40C14 / Z40Cr14 | 2304 | F.3404-X40 Cr 13 | |
| | 420S45 | 1.4034 | X46Cr13 | Z40C14 / Z40Cr14 | | F.3405-X46 Cr 13 | 420 |
| | 431S29 | 1.4057 | X20CrNi172 | Z15CN16.02 | 2321 | F.3427-X15 CrNi16 | 431 |
| | | 1.4104 | X12CrMoS17 | Z10CF17 | 2383 | F.3117-X10 CrS17 | 430F |
| | 434S17 | 1.4113 | X6CrMo17 | Z8CD17.01 | 2325 | | 434 |
| | | 1.4125 | X105CrMo17 | Z100CD17 | | | 440C |
| | | 1.451 | X6CrTi17 | Z8CT17 | | F.3114-X8CrTi17 | XM8/430Ti |
| | 409S19 | 1.4512 | X5CrTi12 | Z6CT12 | | | 409 |
| | | 1.4534 | | | | | 13-8 PH Mo |
| | | 1.4545 | | | | | 15-5 PH |
| | | | | | | | 15-7 PH Mo |
| | | 1.4504 | | | | | 17-4 PH |
| | | 1.4548 | | Z7CNU17-04 | | | 17-4 PH ,CH900 |
| | 401S45 | 1.4718 | X45CrSi93 | Z45CS9 | | F.3220-X 4 ScrSi 09-03 | HNV3 |
| | 403S17 | 1.4724 | X10CrAl13 | Z10C13 | | F.13152-X 10 CrAl13 | |
| | | 1.4731 | X40CrSiMo102 | Z40CSD10 | | F.3221-X 40 CrSiMo 10-02 | |
| | 430S15 | 1.4742 | X10CrAl18 | Z10CAS18 | | F.3153-X 10 CrAl 18 | 430 |
| | | 1.4762 | X10CrAl24 | Z10CAS24 | | F.3154-X 10 CrAl24 | 446 |
| | 303S21 | 1.4305 | X10CrNiS189 | Z10CNF18.09 | 2346 | F.3508-X10CrNiS18-09 | 303 |
| | 304S15 | 1.4301 | X5CrNi1810 | Z6CN18.09 | 2332 | F.3451-X5 CrNi18-10 | 304/304H |
| | 305S19 | 1.4303 | X5CrNi1812 | Z8CN18.12 | | F.3513-X8CrNi18-12 | 308; 305 |
| | 304S12/S11/C12 | 1.4306 | G-X2CrNi189/1911 | Z2CN18.10/Z3CN19.10M | 2333/52 | F.3503-X 2CrNi19-10 | 304L |
| | 304C15 | 1.4308 | G-X6CrNi189 | Z6CN18.10M | 2333 | | CF-8 |
| | 301S21 | 1.431 | X12CrNi177 | Z12CN17.07 | | F.3517-X12CrNi17 07 | 301 |
| | 304S62 | 1.4311 | X2CrNiN1810 | Z2CN18.10Az | 2371 | | 304LN |
| | 425C11 | 1.4313 | G-X5CrNi134 | Z4CND13.4M | 2385 | | CA6-NM |
| | 316S16/S31 | 1.4401 | X5CrNiMo17122 | Z6CND17.11 | 2347 | F.3543-X5CrNiMo17-12/-03 | 316/316L |
| | 316S11/S12 | 1.4404 | X2CrNiMo17132 | Z2CND 18.13 | 2348 | F.3533-X 2CrNiMo17 12-03 | 316L |
| | 316S61 | 1.4406 | 2CrNiMoN17122 | Z2CND 17.12Az | | | 316LN |
| | 316C16 | 1.4408 | G-X6CrNiMo1810 | | 2343 | F.8414-AM-X7 CrNiMo20 10 | CF-8M |
| | 316S62 | 1.4429 | X2CrNiMo17133 | Z2CND17.13Az | 2375 | | 316LN |
| | 316S11/S12 | 1.4435 | X2CrNiMo18143 | Z2CND17.13 | 2353 | F.3533-X 2 CrNiMo 17-12-03 | 316L |
| | 316S16 | 1.4436 | X5CrNiMo17133 | Z6CND17.12 | 2343 | F.3534-X 6 CrNiMo 17-12-03 | 316 |
| | 317S12 | 1.4438 | X2CrNiMo18164 | Z2CND19.15 | 2367 | | 317L |
| | 317S16 | 1.4449 | X5CrNiMo1713 | | | | 317 |
| | 347C17 | 1.4452 | G-X5CrNiNb189 | Z6NNb18.10M | | | |
| | | 1.446 | X8CrNiMo275 | | 2324 | F.3309-X 8CrNiMo27-05 | 329 |
| | 321S12S31 | 1.4541 | X6CrNiTi1810 | Z6CNT18.10 | 2337 | F.3553-X 7 CrNiTi 18-11 | 321 |
| | | 1.4542 | X5CrNiCuNb1714 | Z6CNU17.04 | | | 630 |
| | 347S17/S18 | 1.4546 | X5CrNiNb1810 | | | | 348 |
| | 347S17/S31 | 1.455 | X6CrNiNb1810 | Z6CNNb18.10 | 2338 | F.3552-X 7 CrNiNb 18-11 | 347 |
| | 320S31/S17 | 1.4571 | X6CrNiMoTi17122 | Z6CNDT17.12 | 2350 | F.3552-X 6 CrNiMoTi17-12-03 | 316Ti |
| | 318S17 | 1.458 | X6CrNiMoNb17122 | Z6CNDNb17.12/19.13 | | | 316Cb |
| | 318C17 | 1.4581 | G-X5CrNiMiNb1810 | Z4CNDNb18.12M | | | |
| | 309S24 | 1.4828 | X15CrNiSi2012 | Z15CNS20.12 | | | 309 |
| | 309S24 | 1.4833 | X7CrNi2314 | Z15CN24.13 | | | 309S |
| | 309C30 | 1.4837 | G-X40CrNiSi2520 | | | | |
| | | 1.4841 | X15CrNiSi2520 | Z15CNS25.20 | | F.3310-X15 CrNiSi 25-20 | 314/310 |
| | 310S24 | 1.4845 | X12CrNi2521 | Z12CN25.20 | 2361 | F.331 | 310S |
| | 310C40 | 1.4848 | G-X40CrNiSi2520 | | | F.8452-AM-X 40 CrNi25 20 | HK |
| | 349S54 | 1.4871 | X53CrMnNiN219 | Z52CMN21.09 | | F.3217-X 53 CrMnNiN 21-09 | EV8 |
| | 331S40 | 1.4873 | X45CrNiW189 | Z35CNWS14.14 | | F.3211-X45 CrNiSiW 28-09 | |
| | 321S20 | 1.4878 | X12CrNiTi189 | T6CNT18.12(B) | 2337 | F.3523-X 6CrNiTi 18 11 | 321 |
| | 1501-509;510 | 1.5662 | X8Ni9 | Z8N9 | | F.2645 - X 8 Ni 09 | A353 |
| | | 1.568 | 12Ni19 | Z18N5 | | | 2515 |
| HIGH TEMPERATURE ALLOYS | NA 18 | 2.4375 | NiCu30 Al | NU 30 AT | | | Monel k-500 |
| | | 2.4685 | G-NiMo28 | | | | Hastelloy B |
| | | 2.481 | G-NiMo30 | | | | Hastelloy C |
| | | 2.461 | NiMo16cR16Ti | | | | Hastelloy C-4 |
| | NA 16/3072-76 | 2.4858 | NiCr21Mo | NC 21 Fe DU | | | Incoloy 825 |
| | | 2.4694 | NiCr16fE7TiAl | | | | Inconel |
| | NA 21 | 2.4856 | NiCr22Mo9Nb | NC 22 FeDNb | | | Inconel 625 |

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|---|---|---|---|---|---|---|---|
| HIGH TEMPERATURE ALLOYS | | 2.4856 | | | | | Inconel 625 |
| | | 2.4642 | NiC29Fe | Nnc 30 Fe | | | Inconel 690 |
| | | 2.4668 | NiCr19FeNbMo | NC 19 Fe Nb | | | Inconel 718 |
| | | 2.4669 | NiCr15Fe7TiAl | NC 15 TNb A | | | Inconel X-750 |
| | | | | | | | Invar 36-36 Alloy |
| | | | | | | | Invar Super 32-5 |
| | | | | | | | Invar Super 32-5 |
| | NA 13 | 2.436 | NiCu30Fe | NU 30 | | | Monel 400 |
| | X5NiCrTi26 15 | | | | HR650 | | A286 |
| | | | Co28Cr6Mo | Z6CNU15-5 | | | Co Chrome ASTM F-75 |
| | NA17 | 1.4864 | X12NiCrSi3616 | Z12NCS37.18 | | F.3313-X 12 CrNi 36-16 | 330 |
| | NA15(H) | 1.4876 | X10NiCrAlTi3320 | Z8NC3221 | | F.3545-X 9NiCr 33-21 | B163 |
| | 3072-76/NA13 | 2.436 | NiCu30Fe | NU30 | | | 4544/SB127/164 |
| | 3072-76/NA18/3146 | 2.4375 | NiCu30Al | | | | 4676 |
| | | 2.4602 | NiCr17Mo17FeW | NC 17 DWY | | | 5388 C |
| | HR5/203-4/703-B | 2.463 | Ni-Cr20Ti | NC 20 T | MH-05 | | Nimonic 75 |
| | HR 10 | 2.465 | NiCr20Co19MoTi | NCK 20 D | | | |
| | | 2.4662 | NiCr15MoTi | Z8 NCDT 42 | MH-16 | | 5660C |
| | HR 6/204 | 2.4665 | NiCr22Fe18Mo | Nc 22 FeD | MH-03 | | 5536E |
| | HC 203 | 2.467 | G-NiCr13Al6MoNb | NC 13 AD | MH-31 | | 5391A |
| | HC 204 | 2.4674 | NiCo15Cr10MoAlTi | NK 15 CAT | | | |
| | 3072-76 | 2.4816 | NiCr15Fe | NC 15 Fe | | | 5540 |
| | | 2.4856 | NiCr22Mo9Nb | NC 22 FeDNB | | | 5581 |
| | 3072-76 | 2.4858 | NiCr21Mo | NC 21 FeDU | | | |
| | HR 207/5047 | | NiFe33Cr17Mo | NW 11 AC | | | |
| | | | NiCo32Cr26Mo | KC 20 WN | | | |
| | | | NiCo28Cr15MoAlTi | NK 27 CADT | | | |
| | HR 3/5007 | 2.4634 | NiCo20Cr15MoAlTi | NCKD 20 ATV | MH-14 | | |
| | | 2.4654 | NiCr20Co14MoTi | NC 20 K 14 | | | |
| | HR 505 | 2.4669 | NiCr16FeTi | NC 15 Fe TNb | | | 5542G |
| | | 2.4676 | NiCo10W10Cr9AlTi | | | | |
| | | | NiCr20Co16MoTi | NC 19 KDU/V | | | |
| | | | NiW13Co10Cr9AlTi | NKW 10 CAT aHf | | | |
| | | | NiCr16Co10WAlTi | | | | |
| | HR 401HR601/736B | 2.4631 | NiCr20TiAl | NC 20 TA | MH-07 | | |
| | | 2.4636 | NiCo15Cr15MoAlTi | NCKD 20 AT | | | 687 |
| | | 2.4662 | NiFe35Cr14MoTi | Z8 NCDT 42 | | | |
| | HR 8 | 2.4668 | NiCr19Fe19NbMo | NC 19 FeNb | MH-06 | | |
| | | 2.4916 | NiCr19Co11MoTi | | | | |
| | | 2.4983 | NiCr18Co18MoAlTi | NCK 19 DAT | | | 684 |
| | | | NiCo22Cr16WAlTi | NC 14 K8 | | | |
| TITANIUM | TA.1 | 3.7024/25 | Ti 99,8 | T-35 | | Ti-PO1 | |
| | TA.2/3/4/5 | 3.7034/35 | Ti 99,7 | T-40 | | Ti-PO2 | 4941/42/51/4902 |
| | TA.6/7/8/9 | 3.7064/65 | Ti99,5 | T-60 | | Ti-PO4 | 4901/21 |
| | TA.21-24/52-55/58 | 3.7124 | TiCu2 | T-U2 | | Ti-P11 | |
| | DTD 5023/5273/5283 | | | T-50 | | | 4900 |
| | | 3.7114 | TiAl5Sn2 | | | | Ti-5Al-2.5Sn |
| | | | 5553 | | | | Ti-5Al-5V-5Mo-3Cr |
| | TA.43/44 | 3.7154 | TiAl6Zr5Mo0,5Si0,2 | T-A6ZD | | Ti-P67 | |
| | TA.10-13/28/56 | 3.7164/65 | TiAl6V4 | T-A6V | | Ti-P63 | 491128/35/54/65/67 |
| | TA.45-51/57 | 3.7184 | TiAl4Mo4Sn2Si0,5 | T-A4DE | | Ti-P68 | |
| NODULAR CAST IRON | 420/12 | 0.704 | GGG-40 | FGS-400-12 | 0717-02 | | 60-40-18 |
| | 370/17 | 0.7043 | GGG-40.3 | FGS370-17 | 0717-15 | | |
| | 500/7 | 0.705 | GGG-50 | FGS500-7 | 0727-02 | | 65-45-12 |
| | 600/3 | 0.706 | GGG-60 | FGS 600-3 | 0732-03 | | 80-55-06 |
| | 700/2 | 0.707 | GGG-70 | FGS 700-2 | 0737-01 | | 100-70-03 |
| | 800/2 | 0.708 | GGG-80 | FGS 800-2 | | | 120-90-02 |
| | W 340/3 | 0.8035 | GTW-35-04 | MB 35-7 | | | |
| | W 410/4 | 0.804 | GTW-40-05 | MB 40-10 | | | |
| | B 340/12 | 0.8135 | GTS-35-10 | MN 35-10 | SIS 08 15-00 | | 32 510 |
| | P 440/7 | 0.8145 | GTS-45-06 | MP 50-5 | SIS 08 54-00 | | |
| | P 540/5 | 0.8155 | GTS-55-04 | MP 60-3 | SIS 08 56-00 | | |
| | P 690/2 | 0.817 | GTS 70-02 | MP 70-2 | SIS 08 62-03 | | 70 003 |
| | B 290/6 | | | MN 32-8/38-18 | SIS 08 14-00 | | |
| GREY CAST IRON | | 0.601 | GG10 | Ft10D / FGL100 | 0110-00 | FG 10 | A48-20B |
| | Grade 150 | 0.6015 | GG15 | Ft15D / FGL150 | 0115-00 | FG 15 | A48-25B |
| | Grade 220 | 0.602 | GG20 | Ft20D / FGL200 | 0120-00 | FG20 | A48-30B |
| | Grade 260 | 0.0625 | GG25 | Ft25D / FGL250 | 0125-00 | FG 25 | A48-40B |
| | Grade 300 | 0.603 | GG30 | Ft30D / FGL300 | 0130-00 | FG 30 | A48-45B |
| | Grade 350 | 0.6035 | GG35 | Ft35D / FGL350 | 0135-00 | FG35 | A48-50B |
| | Grade 400 | 0.604 | GG40 | Ft40D / FGL400 | 0140-00 | | A48-60B |
| ALUMINIUM ALLOYS | LM4/LM22 | 3.2151 | G-AlSi6Cu4 | A-S5U | 4230 | L-2660 | 319,2 |
| | 2L99/LM25 | 3.2371 | G-AlSi7Mg | A-S7G0,3 | 4244 | | A356.2 |
| | LM24 | 3.2161 | G-AlSi8Cu3 | A-S9U3 | 4252 | L-2630 | 380,1 |
| | LM9 | 3.2381 | G-AlSi10Mg | A-S10G | 4253 | L-2560 | A360 |
| | LM20 | 3.2583 | G-AlSi12Cu | A-S12U | 4260 | L-2530 | 413,1 |
| | LM6 | 3.3581 | G-AlSi12 | A-S13 | 4261 | L-2520 | A413 |

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|---|---|---|---|---|---|---|---|
| ALUMINIUM ALLOYS | LM28/LM29 | | AlSi18-25CuNiMg | | | | 393 |
| | 1C | 3.0205 | Al99 | A4 | 144010 | L-3001 | 1200 |
| | 1B | 3.0255 | Al99,5 | A5 | 144007 | L-3051 | 1050A |
| | 1E | 3.0257 | E-Al | A5/L | 144008 | L-3052 | 1350A |
| | 1A | 3.0285 | Al99,8 | A8 | 144004 | L-3081 | 1080A |
| | 1 | 3.0385 | Al99,98R | A99 | | | 1199 |
| | N31 | 3.0505 | AlMn0,5Mg0,5 | | | | 3105 |
| | N3 | 3.0515 | AlMn | | 144054 | L-3810 | 3103 |
| | | 3.0525 | AlMn1Mg0,5 | A-M1G0,5 | | | 3005 |
| | N4 | 3.0526 | AlMnMg1 | A-M1G | | L-3820 | 3004 |
| | | 3.0915 | AlFeSi | A-FeS | | | 8011A |
| | H15 | 3.1255 | AlCuSiMn | A-U4SG | 144338 | L-3130 | 2014 |
| | | 3.1303 | AlCu2Mg0,5 | | | | 2036 |
| | 3L86/HR13 | 3.1305 | AlCu2,5Mg0,5 | A-U2G | | L-3180 | 2117 |
| | H14 | 3.1325 | AlCuMg1 | A-U4G | | L-3120 | 2017A |
| | 2L98 | 3.1355 | AlCuMg2 | A-U4G1 | | L3140 | 2024 |
| | | 3.1645 | AlCuMgPb | A-U4Pb | 144335 | L-3121 | 2003 |
| | FC1 | 3.1655 | AlCuBiPb | A-U5PbBi | 144355 | L-3182 | 2011 |
| | 2L91/92 | 3.1841 | G-AlCu4Ti | | | | 295.1/.2 |
| | 91E | 3.2305 | E-AlMgSi | | | L-3431 | 6101B |
| | BTR6 | 3.2307 | Al99,85MGsI | A85-GS | | | 6463 |
| | H30 | 3.2315 | Al-Si1 Mg | A-SGMO,7 | 144212 | L-3451 | 6181 |
| | H9 | 3.3206 | AlMGSi0,5 | | 144103 | L-3441 | 6060 |
| | BTRE6 | 3.3207 | E-AlMgSi0,5 | A-GS/L | 144102 | | 6101C |
| | | 3.3241 | G-AlMg3Si | A-G3T | | | F/B514.0 |
| | N41 | 3.3315 | AlMg1 | A-G0,6 | 144106 | L-3350 | 5005A |
| | 3L44 | 3.3316 | AlMg1,5 | A-G1,5 | | L-3380 | 5050B |
| | BTR2 | 3.3317 | Al99,85Mg1 | A85-G1 | | | |
| | | 3.3326 | AlMg1,8 | | | | 5051A |
| | | 3.3345 | AlMg4,5 | | | | 5082 |
| | N5Mg3,5 | 3.3523 | AlMg2,5 | A-G2,5C | 144120 | L-3360 | 5052 |
| | N4 | 3.3525 | AlMg2Mn0,3 | A-G2M | | | 5251 |
| | | 3.3527 | AlMg2Mn0,8 | | | | 5049 |
| | | 3.3535 | AlMg3 | A-G3M | 144133 | L-3390 | 5754 |
| | N51 | 3.3537 | AlMg2,7Mn | A-G2,5MC | | | 5454 |
| | | 3.3541 | G-AlMg3 | A-G3T | | L-2341 | 514 |
| | | 3.3545 | AlMg4Mn | A-G4MC | | L-3322 | 5086 |
| | N8 | 3.3547 | AlMg4,5Mn | 5083 | 144140 | L-3321 | 5083 |
| | N6 | 3.3555 | AlMg5 | | 144146 | L-3320 | 5056A |
| | LM5 | 3.3561 | G-AlMg5 | A-G6 | | | 514.1 |
| | LM10 | 3.3591 | G-AlMg10 | A-G10-Y4 | | L-2310 | 520 |
| | H17 | 3.4335 | AlZn4,5Mg1 | A-Z5G | 144425 | L-3741 | 7020 |
| | | 3.4345 | AlZnMgCu0,5 | A-Z5GU0,6 | | | 7022 |
| | 2L95 | 3.4365 | AlZnMgCu1,5 | A-Z5GU | | L-3710 | 7075 |
| | | 3.4415 | AlZn1 | | | L-3721 | 7072 |
| COPPER ALLOYS | Pb2 | 2.1052 | G-CuSn12 | CuSn12 | | | C 90800 |
| | CT2 | 2.106 | G-CuSn12Ni | | | | C 91700 |
| | CT1 | 2.1086 | G-CuSn10 | | | | C 90250 |
| | | 2.109 | G-CuSn7ZnPb | CuSn7Pb6Zn4 | | | C 93200 |
| | LG4 | 2.1093 | G-CuSn6ZnNi | | | | C 92410 |
| | LG2 | 2.1096 | G-CuSn5ZnPb/RG5 | CuPb5Sn5Zn5 | | | C 83600 |
| | LG1 | 2.1098 | G-CuSn2ZnPb | | | | C 83810 |
| | LB2 | 2.1176 | G-CuPb10Sn | CuPb10Sn10 | | | C 93700 |
| | LB1 | 2.1182 | G-CuPb15Sn | | | | C 93800 |
| | LB5 | 2.1188 | G-CuPb20Sn | CuPb20Sn5 | | | C 94100 |
| | | 2.0918 | CuAl5As | CuAl6 | | | C 60 800 |
| | | 2.092 | CuAl8 | CuAl8 | | | C 61 000 |
| | CA 106 | 2.0932 | CuAl8Fe3 | CuAl7Fe2 | | | C 61 400 |
| | CA 105 | 2.0936 | CuAl10Fe3Mn2 | CuAl9Fe3Mn2 | | | C 62 300 |
| | AB 1 | 2.094 | CuAl10Fe | CuAl9Fe3 | | | C 95 200 |
| | CA 104 | 2.0966 | CuAl10Ni5Fe4 | CuAl9Ni5Fe3Mn | | | C 63 200 |
| | AB 2 | 2.097 | G-NiAlBzF50 | CuAl9Ni5Fe | | | C 95 800 |
| | CC 102 | 2.1293 | CuCrZr | | | | C 18100 |
| | C 112 | 2.1285 | CuCo2Be | | | | C 17500 |
| | CB 101 | 2.1245 | CuBe1,7 | CuBe1,7 | | | C 17000 |

# Coatings

**ALtima®**
Aluminium Titanium Nitride (AlTiN). ALtima® is the original high performance coating. This coating allows tools to be run at higher speeds and feeds in a wide array of materials. Also, it allows the option of running tools dry due to the high oxidation temperature of the coating.

**ALtima® Plus**
This Aluminium Titanium Nitride (AlTiN) multi-layer coating has opti- mized coating structure, with pre and post treatment of the coating for optimized high performance drilling in any ferrous material.

**ALtima® 52**
Aluminium Titanium Nitride (AlTiN). ALtima® 52 is specially designed for milling hardened steels 52 Rc and above.
It has very high hardness and the oxidation temperature of the coating makes this the absolute best choice for hardened steel milling. ALtima® 52 is designed to allow for dry machining.

**ALtima® Blaze**
ALtima® Blaze is designed to allow higher material removal rates. This coating has a higher oxidation temperature than a typical TiAlN coating.
It has shown very good results in nickel alloys, titanium, and other difficult to machine materials. Tools coated with ALtima® Blaze can be used in dry machining.

**Special Coatings**
Upon request, M.A.Ford® can provide any commercially available coating. Any standard M.A.Ford® cutting tool can be provided with coating if requested.

**Fordlube**
Titanium DiBoride ($TiB_2$) is a unique coating with low Aluminium affinity, smooth surface finish and high hardness. It is ideal for Aluminium and Magnesium alloys as it prevents build-up on cutting edge, provides superior chip flow along with extended wear resistance.

**Gem+**
Recommended for aluminium and aluminium alloys up to 12% Si, non-ferrous metals and composites. Gem+ provides excellent wear resistance and maintains sharp cutting edges.

**TiN**
Titanium Nitride (TiN). TiN coating has shown good results in low carbon steels and many iron-based applications. It is a very popular coating used in the industry today.

**TiCN**
Titanium Carbonitride (TiCN). TiCN is a multi-layer coating because of the multi-layer composition, TiCN is tougher than TiN, even though TiCN is harder. The added toughness of the TiCN coating makes it a good choice for mechanically stressed edges like in end mill applications. The higher hardness makes TiCN a good choice for abrasive applications where higher wear resistance is required.

**ALtima® Xtreme**
ALtima® Xtreme is a high heat resistant coating with smooth surface to reduce chip rewelding. First choice in Hardened Steels, Stainless Steels and Heat Resistant Alloys like Inconel 718.

**ALtima® Nano**
ALtima® Nano is a high performance coating providing excellent heat resistance in high temperature machining, especially in Titanium and Stainless Steel. It provides improved adhesion, shock resistance and excellent coating smoothness.

**CERAedge® combines the heat resistance of conventional AlTiN coatings with the hardness and smoothness of amorphous diamond coatings.**

- Hardness that makes it the 3rd hardest material when compared to industrial diamonds
- Toughness that is comparable to Titanium
- Lubricity that approaches Teflon

**Applications-**

- **Only CERAedge® has properties allowing for ideal drilling and milling of Titanium clad composites**
- **Ideal for machining Titanium, Aluminium Alloys and High Silicon Aluminium materials.**

## Coating Properties

| M.A. Ford Coating | M.A. Ford Tool Number Designation | Microhardness (HV) | Maximum Service Temp. | Friction Coefficient |
|---|---|---|---|---|
| ALtima® | A | 3100 | 1100°C / 2012°F | 0.42 |
| ALtima® Plus | AP | 3200 | 1100°C / 2012°F | 0.25 |
| ALtima® 52 | A | 3600 | 1200°C / 2192°F | 0.4 |
| ALtima® Blaze | B | 3200 | 1100°C / 2012°F | 0.35 |
| ALtima® Xtreme | AX | 3800 | 1100°C / 2012°F | 0.3 - 0.5 |
| ALtima® Nano | AN | 3875 | 1100°C / 2012°F | 0.3 |
| TiN | T | 2300 | 600°C / 1112°F | 0.4 |
| TiCN | C | 3000 | 400°C / 752°F | 0.4 |
| Fordlube | F | 4000 | 700°C / 1292°F | 0.3 |
| Gem+ | GP | 4710 | 500°C / 932°F | 0.3 |
| CERAedge® | CE | 3400 | 1100°C / 2012°F | 0.25 |



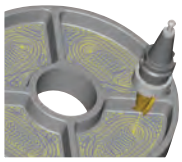
# Integrated Manufacturing Solutions



**M.A.Ford®** World Class Cutting Tools



**REGO-FIX® powRgrip®** Precision Toolholding



**HSM Tool Path Optimisation**




**Spike® TDS** Cutting Tool Force Mapping



**TMS** Tool Management System



**Technical Support & Advice**

## Take control of your machining processes with IMS

Integrated Manufacturing Solutions, IMS for short, combines a range of complementary technologies from M.A. Ford, including our high-performance tooling, which combine to help optimise machining and enhance productivity.

Recently extended with the addition of Spike® TDS tool force mapping and TMS automated tool management, IMS also incorporates HSM tool path optimisation software and REGO-FIX® precision tool holding, as well as our extensive cutting tool range and unrivalled technical support.

***IMS – Providing solutions for manufacturing challenges.***

For further information please contact our support team on: 01332 267960

# Custom tools
## with customised service

M.A. Ford Europe
Custom Tools Division

There are some applications where only a dedicated special purpose tool is the best solution.

Our Custom Tools Division gives you the best of both worlds by providing you with the facilities to design and manufacture a special tool to your exact requirements, but with the added advantage of being precision manufactured by M.A. Ford Europe.

**Performance and peace of mind.**
**A perfect combination.**





**EXPRESS**
**Special Tools in 7 days***

Contact us now: 01332 267960 or
Email: customtools@mafordeurope.com

* Terms & conditions apply.

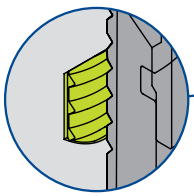
# REGO-FIX® powRgrip®

As an authorised UK REGO-FIX distributor, we can offer you the ultimate combination in high performance cutting tools and tool holding solutions.

## The figures speak for themselves:

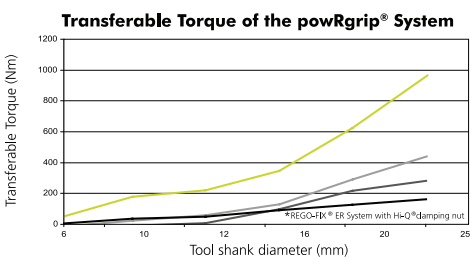
REGO-FIX powRgrip® tool holding system with secuRgrip® option for 100% security against tool pull-out

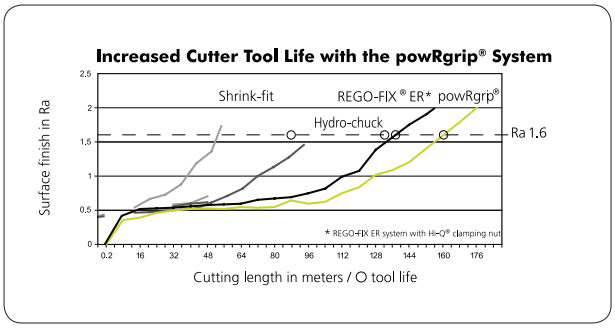
- Holders guaranteed for life under normal usage of 20,000 insertion/ extraction cycles of collet without deterioration in clamping force
- ≤ 3µm run-out
- Designed for roughing and finishing operations
- Anti-vibration effect over standard shrink-fit allowing increased tool life and cutting parameters



Perfect for HA & HB shanks




For further information please contact our support team on: 01332 267960

# **FordGrip** Power Chuck

FordGrip Power Chuck range of collet chucks provides manufacturers with a high precision and cost-effective tool holding solution that allows optimum tool performance to be achieved

- High gripping force ensures tool security
- Accurate tool runout (0.005mm at 3xØ) increases tool-life and improves surface finish
- Suitable for plain, Weldon and whistle notch shank end-mills and drills (Weldon and whistle notch must be used with reduction sleeves)
- Simple mechanism allows easy opening and closing with no maintenance
- Reduced length and external dimensions for improved balancing (G2.5 to 25,000rpm)
- Suitable for through coolant tools





M.A. FORD GRIP POWER CHUCK



M.A. FORD GRIP HYDRAULIC MILLING CHUCK

For further information please contact our support team on: 01332 267960

# Optimised Cutting
## High Speed Machining (HSM)



Since producing our first cutting tools in 1919, M.A. Ford has always striven to improve customer productivity and reduce costs.

The TuffCut® XR-XT range of end mills is the latest step in this process, offering unique Heli-pitch geometry, proprietary substrates and state of the art ALtima® coatings.

HSM uses cutting speeds that are typically more than double thoses of standard or conventional techniques. In conjunction with the increase in surface speed, by controlling the cutting tool engagement angle during the milling process, and the use of chip thickness compensation, increased cutting data can be achieved.

Before using these techniques there are several requirements to consider:

- Rigid machine tools with modern control systems with a HSM function.
- High performance, high technology cutting tools.
- High gripping strength, rigid tool holders.
- Air or powerful coolant delivery system-according to material being machined.
- CAD/CAM software to control the engagement angle of the tool.

**We can show you how!**

M.A. Ford utilises class leading CAD/CAM software which allows for exact control of the radial depth engagement, which is crucial to the high speed machining process.

A step over of 10% of the cutter diameter requires a chip thickness compensation factor of 1.8 to be applied. 20% radial engagement requires a compensation of 1.2 times. However, care must be taken when using these rates for tight corner internal machining.

Due to the small radial cuts, large axial cuts – typically 2 times the tool diameter can be used. The combination of these factors enables most steels up to 40HRC to be machined at feeds of up to 13 m/min.
An example of this HSM cutting data can be seen on the next page in a direct comparison with conventional programming techniques.

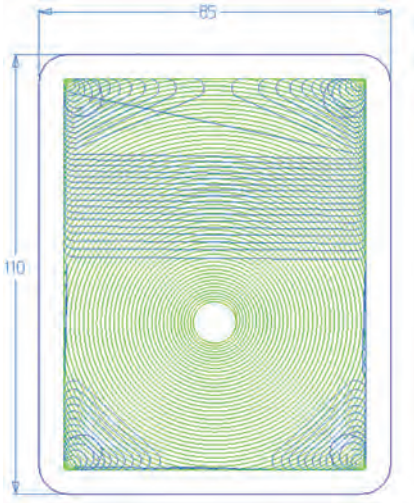
**Benefits of HSM:**

- Decreased cycle time
- Reduced costs
- Potentially reduced cutting tool diameter and hence cost
- Improved process reliability
- Improved cutting tool life
- Reduced coolant consumption

For further information please contact our support team on: 01332 267960

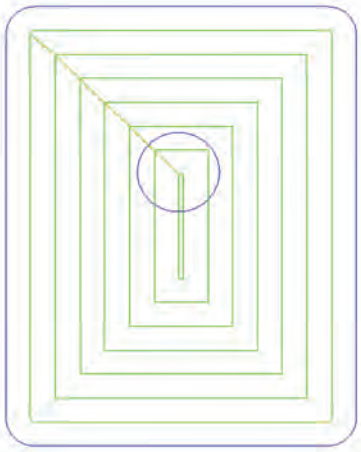
# Benefits of Enhanced Cutting Parameters with HSM Toolpaths

**HSM tool path**




Tool diameter-12 mm 177 1200-0.5RA
Entry-Helical ramp-2 degrees
Axial depth Ap-24 mm-1cut
Radial step over Ae-10%-1.2 mm

**Conventional tool path**



Tool diameter-12 mm 177 1200-0.5RA
Entry-Via drilled hole.
Axial depth Ap-24 mm-2 cuts of 12 mm
Radial step over Ae-50%-6 mm

## Cutting data and cycle time by material

| **Steel** | | |
|---|---|---|
| RPM | 8000 | 3200 |
| Feed mm/min | 6700 | 765 |
| Cycle time | 1 min-40 secs | 4 mins |
| Metal removal rate | 193 $cm^3$ | 55 $cm^3$ |
| Expected tool life | 2 - 3hrs | 1 - 2hrs |

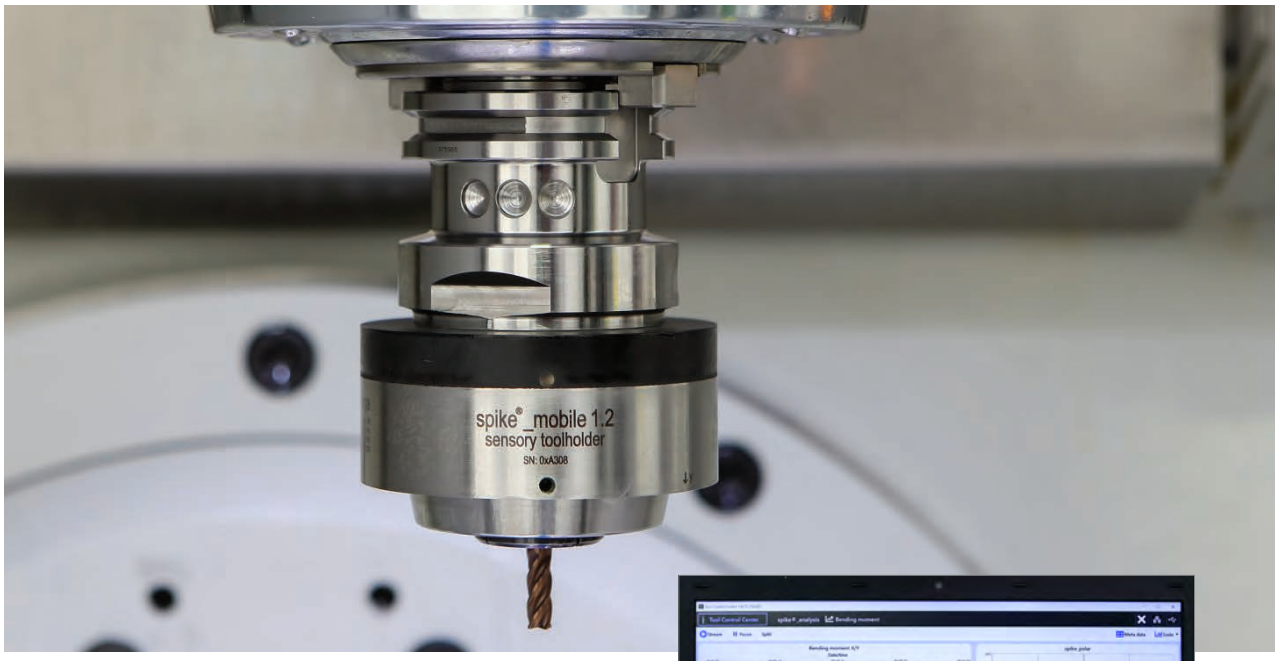
| **Stainless Steel** | | |
|---|---|---|
| RPM | 4000 | 1855 |
| Feed mm/min | 3400 | 450 |
| Cycle time | 3 min-20 secs | 7 mins |
| Metal removal rate | 98 $cm^3$ | 32 $cm^3$ |
| Expected tool life | 2 - 3hrs | 1 - 2hrs |

| **Titanium** | | |
|---|---|---|
| RPM | 2600 | 1600 |
| Feed mm/min | 2100 | 380 |
| Cycle time | 5 min-15 secs | 8 mins |
| Metal removal rate | 61 $cm^3$ | 27 $cm^3$ |
| Expected tool life | 2 - 3hrs | 1 - 2hrs |

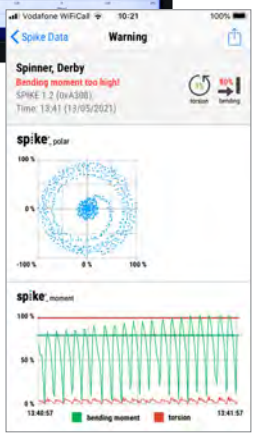
| **Inconel 625** | | |
|---|---|---|
| RPM | 930 | 660 |
| Feed mm/min | 470 | 80 |
| Cycle time | 21 mins | 37 mins |
| Metal removal rate | 14 $cm^3$ | 6 $cm^3$ |
| Expected tool life | 30 mins - 1 hr | 15 - 30 mins |

# **Spike®** cutting force monitoring

As part of our Integrated Manufacturing Solutions (IMS) programme, the Spike® cutting force monitoring system enables us to provide customers with optimised performance data derived from their own applications.






By monitoring tension/pressure, torsion and bending moment in real time, Spike® allows the effects of changes in parameters, such as speed, feed and depth of cut to be instantly viewed and analysed by the software.

The results are then displayed as graphic and numerical data, which enables tooling to be optimised to specific machining conditions or requirements.

At M.A. Ford Europe, we also use the system as an integral part of our tool development programme to analyse the effects that edge geometry, carbide and coating variations have on tool performance in any material. This allows us to deliver a high-performance solution backed up by robust data.




For further information please contact our support team on: 01332 267960

# TMS - Automated tool management systems




## Tooling and inventory management at the push of a button

**Our versatile TMS range of tool management and inventory control machines provide M.A. Ford customers with a fully automated and cost effective-stock control solution on-site at the point of use.**

TMS is easy to use and provides a simple method of managing tool usage and consumption while controlling stock and manufacturing costs, all at the push of a button.

All TMS machines are linked to an online portal, allowing customers to generate a wide range of inventory and usage reports to help manage cutting tool expenditure and monitor costs in detail.

The system automatically generates purchase orders for replenishment stock, or new products, direct to M.A. Ford Europe.

## TMS options

**TMS-CS**
This range uses multi-tier stacked carousels, which are segmented into different 'cells' that can be configured for different sized items. They are loaded with single tools or multiple items, if required, each with their own location code. When the correct code is entered the carousel rotates and the access door automatically unlocks when the tool is available for collection.

**TMS-DS**
Our TMS-DS models are configured as stacked drawers. Each drawer contains a number of compartments, which can be configured to meet the specific needs of each customer. Once the unique location code is entered on the keypad, the appropriate drawer will open and the individual item will be available for use.

## Why TMS?

**Greater control**
Control tooling costs, production and inventory easily while accessing a range of dedicated and detailed usage reports online, as well as automated replenishment.

**Easy to configure**
The divider system allows items to be added or removed in minutes, giving great flexibility and time savings.

**Software and flexible system integration**
Our powerful software can manage a single TMS unit or banks of machines, giving the flexibility of assigning them as a master or 'slave' unit.

**Small footprint and easy location**
The small footprint allows TMS solutions to be located close to the point of use in production areas as well as specialised dedicated manufacturing cells.

**Secure access at any time**
Round the clock traceable access using keypad log-in, proximity or biometric methods for authorised users.

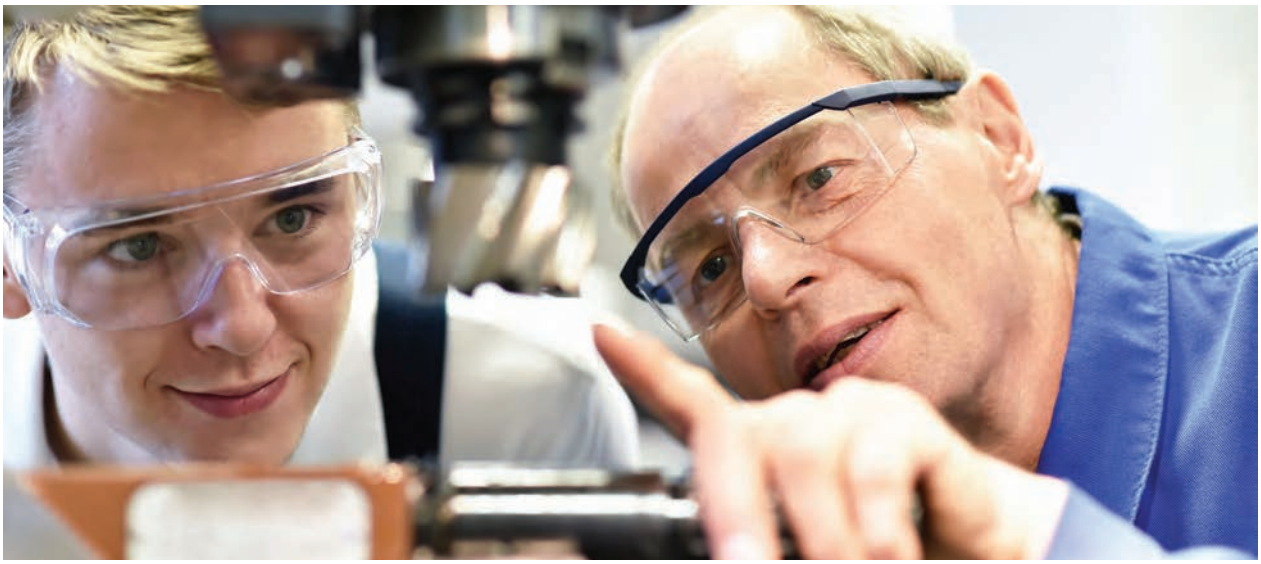
**No Spirals - No Drop**
TMS carousel and drawer options do not use rotating spirals so there's no drop and items can easily be returned, if required.

**High capacity**
More than 800 individual SKUs can be stocked in a single TMS machine.

For further information please contact our support team on: 01332 267960

# **Technical** Support & Advice

Like the cutting edge performance offered by our tooling, the high quality standards provided by our technical support team are an integral part of our business and an essential link for our customers.



Whether it's a simple product performance or tool selection query or a complex question about a new tooling application or improving machining performance, our technical support team has the expertise, experience and knowledge to advise and help.

At M.A. Ford Europe, service and technical support is not just a function of our business, it's a fundamental part of what we do and how we work together with customers to deliver the best solutions for their machining and manufacturing operations.

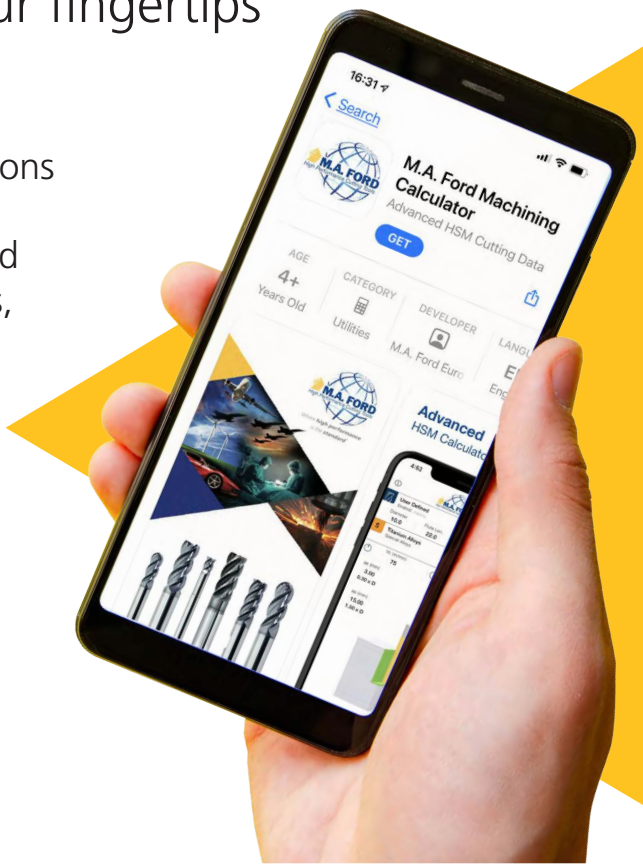
In addition to guidance and advice, our team can also provide training at our Technical Centre or at customers' premises, application & tool testing to verify performance, as well as support for every element within our Integrated Manufacturing Solutions (IMS) programme.

Where a unique cutting solution is required, we also support customers through our own specialist Custom Tools Division, which is dedicated to the design & manufacture of custom tools and innovative solutions to meet individual customer specifications.

For further information please contact our support team on: 01332 267960

# The M.A. Ford interactive cutting data app
## - Everything you need at your fingertips

Our interactive app for iOS and Android devices makes tool cutting data calculations simpler and faster by minimising text input and using 3D graphics that respond instantly to changing cutting parameters, using smart-phone or tablet touch screens.




Developed around our proven cutting data, the app supports a wide range of ISO materials including steel, aluminium alloys, stainless steel and titanium, as well as cast iron, hardened steels and exotic alloys.

Once basic information has been selected from 'drop down' menus, such as tool type, diameter and material, the app allows you to 'drag' the tool graphic display to change the radial engagement and depth of cut, which instantly calculates speeds and feeds.



Radial chip thinning data is also calculated for use with high-speed machining (HSM) strategies, which can significantly reduce cycle times and improve tool life.

Colour coded feedback guides you toward the recommended cutting conditions based on the chosen input parameters. User over-ride controls allow cutting data to be fine-tuned for individual applications, as well as enabling calculations to be made that compare multiple scenarios instantly.

Proven cutting data can be stored via the 'Save' feature for future reference or shared with other app users. A hyperlink to M.A. Ford Europe's website also allows immediate access to online information and downloads.

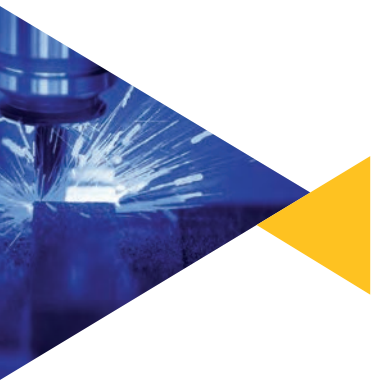
Get it on Google Play

Download on the App Store

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*Where* ***high performance*** *is the* ***standard***®

M.A. FORD
High Performance Cutting Tools



APG
ADVANCED PRODUCT GROUP

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RANGE

TuffCut® Endmills

Cyclone Drills

Countersinks

Twister® Drills

Edgehog® Burrs

TrueSize® Reamers

Diamond Grind Routers


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