









 **OSAWA**  
D R I L L S   &   E N D   M I L L S



**OSW21** CATALOGUE



MATERIALS		HARDNESS/Rm
<b>P1</b>	Free cutting steel and structural steel	< 500 N/mm <sup>2</sup>
<b>P2</b>	Carbon steel and low alloy steel	500-700 N/mm <sup>2</sup>
<b>P3</b>	Medium alloy steel and heat treated steel	600-800 N/mm <sup>2</sup>
<b>P4</b>	High alloy steel	800-1000 N/mm <sup>2</sup>
<b>P5</b>	Tool steel	900-1200 N/mm <sup>2</sup>
<b>P6</b>	High tensile strength steel	1200-1480 N/mm <sup>2</sup>
<b>P7</b>	Ferritic - Martensitic stainless steel	
<b>P8</b>	PH stainless steel	
<b>M1</b>	Austenitic stainless steel (good machinability)	
<b>M2</b>	Austenitic stainless steel (medium machinability) and Duplex	
<b>M3</b>	Super austenitic stainless steel and super Duplex	
<b>K1</b>	Grey cast iron	150-250 HB
<b>K2</b>	Nodular cast iron	150-350 HB
<b>K3</b>	Austenitic cast iron	120-260 HB
<b>K4</b>	ADI cast iron	250-500 HB
<b>N1</b>	Aluminium alloys ≤ 12% Si	
<b>N2</b>	Aluminium alloy > 12% Si and Aluminium-Magnesium	
<b>N3</b>	Copper alloy	
<b>N4</b>	Brass alloy and Bronze alloy	
<b>N5</b>	Plastic material	
<b>N6</b>	Carbon fiber and composite	
<b>S1</b>	Heat resistant super alloys (HRSA) Ni base (good machinability)	< 25 HRC
<b>S2</b>	Heat resistant super alloys (HRSA) Ni base (medium machinability)	25-35 HRC
<b>S3</b>	Heat resistant super alloys (HRSA) Ni base (low machinability)	35-45 HRC
<b>S4</b>	Low Titanium base alloy (good machinability)	
<b>S5</b>	High Titanium base alloy (medium machinability)	
<b>H1</b>	Hardened steel	50-56 HRC
<b>H2</b>	Hardened bearing steel	54-62 HRC
<b>H3</b>	Hardened tool steel	60-65 HRC
<b>H4</b>	Hardened martensitic stainless steel	50-56 HRC
<b>H5</b>	Hardened white cast iron	48-55 HRC

 REFER TO PAGES 15-29 FOR THE COMPLETE LIST OF WORKPIECE MATERIALS.  
 CONSULTARE PAGG. 15-29 PER LA LISTA COMPLETA DEI MATERIALI  
 AUF DEN SEITEN 15 BIS 29 FÜR DIE VOLLSTÄNDIGE LISTE VON WERKSTOFFMATERIALIEN  
 CONSULTER DE LA PAGE 15 À LA PAGE 29 POUR LA LISTE COMPLÈTE DES MATÉRIAUX  
 CONSULTAR DESDE PÁG. 15 A PÁG. 29 PARA LA LISTA COMPLETA DE LOS MATERIALES  
 ПОЛНЫЙ СПИСОК ОБРАБАТЫВАЕМЫХ МАТЕРИАЛОВ СМОТРИ НА СТР. 15-29.

## OSW21 CATALOGUE



*Osawa is a trademark owned by Sorma S.p.A. which is on a mission to provide the cutting tool market with solid tools for milling and drilling. Based on the well-established know how of Sorma S.p.A., coming from Japanese and European best technologies, the brand Osawa was launched in 2001 and groups different tools manufacturers located worldwide (Europe, Far East and USA). To keep up with the evolution of production systems and costs, Sorma is increasing its investments in China, Taiwan and Korea, always putting quality first: Osawa producers are strictly selected on the strength of their tools' performances and they are all certified ISO 9001. Such structure makes Osawa able to meet a very wide spectrum of customers' requests, even on most critical applications. Its production flexibility together with the highly qualified direction of Sorma gives Osawa the possibility to have high profile tools in any item of the range.*

*Arturo Sorgato  
President - Sorma S.p.A.*



*Osawa è un marchio registrato di Sorma S.p.A. che ha la mission di offrire al mercato dell'industria meccanica utensili integrali per foratura e fresatura. Basato sull'esperienza maturata da Sorma con le migliori tecnologie giapponesi ed europee, il marchio Osawa è stato lanciato nel 2001 e raggruppa diversi produttori di utensili collocati in varie parti del mondo (Europa, Estremo Oriente e USA). Per far fronte all'evoluzione dei sistemi e dei costi di produzione, Sorma sta incrementando i propri investimenti in Cina, Taiwan e Corea, facendo sempre della qualità il proprio baluardo: i produttori Osawa sono selezionati severamente sulla base delle prestazioni dei loro utensili e sono tutti certificati ISO 9001. Questa struttura permette ad Osawa di far fronte ad un ampio quadro di richieste da parte dei clienti, anche nelle applicazioni più critiche. La sua flessibilità produttiva, insieme alla direzione altamente qualificata di Sorma, danno la possibilità ad Osawa di offrire utensili di alto profilo in ogni componente della gamma.*

*Arturo Sorgato  
Presidente - Sorma S.p.A.*



*Osawa ist eine geschützte Handelsmarke der Firma Sorma S.p.A., die als Ziel, ein umfangreiches Angebot von Bohr- und Fräswerkzeugen für den Maschinenbau anbieten soll. Dank der langen Erfahrung, die Sorma während der Jahrzehnte sammeln konnte, und der besten japanischen und europäischen Technologien, wurde im Jahre 2001 die Handelsmarke Osawa gegründet. Osawa enthält hochwertige Werkzeuge von verschiedenen ausgelesenen Herstellern aus aller Welt (Europa, Ferner Osten, USA). Um den Schritt der ständigen Entwicklung der Fertigungsprozesse und Produktionskosten halten zu können, hat Sorma seine Investitionen in China, Taiwan und Korea erhöht, ohne selbstverständlich auf die Qualität zu verzichten, die seit immer im Mittelpunkt steht. Die Osawa Lieferanten sind auf sehr sorgfältiger Weise ausgewählt, verfügen alle über eine ISO 9001 Zertifizierung, und müssen die streng angeforderten Leistungsverhältnisse der Werkzeuge einhalten können. Dieser Hintergrund ermöglicht Osawa ein sehr breites Spektrum von Anfragen zu befriedigen, auch für die kritischsten Anwendungsfälle. Seine Flexibilität bei den verschiedenen Fertigungsprozesse, in Verbindung mit einer hochqualifizierten Führung der Firma Sorma, gibt Osawa die Möglichkeit hochwertige Werkzeuge in den verschiedenen Produktsegmente anzubieten.*

*Arturo Sorgato  
Präsident - Sorma S.p.A.*





Osawa est une marque déposée par Sorma S.p.A. qui a la mission d'offrir au marché de l'industrie mécanique des outils monobloc pour le perçage et le fraisage. Basée sur l'expérience acquise par Sorma avec les meilleures technologies japonaises et européennes, la marque Osawa a été lancée en 2001 et elle regroupe plusieurs producteurs d'outils qui se trouvent partout dans le monde (Europe, Extrême Orient et USA). Pour faire face à l'évolution des procédés de fabrication et des coûts de production, Sorma est en train d'augmenter ses propres investissements en Chine, à Taiwan et en Corée, en faisant toujours de la qualité son point de force : les producteurs Osawa sont sélectionnés sévèrement en fonction de la performance de leurs outils, et sont tous certifiés ISO 9001. Cette structure permet à Osawa de faire face à un large cadre de demandes de la part des clients, aussi dans les applications les plus critiques. Sa flexibilité productive, sous la direction hautement qualifiée de Sorma, donne à Osawa la possibilité d'offrir des outils de haut profil pour chaque composant de la gamme.

Arturo Sorgato  
Président - Sorma S.p.A.



Osawa es una marca registrada de Sorma S.p.A. cuya misión es ofrecer al mercado de la industria mecánica herramientas integrales para el taladrado y el fresado. Basada en la experiencia adquirida por Sorma con las mejores tecnologías Japonesas y Europeas, la marca Osawa fue lanzada en el 2001 y reúne a diferentes fabricantes de herramientas ubicados en varias partes del mundo (Europa, Extremo Oriente y EE.UU.). Para hacer frente a la evolución de los sistemas y de los costes de producción, Sorma está aumentando su inversión en China, Taiwán y Corea, haciendo siempre de la calidad el propio baluarte: los productores Osawa se seleccionan basándose en el rendimiento de sus herramientas y son todos certificados ISO 9001. Esta estructura permite a Osawa de hacer frente a un panorama amplio de peticiones por parte de los clientes, incluso en las aplicaciones más críticas. Su flexibilidad productiva, junto a la dirección de profesionales altamente calificados de Sorma, dan la posibilidad a Osawa de ofrecer herramientas de alto perfil en cada componente de la gama.

Arturo Sorgato  
Presidente - Sorma S.p.A.



Osawa – это марка зарегистрированная ЗАО «Sorma S.p.A.», которая включает в себя широкую гамму продукции интегрального осевого инструмента для сверления и фрезерования, применяемого в металлообрабатывающей промышленности. Компания «Sorma» обладает передовыми технологиями, накопленными благодаря многолетнему опыту работы с лучшими японскими и европейскими производителями. Марка Osawa появилась в 2001 году и объединила ведущих производителей инструментов, расположенных в разных частях мира (Европе, Дальнем Востоке и США). Следуя требованиям современного рынка по оптимизации стоимости и качества продукции, компания «Sorma» увеличила свои инвестиции в производство в таких странах как Китай, Тайвань и Корея, при условии соблюдения высочайших стандартов качества: все производители Osawa проходят строгий контроль качества продукции и высоких производственных стандартов. Всё производство сертифицировано согласно стандартам ISO 9001. Благодаря этому, продукция Osawa может быть применена для решения широкого спектра даже самых сложных задач и в состоянии удовлетворить требования потребителя возникающих при металлообработке. Гибкое производство Osawa, совместно с высококвалифицированным специалистами компании «Sorma», позволяют предложить качественный инструмент по всем направлениям продукции.

Arturo Sorgato  
Президент ЗАО «Sorma S.p.A.»

## WARNING

read carefully before using our products

- Tools may chatter if broken. The wearing of eye protection is strongly advised in the vicinity of the working area.
- The correct using condition and handling of our tools is essential to ensure maximum life and hazard-free operation.
- Cutting tools have sharp edges and care must be taken when handling to avoid cuts/lacerations to unprotected hands.
- The wearing of gloves is forbidden as the gloves may entangle with turning tools.
- Tools may hurt the user's feet when falling off. Safety shoes should be put on at all time.
- While fitting the tools to machine spindles and/or sleeves, care should be taken to avoid subjecting them to shock or impact.
- Check that the workpieces are properly seated and securely held in the chuck before switching on machine power.
- Do not use a tool which cutting edges are worn-out or chipped severely.
- Grinding operations may produce potentially hazardous dust particles or vapour. Adequate ventilation equipment should be provided.

## VORSICHT

bitte sorgfältig durchlesen, bevor Sie unsere Produkte gebrauchen

- Beschädigte Werkzeuge können vibrieren, es wird daher dringend empfohlen Schutzbrillen in der Nähe der Arbeitsstelle zu tragen.
- Ordnungsgemäße Handhabung und Arbeitsvoraussetzung sind Grundbedingungen für lange Lebensdauer und Sicherheit.
- Die Schneidkanten der Werkzeuge sind sehr scharf und können ungeschützte Hände verletzen. Vorsicht bei der Handhabung.
- Handschuhe können sich mit drehenden Werkzeugen verfangen, sie sind daher verboten.
- Unfallschutzschuhe ständig anziehen: beim Hinunterfallen können die Werkzeuge die Füße verletzen.
- Beim Einsetzen der Werkzeuge auf die Maschinen ist darauf zu achten, Stöße zu vermeiden.
- Prüfen Sie vor Inbetriebnahme der Maschine die genaue Befestigung der Werkstücke.
- Werkzeuge mit beschädigten Schneiden nicht mehr verwenden.
- Beim Schleifen können gefährliche Partikel oder Gase entstehen. Angemessene Entlüftung muß gewährleistet sein.

## ADVERTENCIAS

leer atentamente antes de comenzar a utilizar nuestros productos

- Si las herramientas están rotas, pueden vibrar. Se aconseja absolutamente el uso de gafas de protección cuando se está cerca del área de trabajo.
- El uso correcto de nuestras herramientas es esencial para asegurarse la mayor duración y para evitar operaciones peligrosas.
- Las herramientas de corte poseen bordes muy afilados que pueden causar heridas en las manos si no están debidamente protegidas.
- Está prohibido el uso de guantes. El tejido puede pegarse al filo y ser arrastrado por la herramienta en rotación.
- Las herramientas que caen pueden dañar los pies del operador. El calzado de protección contra accidentes debe usarse en todo momento.
- Si se fija una herramienta a la máquina tener la precaución de no averiarla.
- Controlar el posicionamiento perfecto y la fijación de la pieza a mecanizar antes de accionar la máquina.
- No utilizar herramientas muy gastadas o averiadas.
- Cuando se afila una herramienta pueden formarse polvos y vapores peligrosos. Disponer un sistema de ventilación adecuado.

## AVVERTENZE

leggere attentamente prima dell'utilizzo dei nostri prodotti

- Gli utensili, se rotti, possono vibrare. L'uso di occhiali protettivi è assolutamente consigliato in prossimità dell' area di lavoro.
- Il corretto utilizzo dei nostri utensili è essenziale al fine di assicurarne la miglior durata ed evitare operazioni pericolose.
- Gli utensili da taglio hanno un tagliente molto affilato che può procurare ferite alle mani se non protette adeguatamente.
- L'uso di guanti è vietato. Il tessuto può legarsi al tagliente ed essere trascinato dall'utensile in rotazione.
- Gli utensili che cadono possono danneggiare i piedi dell'operatore. Le scarpe antinfortunistiche devono essere indossate in qualsiasi momento
- Nel fissare l'utensile alla macchina fare sempre attenzione a non danneggiarlo.
- Controllare il perfetto posizionamento e fissaggio del pezzo da lavorare prima di azionare la macchina.
- Non riutilizzare utensili fortemente usurati o danneggiati.
- La riaffilatura può generare polveri e vapori pericolosi. Attrezzarsi con un sistema di ventilazione adeguato.

## AVERTISSEMENT

à lire attentivement avant utilisation de nos produits

- Les outils si cassés peuvent vibrer. Le port de lunettes de sécurité près de la zone de travail est vivement recommandé.
- Des conditions d'emploi correctes de nos produits sont essentielles pour assurer une durée de vie maximum et éviter des accidents.
- Les outils ont des arêtes vives et peuvent blesser les mains non protégées.
- Le port de gants près d'outils en rotation est interdit car ils peuvent être happés par l'outil.
- Des outils tombant à terre peuvent blesser les pieds de l'opérateur : le port de chaussures de sécurité est conseillé.
- En montant les outils sur le porte-outils, veiller à éviter les chocs.
- S'assurer que la pièce soit parfaitement fixée avant de mettre la machine en route.
- Ne pas utiliser des outils usés ou endommagés.
- Le réaffûtage des outils peut provoquer des vapeurs et des poussières dangereuses qui devront être convenablement aspirées.

## ПРЕДУПРЕЖДЕНИЕ

внимательно прочитайте перед использованием нашей продукции

- Повреждённый инструмент подвержен вибрациям. Настоятельно рекомендуется использование средств защиты глаз, в непосредственной близости от рабочей зоны.
- Правильное использование нашего инструмента обеспечит максимальный срок его службы и безопасность работы.
- Режущий инструмент, имеет острые кромки, поэтому необходимо соблюдать осторожность при его использовании.
- Использование перчаток запрещено, так как ткань перчатки может зацепиться за части инструмента, что может привести к травмам при вращении инструмента.
- При падении инструмент может повредить ноги пользователя. Во время работы с инструментом должна быть использована специальная защитная обувь.
- Устанавливать инструмент в станок необходимо с осторожностью, во избежание его повреждения.
- Необходимо проверить надёжность крепления заготовки до включения станка.
- Не использовать повторно повреждённый или пришедший в негодность инструмент.
- Переточка инструмента может привести к образованию опасных испарений и пыли. Строго рекомендуется использование соответствующих вентиляционных систем.

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## 33. CARBIDE DRILLS

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63.....	TYPHOON TA - 4HTA general purpose - 3xD, 8xD
77.....	TYPHOON SUH stainless steel - 3xD, 5xD
91.....	TYPHOON ALH non-ferrous materials - 3xD, 5xD
101.....	TYPHOON HRC hardened steel 45÷62 HRC - 3xD
107.....	TYPHOON SUH MINI short, long and extra long - 5xD÷30xD
139.....	TYPHOON HL long and extra-long - 12xD÷30xD
173.....	TYPHOON HSD step drill for 90° chamfering
179.....	C-SD-TA NC spotting

## 183. HSS DRILLS

193.....	LFTA high performance
203.....	SUTA high performance
213.....	HSS - HSS/Co general purpose

## 279. CARBIDE END MILLS

297.....	G2 general purpose
343.....	MDTA general purpose
367.....	HF VH/UP universal and multi-purpose
463.....	MEF stainless steel and super alloys
477.....	ALU non ferrous materials
503.....	MEX (30÷55 HRC), MH (30÷70 HRC) steel and hardened steel
563.....	UH (< 70 HRC), MH (30÷70 HRC) steel and hardened steel






## 627. HSS END MILLS

639.....	HSS/Co - HSSP general purpose
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## 681. CARBIDE BURRS

683.....	Carbide burrs
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## CATALOGUE STRUCTURE

-  SUDDIVISIONE DEL CATALOGO
-  AUFTEILUNG DES KATALOGS
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-  SUBDIVISIÓN DEL CATÁLOGO
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213.....	HSS - HSS/Co general purpose
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563.....	UH (< 70 HRC), MH (30+70 HRC) steel and hardened steel
<b>4</b>	<b>427. HSS END MILLS</b> 
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<b>5</b>	<b>681. CARBIDE BURRS</b> 
683.....	Carbide burrs

### 5 MAIN SECTIONS

- 1 carbide drills
- 2 HSS drills
- 3 micrograin carbide end mills
- 4 HSS end mills
- 5 carbide burrs

### 5 MACRO SEZIONI

- 1 punte in metallo duro
- 2 punte in HSS
- 3 frese in metallo duro micrograna
- 4 frese in HSSCo e HSSP
- 5 lime rotative in metallo duro

### 5 HAUPTABSCHNITTE

- 1 VHM Bohrer
- 2 HSS Bohrer
- 3 VHM Fräser Mikrokörnung
- 4 Fräser aus HSSCo und HSSP
- 5 Hartmetall-Rotierfräser

### 5 CHAPITRES

- 1 forets en carbure
- 2 forets en HSS
- 3 fraises en carbure micrograin
- 4 fraises en HSSCo et HSSP
- 5 limes rotatives en carbure

### 5 MACRO SECCIONES

- 1 brocas en metal duro
- 2 brocas en HSS
- 3 fresas en metal duro micrograno
- 4 fresas en HSS/Co y HSSP
- 5 limas rotativas en metal duro

### 5 ПОДРАЗДЕЛОВ

- 1 твёрдосплавные свёрла
- 2 свёрла из быстрорежущей стали
- 3 фрезы из мелкозернистого твёрдого сплава
- 4 фрезы из порошковой и легированной Co быстрорежущей стали
- 5 борфрезы твёрдосплавные

## PRODUCT SEARCH

- RICERCA PRODOTTI
- PRODUKTSUCHE
- RECHERCHE PRODUITS
- BÚSQUEDA PRODUCTOS
- ПОДБОР ИНСТРУМЕНТА

# 1

## Alphanumeric index

Indice alfanumerico Alphanumerischer Index

ITEM No.	PAGE	ITEM
118N	214	G2250
134N (234NVA)	252	G2251
1385NTI (1386STI)	223	G2310
1386STI	223	G2311
1386STI SET	226	G2312
138HB	234	G2410

### ALPHANUMERIC INDEX

If product code (e.g. ITEM No. 118N) is known, check the alphanumeric index at page 12.

### INDICE ALFANUMERICO

Conoscendo il codice prodotto (es. ITEM No. 118N), consultare l'indice alfanumerico a pag. 12.

### ALPHANUMERISCHER INDEX

Wenn Sie die Art.Nr kennen (z.B. ART.Nr 118N), können Sie die entsprechende Seite durch den Alphanumerischen Index - Seite 12 - finden.

### INDEX ALPHANUMÉRIQUE

En connaissant le code produit (ex. ITEM No. 118N), consulter l'index alphanumérique à la page 12.

### ÍNDICE ALFANUMÉRICO

Conociendo el producto (ej. ITEM No. 118N), consultar el índice alfanumérico en pág. 12.

### АЛФАВИТНЫЙ УКАЗАТЕЛЬ

Если артикул (т.е. код № 118n) известен, смотрите алфавитный указатель на стр. 12.

# 2

D	D1/2	R	R1/2	SHANK	L	FL	FL	FL	FL	EDP No.	Stock
1	0.8-2.00	0.50	0.4-0.815	A	2	30	2	30	2	G2CSB210	●
1.5	0.8-2.00	0.75	0.4-0.815	A	2	30	2	30	2	G2CSB215	●
2	0.8-2.00	1.00	0.4-0.815	A	4	30	2	30	2	G2CSB220	●
2.5	0.8-2.00	1.25	0.4-0.815	A	2	30	2	30	2	G2CSB225	●
3	0.8-2.00	1.50	0.4-0.815	A	4	30	2	30	2	G2CSB230	●
3.5	0.8-2.00	1.75	0.4-0.815	A	2	30	2	30	2	G2CSB235	●
4	0.8-2.00	2.00	0.4-0.815	A	4	30	2	30	2	G2CSB240	●
4.5	0.8-2.00	2.25	0.4-0.815	A	2	30	2	30	2	G2CSB245	●
5	0.8-2.00	2.50	0.4-0.815	A	4	30	2	30	2	G2CSB250	●
5.5	0.8-2.00	2.75	0.4-0.815	A	2	30	2	30	2	G2CSB255	●
6	0.8-2.00	3.00	0.4-0.815	A	4	30	2	30	2	G2CSB260	●
6.5	0.8-2.00	3.25	0.4-0.815	A	2	30	2	30	2	G2CSB265	●
7	0.8-2.00	3.50	0.4-0.815	A	4	30	2	30	2	G2CSB270	●
7.5	0.8-2.00	3.75	0.4-0.815	A	2	30	2	30	2	G2CSB275	●
8	0.8-2.00	4.00	0.4-0.815	A	4	30	2	30	2	G2CSB280	●
8.5	0.8-2.00	4.25	0.4-0.815	A	2	30	2	30	2	G2CSB285	●
9	0.8-2.00	4.50	0.4-0.815	A	4	30	2	30	2	G2CSB290	●
9.5	0.8-2.00	4.75	0.4-0.815	A	2	30	2	30	2	G2CSB295	●
10	0.8-2.00	5.00	0.4-0.815	A	4	30	2	30	2	G2CSB300	●
10.5	0.8-2.00	5.25	0.4-0.815	A	2	30	2	30	2	G2CSB305	●
11	0.8-2.00	5.50	0.4-0.815	A	4	30	2	30	2	G2CSB310	●
11.5	0.8-2.00	5.75	0.4-0.815	A	2	30	2	30	2	G2CSB315	●
12	0.8-2.00	6.00	0.4-0.815	A	4	30	2	30	2	G2CSB320	●
12.5	0.8-2.00	6.25	0.4-0.815	A	2	30	2	30	2	G2CSB325	●
13	0.8-2.00	6.50	0.4-0.815	A	4	30	2	30	2	G2CSB330	●
13.5	0.8-2.00	6.75	0.4-0.815	A	2	30	2	30	2	G2CSB335	●
14	0.8-2.00	7.00	0.4-0.815	A	4	30	2	30	2	G2CSB340	●
14.5	0.8-2.00	7.25	0.4-0.815	A	2	30	2	30	2	G2CSB345	●
15	0.8-2.00	7.50	0.4-0.815	A	4	30	2	30	2	G2CSB350	●
15.5	0.8-2.00	7.75	0.4-0.815	A	2	30	2	30	2	G2CSB355	●
16	0.8-2.00	8.00	0.4-0.815	A	4	30	2	30	2	G2CSB360	●
16.5	0.8-2.00	8.25	0.4-0.815	A	2	30	2	30	2	G2CSB365	●

### GENERAL AND THUMB INDEX

If product series (e.g. Carbide End-Mills G2) is known, check general index at page 5 or follow the thumb index.

### INDICE E RUBRICATURA

Conoscendo la serie prodotto (es. Carbide End-Mills G2), consultare l'indice generale a pag. 5 o seguire la rubricatura.

### INDEX UND DAUMEN INDEX

Wenn die Produktgruppe bekannt ist (z.B Carbide End-Mills G2), schlagen Sie im Index -Seite 5- nach, oder folgend Sie dem Daumen Index.

### INDEX ET RUBRIQUE

En connaissant la référence du produit (ex. Carbide End-Mills G2), consulter l'index général à la page 5 ou suivre la rubrique.

### ÍNDICE Y DIRECTORIO

Conociendo la serie de producto (ej. Carbide End-Mills G2), consultar el índice general en pág. 5 o seguir el directorio.

### ОГЛАВЛЕНИЕ И РУБРИКАТОР

Если известна серия продукции (т.е. Carbide End-Mills g2), смотри общее оглавление на стр. 5 или используйте рубрикатор.

## PRODUCT SEARCH

- RICERCA PRODOTTI
- PRODUKTSUCHE
- RECHERCHE PRODUITS
- BÚSQUEDA PRODUCTOS
- ПОДБОР ИНСТРУМЕНТА

### 3

**Selection Guide**

Indice grafico Auswahllhilfe Indice graphique Índice gráfico Руководство по выбору

PU-HPU universal application 3xD - 5xD	<b>353PU</b> 43	
	<b>353HPU</b> 43	
	<b>353PU</b> 52	
	<b>353HPU</b> 52	
TA-4HTA general purpose 3xD - 8xD	<b>343TA</b> 44	
	<b>318A</b> 44	
	<b>3544HTA</b> 70	
SUH stainless steel 3xD - 5xD	<b>355SUH</b> 79	
	<b>355SUH</b> 85	
ALH high toughness material 3xD - 5xD	<b>353AH</b> 93	
	<b>353AH</b> 97	
HRC hardened steel 45-52 HRC 3xD	<b>353HRC</b> 103	
	<b>355SUH MIN</b> 114	
	<b>355SUH MIN</b> 118	
	<b>3512SUH MIN</b> 122	
SUH MINI short, long and extra long 5xD = 30xD	<b>353SUH MIN</b> 126	
	<b>353SUH MIN</b> 130	
	<b>353SUH MIN</b> 134	
	<b>3512AL</b> 147	
	<b>3512AL</b> 152	
HL long and extra long 12xD = 30xD	<b>353HL</b> 157	
	<b>353HL</b> 162	
	<b>353HL</b> 167	
HSD stag. drill for 90° chamfering	<b>373HD</b> 175	
NC spotting 90° - 120°	<b>CS-Drill 90</b> 189	
	<b>CS-Drill 120</b> 189	

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**Selection Guide**

Indice grafico Auswahllhilfe Indice graphique Índice gráfico Руководство по выбору

RANGE	DRAWING DEPTH	BORING	TYPE	MATERIAL COATING	ARC	POINT ANGLE	HELIX ANGLE	DRILLING	BOSS	DRUM	COX	DOX	DOX1	DOX2	DOX3
3-20	3xD	DRILLING	PU	MS P2550	140°	30°	45°	*	*	*	*	*	*	*	*
3-20	3xD	DRILLING	HFU	MS P2550	140°	30°	45°	*	*	*	*	*	*	*	*
3-20	5xD	DRILLING	PU	MS P2550	140°	30°	45°	*	*	*	*	*	*	*	*
3-20	5xD	DRILLING	HFU	MS P2550	140°	30°	45°	*	*	*	*	*	*	*	*
1-14	3xD	DRILLING	TA	MS P2550	140°	30°	*	*	*	*	*	*	*	*	*
1-12	3xD	DRILLING	TA	MS P2550	140°	30°	*	*	*	*	*	*	*	*	*
1-14	8xD	OSAWA	6HTA	MS P2550	140°	30°	*	*	*	*	*	*	*	*	*
3-20	3xD	DRILLING	SUH	MS P2550	140°	30°	*	*	*	*	*	*	*	*	*
3-20	5xD	DRILLING	SUH	MS P2550	140°	30°	*	*	*	*	*	*	*	*	*
3-20	3xD	DRILLING	ALH	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
3-20	5xD	DRILLING	ALH	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
2.6-14.2	3xD	DRILLING	HRC	MS P2550	45-62	150°	15°	45°	*	*	*	*	*	*	*
1-3	5xD	OSAWA	SUH MINI	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
1-3	8xD	OSAWA	SUH MINI	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
1-3	12xD	OSAWA	SUH MINI	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
1-3	25xD	OSAWA	SUH MINI	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
1-3	25xD	OSAWA	SUH MINI	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
1-3	35xD	OSAWA	SUH MINI	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
1-10	12xD	OSAWA	HL	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
1-10	15xD	OSAWA	HL	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
1-10	25xD	OSAWA	HL	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
1-10	25xD	OSAWA	HL	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
1-10	35xD	OSAWA	HL	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
1-10	35xD	OSAWA	HL	MS P2550	130°	30°	*	*	*	*	*	*	*	*	*
1-10	12xD	OSAWA	HSD	MS P2550	140°	30°	90°	*	*	*	*	*	*	*	*
1-14	8xD	OSAWA	SD	MS P2550	90°	30°	*	*	*	*	*	*	*	*	*
1-14	8xD	OSAWA	SD	MS P2550	150°	30°	*	*	*	*	*	*	*	*	*

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### SELECTION GUIDE

An easy graphic index with tool and application information is available at the beginning of each section.

### GUIDA ALLA SELEZIONE

All'inizio di ogni macro sezione è disponibile un indice grafico con informazioni relative all'utensile e alle sue applicazioni.

### AUSWAHLHILFE

Am Anfang von jedem Hauptabschnitt ist ein grafischer Index, mit Infos bezüglich des Werkzeugs und seinem Anwendungsfeld, vorhanden.

### GUIDE DE SÉLECTION

Un index graphique avec les informations relatives à l'outil et à ses applications est disponible au début de chaque chapitre.

### GUÍA DE SELECCIÓN

Al inicio de cada macro sección está disponible un índice gráfico con informaciones relativas a la herramienta y a sus aplicaciones.

### ПОМОЩНИК ПО ПОДБОРУ

В начале каждого подраздела находится простой графический индекс инструмента, который даёт информацию об инструменте и его применении.

### SELECTION GUIDE INDEX

- CARBIDE DRILLS page 36
- HSS DRILLS page 188
- CARBIDE END MILLS page 284
- HSS END MILLS page 632
- CARBIDE BURRS page 682

**PRODUCT SEARCH**

- RICERCA PRODOTTI
- PRODUKTSUCHE
- RECHERCHE PRODUITS
- BÚSQUEDA PRODUCTOS
- ПОДБОР ИНСТРУМЕНТА

**4**

**SYSTEM CHART**  
 An easy guide to the application range by work-piece material, for each tool series is available at the beginning of each section.

**SYSTEM CHART**  
 All'inizio di ogni macro sezione per ogni famiglia di utensili è disponibile un sistema di grafici applicativi in base al materiale da lavorare.

**SYSTEM CHART**  
 Am Anfang von jedem Hauptabschnitt stehen Diagramme für die verschiedenen Werkzeuge, die je nach zu bearbeitendem Material erstellt sind, zur Verfügung.

**SYSTEM CHART**  
 Au début de chaque chapitre, pour chaque famille d'outils, un système graphique d'application est disponible sur la base de la matière à usiner.

**SYSTEM CHART**  
 Al inicio de cada macro sección para cada familia de herramientas está disponible un sistema de tablas aplicativas en base al material a mecanizar.

**SYSTEM CHART**  
 В начале каждого подраздела, для каждой группы инструмента находится система графических диаграмм соответствующих типу обрабатываемого материала.


- SYSTEM CHART INDEX**  
 CARBIDE DRILLS page 38  
 HSS DRILLS page 190  
 CARBIDE END MILLS page 294  
 HSS END MILLS page 636

## PRODUCT PAGE

- PAGINA PRODOTTO
- SEITE DES PRODUKTS
- PAGE PRODUIT
- PÁGINA PRODUCTO
- СТРАНИЦА АРТИКУЛА

G2 - General purpose - Square OSAWA

**G2CS2**  
cylindrical shank, 2 flutes



OSAWA NORM N HRC PV200 <45 HRC

ISO MATERIALS TABLE

D	D Tol.	C	C Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
1	0/-0.020			4	3		50	2	G2CS2010	●
1.5	0/-0.020			4	4.5		50	2	G2CS2015	●
2	0/-0.020			4	6		50	2	G2CS2020	●
2.5	0/-0.020			4	7		50	2	G2CS2025	●
3	0/-0.020			4	8		50	2	G2CS2030	●
3.5	0/-0.020			4	10		50	2	G2CS2035	●
4	0/-0.020			4	11		50	2	G2CS2040	●
4.5	0/-0.020			6	13		50	2	G2CS2045	●
5	0/-0.020			6	13		50	2	G2CS2050	●
5.5	0/-0.020			6	13		50	2	G2CS2055	●
6	0/-0.020			6	15		50	2	G2CS2060	●
6.5	0/-0.025			8	17		60	2	G2CS2065	●
7	0/-0.025			8	17		60	2	G2CS2070	●
7.5	0/-0.025			8	17		60	2	G2CS2075	●
8	0/-0.025			8	20		60	2	G2CS2080	●
8.5	0/-0.025			10	23		75	2	G2CS2085	●
9	0/-0.025			10	23		75	2	G2CS2090	●
10	0/-0.025			10	30		75	2	G2CS2100	●
10.5	0/-0.025			12	25		75	2	G2CS2105	●
11	0/-0.025			12	28		75	2	G2CS2110	●
12	0/-0.025			12	30		75	2	G2CS2120	●
13	0/-0.030			16	33		100	2	G2CS2130	●
14	0/-0.030			14	26		83	2	G2CS2140	●
15	0/-0.030			16	40		100	2	G2CS2150	●
16	0/-0.030			16	32		92	2	G2CS2160	●
17	0/-0.030			20	40		100	2	G2CS2170	●
18	0/-0.030			20	40		100	2	G2CS2180	●
20	0/-0.030			20	40		100	2	G2CS2200	●

● stock standard ○ non-standard stock ▼ stock exhaustion

- Product code or ITEM nr.
- Codice prodotto o ITEM No.
- Name des Produkts oder Artikelnummer
- Code produit ou ITEM No.
- Código producto o ITEM No.
- Артикул или КОД №
- Icons
- Icone descrittive
- Beschreibende Symbole
- Icônes descriptives
- Iconos descriptivos
- Икона
- ISO Materials table with black or white stars to indicate applicability
- Tabella materiali ISO con stellina nera o bianca per indicazione applicabilità
- ISO Materialtabelle, mit weissem oder schwarzem Stern je nach Anwendbarkeit
- Tableau des matières ISO avec étoile noire ou blanche pour indiquer l'application
- Tabla materiales ISO con estrella negra y blanca para indicar aplicabilidad
- Таблица материалов ISO с чёрными или белыми звёздочками обозначающие применяемость
- Machining icons available also in the parameters tables (Only for milling)
- Icone di lavorazione, riportate anche nelle tabelle parametri (solo per fresatura)
- Bearbeitungssymbole, sind auch bei der Tabelle der Parameter vorhanden (nur für Fräsen)
- Icônes d'usinage, reportées également dans le tableau des paramètres (seulement pour le fraisage).
- Iconos de mecanizado, indicados también en la tabla de parámetros (solo para fresado)
- Иконки обработки обозначенные также в таблицах с рабочими параметрами (Только для фрезерования)
- Dimensions table with EDP Nr. and stock classification
- Tabella dimensionale con codice prodotto (EDP No.) e classificazione stock
- Tabelle mit Abmessungen, Art.Nummer (EDP Nr.), Verfügbarkeit
- Tableau des dimensions avec code produit (EDP No.) et classification du stock
- Tabla de dimensiones con código producto (EDP No.) y clasificación de stock
- Таблица размеров с кодом артикула и складской классификацией



**PRODUCT PAGE**

- 🇮🇹 PAGINA PRODOTTO
- 🇩🇪 SEITE DES PRODUKTS
- 🇫🇷 PAGE PRODUIT
- 🇪🇸 PÁGINA PRODUCTO
- 🇷🇺 СТРАНИЦА АРТИКУЛА

G2 - General purpose - Square OSAWA

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**G2CS2**  
cylindrical shank, 2 flutes



D	Ø Flute	C	C.Tot.	ØMax	L	H	L
1	Ø1.000	4	3		50		
1.5	Ø1.500	4	4.5		50		
2	Ø2.000	4	6		50		
2.5	Ø2.500	4	7		50		
3	Ø3.000	4	8		50		
4	Ø4.000	4	11		50		
5	Ø5.000	4	13		50		
6	Ø6.000	4	15		50		
8	Ø8.000	4	19		50		
10	Ø10.000	4	23		50		
12	Ø12.000	4	26		50		
15	Ø15.000	4	31		50		
16	Ø16.000	4	32		50		
18	Ø18.000	4	35		50		
20	Ø20.000	4	38		50		

Material Group ISO 513	45°/90°/180°	60°/120°/180°	65°/135°/180°	70°/140°/180°	75°/145°/180°	80°/150°/180°
1	0.020	0.020	0.020	0.020	0.020	0.020
2	0.025	0.025	0.025	0.025	0.025	0.025
3	0.030	0.030	0.030	0.030	0.030	0.030
4	0.035	0.035	0.035	0.035	0.035	0.035
5	0.040	0.040	0.040	0.040	0.040	0.040
6	0.045	0.045	0.045	0.045	0.045	0.045
8	0.050	0.050	0.050	0.050	0.050	0.050
10	0.055	0.055	0.055	0.055	0.055	0.055
12	0.060	0.060	0.060	0.060	0.060	0.060
15	0.065	0.065	0.065	0.065	0.065	0.065
16	0.070	0.070	0.070	0.070	0.070	0.070
18	0.075	0.075	0.075	0.075	0.075	0.075
20	0.080	0.080	0.080	0.080	0.080	0.080

**PARAMETERS TABLE**

Cutting parameters table is available next to each product page for easier and faster consultation.

**TABELLA PARAMETRI**

La tabella dei parametri di lavorazione è riportata di seguito ad ogni pagina prodotto per una consultazione più semplice e rapida.

**TABELLE DER PARAMETER**

Die Tabelle der Parameter folgt nach jeder Seite der Produkte, um auf dieser Weise sofort griffbereit zu sein.

**TABLEAU DES PARAMÈTRES**

Le tableau des paramètres d'usinage se trouve après chaque page produit pour une consultation plus facile et rapide.

**TABLA DE PARÁMETROS**

La tabla de parámetros de corte está disponible al lado de cada página producto para una consulta más rápida y simple.

**ТАБЛИЦА РАБОЧИХ ПАРАМЕТРОВ**

Для лёгкого и быстрого поиска рабочих параметров обработки таблица с их указанием находится на следующей странице соответствующего артикула.

ITEM No.	PAGE	ITEM No.	PAGE	ITEM No.	PAGE	ITEM No.	PAGE
118N	214	G2250	339	MDTACS2	344	UH410	596
134N (234NVA)	252	G2251	339	MDTACS3	350	UH411	599
1385NTI (1386STI)	223	G2310	313	MDTACS4	354	UH412	601
1386STI	223	G2311	313	MDTACSB2	362	UH413	603
1386STI SET	226	G2312	313	MDTAUPR	360	UH600	571
138HB	234	G2410	321	MDTAWSH3	352	UH610R	605
138N	228	G2411	321	MEF600	470	UH611R	607
138N SET	232	G2412	321	MEF901	472	UH612	573
138NTI	228	G2413	321	MEF902	474	UHCS2	584
138WB	238	G2CL4R	333	MEFCS2	464	UHCS4	594
145N	265	G2CS2	300	MEFCS4	468	UHCSB2	620
145NTI	265	G2CS2R	329	MEFCSH3	466	UHF4	592
1692LS	261	G2CS4	317	MEX253	561	UHF4LN	586
1693LS	263	G2CS4R	331	MEX410R	538	UHF-RT	590
218LFTA	194	G2CSB2	337	MEX400	517	UHLN2	566
218NVA	219	G2CSB4	341	MEX610R	542	UHM204	564
234LS	256	G2CSFR	325	MEX611R	544	UHM206	575
234LSTH	256	G2CSH3	309	MEXCL2	515	UMWS2	640
234NVA	252	G2CSHM	323	MEXCL4	519	UMWS4	653
2385NTI (2386STI)	242	G2WS2	302	MEXCLHM	523	UMWSFR	659
2386STI	242	G2WS4	319	MEXCLSB2	559	WCR	671
2386STI SET	245	G2WSFR	327	MEXCS2	513	WDC 45°	673
238LFTA	198	G2WSH3	311	MEXCS4R	535	WDC 60°	673
238NVA	247	GB205	298	MEXCSB2	557	WDD 45°	675
238NVA SET	250	GB255	335	MEXCSFR	525	WDD 60°	675
241LS	272	GB305	307	MEXCSHM	521	WL2	643
245N	270	GB405	315	MEXLN2	508	WL3	649
2691LS	259	HF342	398	MEXLN2R	527	WL4(6)	655
2691LSTH	259	HF440	374	MEXLS2R	533	WLB2	665
2701LS	274	HF441	379	MEXLS4R	540	WLF4R	661
2702LS	276	HF442	405	MEXM2	504	WS2	640
318N	66	HF443	410	MEXM2SC	506	WS3	647
343TA	66	HF444	389	MHCRB2	555/618	WS4(6)	653
3512HL	147	HF445	393	MHLNB2	550/613	WSA2	645
3512SUH MINI	122	HF450	447	MHMB204	546/609	WSB2	663
3515HL	152	HF451	451	MHMB206	548/611	WSFR	659
3520HL	157	HF452	459	SA	685	WTM	677
3520SUH MINI	126	HF542	415	SB	686	WWK	679
3525HL	162	HF642	426	SC	687		
3525SUH MINI	130	HF643	429	SD	688		
3530HL	167	HF742	432	SE	689		
3530SUH MINI	134	HF743	435	SF	690		
353ALH	93	HF840	370	SG	691		
353HPU	43	HF842	401	SH	692		
353HRC	103	HF844	385	SJ	693		
353PU	43	HF850	443	SK	694		
353SUH	79	HF852	455	SL	695		
355ALH	97	HF871	438	SM	696		
355HPU	52	HF942	418	SN	697		
355PU	52	HF943	422	TAFFR	669		
355SUH	85	HFA53	484	TAFM	667		
355SUH MINI	114	HFAL3	481	TAWL2	643		
3584HTA	70	HFAL4	478	TAWL3	649		
358SUH MINI	118	MCA212R	499	TAWL4(6)	655		
372HSD	175	MDA310	494	TAWLB2	665		
980SUTA	204	MDA311	494	TAWLFR	661		
990SUTA	208	MDA312	494	TAWS2	640		
A15FW	698	MDCAB2	501	TAWS3	647		
A16FW	698	MDCL2	348	TAWS4(6)	653		
BUR10	698	MDCL4	358	TAWSB2	663		
CSDTA90°	180	MDCSA1	487	TAWSFR	659		
CSDTA125°	180	MDCSA2	489	TAWSH3	651		
FFR	669	MDCSA3	492	TAWSR	657		
FM	667	MDCSAM	497	UH211	577		
G2210	304	MDTA210	346	UH212	579		
G2211	304	MDTA250	364	UH250	622		
G2212	304	MDTA410	356	UH253	624		

## **INFO**

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MATERIALS		HARDNESS/Rm
<b>P1</b>	✦ Free cutting steel and structural steel	🇫🇷 Aciers pour décolletage et aciers structurels
	🇮🇹 Acciai automatici e acciai strutturali	🇪🇸 Aceros de fácil mecanización y aceros de construcción
	🇩🇪 Automatenstähle und Baustähle	🇷🇺 Автоматные и конструкционные стали
<b>P2</b>	✦ Carbon steel and low alloy steel	🇫🇷 Aciers au carbone et aciers faiblement alliés
	🇮🇹 Acciai al carbonio e acciai basso legati	🇪🇸 Aceros al carbono y aceros de baja aleación
	🇩🇪 Kohlenstoff-Stähle und niedriglegierte Stähle	🇷🇺 Углеродистые и низколегированные стали
<b>P3</b>	✦ Medium alloy steel and heat treated steel	🇫🇷 Aciers moyennement alliés et aciers trempés et recuits
	🇮🇹 Acciai medio legati e acciai di bonifica	🇪🇸 Aceros de media aleación y aceros bonificados
	🇩🇪 Mittellegierte Stähle und Vergütungsstähle	🇷🇺 Среднелегированные и отожженные стали
<b>P4</b>	✦ High alloy steel	🇫🇷 Aciers fortement alliés
	🇮🇹 Acciai alto legati	🇪🇸 Aceros de alta aleación
	🇩🇪 Hochlegierte Stähle	🇷🇺 Высоколегированные стали
<b>P5</b>	✦ Tool steel	🇫🇷 Aciers pour outils
	🇮🇹 Acciai per utensili	🇪🇸 Aceros para herramientas
	🇩🇪 Werkzeugstähle	🇷🇺 Инструментальные стали
<b>P6</b>	✦ High tensile strength steel	🇫🇷 Aciers haute résistance
	🇮🇹 Acciai ad alta resistenza	🇪🇸 Aceros de alta resistencia
	🇩🇪 HSLA-Stähle	🇷🇺 Высокопрочная сталь
<b>P7</b>	✦ Ferritic - Martensitic stainless steel	🇫🇷 Aciers inoxydables ferritiques-martensitiques
	🇮🇹 Acciai inossidabili ferritici e martensitici	🇪🇸 Aceros inoxidables ferríticos-martensíticos
	🇩🇪 Ferritische-Martensitische Stähle	🇷🇺 Ферритно-мартенситная нержавеющая сталь
<b>P8</b>	✦ PH stainless steel	🇫🇷 Aciers inoxydables à durcissement par précipitation
	🇮🇹 Acciai inossidabili PH - indurenti per precipitazione	🇪🇸 Aceros inoxidables PH
	🇩🇪 Ausscheidungshartbare Edelstahl	🇷🇺 Дисперсионно-твердеющая нержавеющая сталь
<b>M1</b>	✦ Austenitic stainless steel (good machinability)	🇫🇷 Aciers inoxydables austénitiques (faiblement allié)
	🇮🇹 Acciai inossidabili austenitici (buona lavorabilità)	🇪🇸 Aceros inoxidables Austeníticos (fácil mecanizado)
	🇩🇪 Austenitische Edelstähle (niedriglegiert)	🇷🇺 Аустенитная нержавеющая сталь
<b>M2</b>	✦ Austenitic stainless steel (medium machinability) and Duplex	🇫🇷 Aciers inoxydables austénitiques (faiblement allié)
	🇮🇹 Acciai inossidabili austenitici (buona lavorabilità)	🇪🇸 Aceros inoxidables Austeníticos (fácil mecanizado)
	🇩🇪 Austenitische Edelstähle (niedriglegiert)	🇷🇺 Аустенитная нержавеющая сталь
<b>M3</b>	✦ Super austenitic stainless steel and super Duplex	🇫🇷 Aciers inoxydables austénitiques (moyennement allié) et Duplex
	🇮🇹 Acciai inossidabili austenitici (media lavorabilità) e Duplex	🇪🇸 Aceros inoxidables Austeníticos (medio mecanizado) y Duplex
	🇩🇪 Austenitische Edelstähle (mittel-legiert) und Duplex	🇷🇺 Аустенитная и дуплексная нержавеющая сталь

INFO

CARBIDE DRILLS

PU/HPU  
TA/4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

CARBIDE DRILLS

PU/HPU  
TA/4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

MATERIALS	HARDNESS/Rm
<b>K1</b> 🇩🇪 Grey cast iron 🇮🇹 Ghise grigie 🇩🇪 Grauguss	🇫🇷 Fonte grise 🇪🇸 Fundición gris 🇷🇺 Серый чугун 150 ÷ 250 HB
<b>K2</b> 🇩🇪 Nodular cast iron 🇮🇹 Ghise sferoidali 🇩🇪 Sphäroguss	🇫🇷 Fonte nodulaire 🇪🇸 Fundición nodular 🇷🇺 Чугун с шаровидным графитом 150 ÷ 350 HB
<b>K3</b> 🇩🇪 Austenitic cast iron 🇮🇹 Ghise austenitiche 🇩🇪 Austenitischer Guss	🇫🇷 Fonte austénitique 🇪🇸 Fundición austenítica 🇷🇺 Аустенитный чугун 120 ÷ 260 HB
<b>K4</b> 🇩🇪 ADI cast iron 🇮🇹 Ghise ADI 🇩🇪 ADI Guss	🇫🇷 Fonte ADI 🇪🇸 Fundición ADI 🇷🇺 Отпущенный ковкий чугун 250 ÷ 500 HB
<b>N1</b> 🇩🇪 Aluminium alloys ≤ 12% Si 🇮🇹 Leghe di alluminio ≤ 12% Si 🇩🇪 Aluminiumlegierungen ≤ 12% Si	🇫🇷 Alliages d'aluminium ≤ 12 % Si 🇪🇸 Aleación de aluminio ≤ 12% Si 🇷🇺 Алюминиевое литье ≤ 12% Si
<b>N2</b> 🇩🇪 Aluminium alloy > 12% Si and Aluminium-Magnesium 🇮🇹 Leghe di alluminio > 12% Si e alluminio-magnesio 🇩🇪 Aluminiumlegierungen > 12% Si und Aluminium-Magnesium	🇫🇷 Alliages d'aluminium > 12 % Si et Aluminium-Magnesium 🇪🇸 Aleación de aluminio > 12% Si y Aluminio-Magnesio 🇷🇺 Алюминиевые сплавы с содержанием Si<12% и алюмо-магниеые сплавы
<b>N3</b> 🇩🇪 Copper alloy 🇮🇹 Leghe di rame 🇩🇪 Kupferlegierungen	🇫🇷 Alliages de cuivre 🇪🇸 Aleación de cobre 🇷🇺 Медные сплавы
<b>N4</b> 🇩🇪 Brass alloy and Bronze alloy 🇮🇹 Leghe di ottone e leghe di bronzo 🇩🇪 Bronze- und Messinglegierungen	🇫🇷 Alliages de bronze et de laiton 🇪🇸 Aleación de Latón y Aleación de Bronce 🇷🇺 Латуни и бронзы
<b>N5</b> 🇩🇪 Plastic material 🇮🇹 Polimeri 🇩🇪 Polymere	🇫🇷 Polymères 🇪🇸 Material plástico 🇷🇺 Пластики
<b>N6</b> 🇩🇪 Carbon fiber and composite 🇮🇹 Fibra di carbonio e compositi 🇩🇪 Faserwerkstoffe und Verbundwerkstoffe	🇫🇷 Fibres et composites 🇪🇸 Fibra de carbonio y compositos 🇷🇺 Углеволокно и композиты

MATERIALS		HARDNESS/Rm	
S	<ul style="list-style-type: none"> <li>Heat resistant super alloys (HRSA) Ni base (good machinability)</li> <li>Leghe a base di nichel resistenti al calore (buona lavorabilità)</li> <li>Warmfeste Superlegierungen (HRSA) Nickel-Legierungen (einfach zu bearbeiten)</li> </ul>	<ul style="list-style-type: none"> <li>Base Ni de superalliages résistants à la chaleur (HRSA) (bonne usinabilité)</li> <li>Super aleaciones resistentes al calor (HRSA) base Nickel (fácil mecanizado)</li> <li>Жаропрочные сплавы (HRSA) Ni(легкообрабатываемые)</li> </ul>	< 25 HRC
	<ul style="list-style-type: none"> <li>Heat resistant super alloys (HRSA) Ni base (medium machinability)</li> <li>Leghe a base di nichel resistenti al calore (media lavorabilità)</li> <li>Warmfeste Superlegierungen (HRSA) Nickel-Legierungen (mittlere Bearbeitbarkeit)</li> </ul>	<ul style="list-style-type: none"> <li>Superalliages résistants à la chaleur (HRSA) Ni base (usinabilité moyenne)</li> <li>Super aleaciones resistentes al calor (HRSA) base Nickel (medio mecanizado)</li> <li>Жаропрочные сплавы (HRSA) Ni(среднеобрабатываемые)</li> </ul>	25 ÷ 35 HRC
	<ul style="list-style-type: none"> <li>Heat resistant super alloys (HRSA) Ni base (low machinability)</li> <li>Leghe a base di nichel resistenti al calore (difficile lavorabilità)</li> <li>Warmfeste Superlegierungen (HRSA) Nickel-Legierungen (schwierig zu bearbeiten)</li> </ul>	<ul style="list-style-type: none"> <li>Superalliages résistants à la chaleur (HRSA) Ni base (faible usinabilité)</li> <li>Super aleaciones resistentes al calor (HRSA) base Nickel (difícil mecanizado)</li> <li>Жаропрочные сплавы (HRSA) Ni(труднообрабатываемые)</li> </ul>	35 ÷ 45 HRC
	<ul style="list-style-type: none"> <li>Low Titanium base alloy (good machinability)</li> <li>Leghe di titanio basso legate (buona lavorabilità)</li> <li>Titanlegierung (gut Bearbeitbarkeit)</li> </ul>	<ul style="list-style-type: none"> <li>Alliages de base à faible teneur en titane (bonne usinabilité)</li> <li>Aleaciones a bajo contenido Titanio (fácil mecanizado)</li> <li>Сплавы с низким содержанием Ti(легкообрабатываемые)</li> </ul>	
	<ul style="list-style-type: none"> <li>High Titanium base alloy (medium machinability)</li> <li>Leghe di titanio alto legate (media lavorabilità)</li> <li>Hochfeste Titanlegierung (mittlere Bearbeitbarkeit)</li> </ul>	<ul style="list-style-type: none"> <li>Alliages à base de titane élevé (usinabilité moyenne)</li> <li>Aleaciones a alto contenido Titanio (medio mecanizado)</li> <li>Сплавы с высоким содержанием Ti (среднеобрабатываемые)</li> </ul>	
H	<ul style="list-style-type: none"> <li>Hardened steel</li> <li>Acciai temprati generali</li> <li>Allgemeine gehärtete Stähle</li> </ul>	<ul style="list-style-type: none"> <li>Aciers trempés</li> <li>Aceros templados</li> <li>Закаленные стали</li> </ul>	50 ÷ 56 HRC
	<ul style="list-style-type: none"> <li>Hardened bearing steel</li> <li>Acciai temprati per cuscinetti</li> <li>Gehärtete Kugellagerstähle</li> </ul>	<ul style="list-style-type: none"> <li>Aciers trempés pour roulements</li> <li>Aceros templados para rodamientos</li> <li>Закаленные подшипниковые стали</li> </ul>	54 ÷ 62 HRC
	<ul style="list-style-type: none"> <li>Hardened tool steel</li> <li>Acciai temprati per utensili</li> <li>Gehärtete Werkzeugstähle</li> </ul>	<ul style="list-style-type: none"> <li>Aciers trempés pour outils</li> <li>Aceros templados para herramientas</li> <li>Закаленные инструментальные стали</li> </ul>	60 ÷ 65 HRC
	<ul style="list-style-type: none"> <li>Hardened martensitic stainless steel</li> <li>Acciai inossidabili martensitici temprati</li> <li>Gehärtete martensitische Edelstahl</li> </ul>	<ul style="list-style-type: none"> <li>Aciers inoxydables martensitiques trempés</li> <li>Aceros inoxidables martensíticos templados</li> <li>Закаленные мартенситные нержавеющие стали</li> </ul>	50 ÷ 56 HRC
	<ul style="list-style-type: none"> <li>Hardened white cast iron</li> <li>Ghise bianche temprate</li> <li>Gehärteter Weißguss</li> </ul>	<ul style="list-style-type: none"> <li>Fonte blanche trempée</li> <li>Fundición blanca templada</li> <li>Закаленный белый чугун</li> </ul>	48 ÷ 55 HRC

INFO

CARBIDE DRILLS

PU/HPU  
TA/4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

CARBIDE  
DRILLS

PU/HPU  
TA/4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

Gr.	Materials	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
P1	Free cutting steel and structural steel Rm < 500 N/mm <sup>2</sup>	1.0037	St 37-2	1.0037	S235JR	Fe 360 B		STKM 12 C	E 24-2
		1.0116	St 37-3	1.0038	S235JRG2	Fe 360 D FF	4360-40 C		E 24-3, E 24-4
		1.0144	St 44-3 N	1.0144	S275J2G3	Fe 430 D FF	4360-43 C	SM 41 C	E 28-3, E 28-4
		1.0301	C 10	1.0301	C 10	C 10	045 M 10	S 10 C	34 C 10, XC 10
		1.0401	C 15			C 15, C 16	080 M 15		37 C 12, XC 18
		1.0402	C 22	1.0402	C 22	C 20, C 21	050 A 20		C 20
		1.0570	St 52-3	1.0570	S355JR	Fe 510 B	4360-50 C	SM 50 YA	E 36-3, E 36-4
		1.0715	9 SMn 28	1.0715	11 SMn 30	CF 9 SMn 28	230 M 07	SUM 22	S 250
		1.0718	9 SMnPb 28	1.0718	11 SMnPb 30	CF 9 SMnPb 28		SUM 22 L	S 250 Pb
		1.0721	10 S 20	1.0721	10 S 20	CF 10 S 20	210 M 15		10 F 1
		1.0722	10 SPb 20			CF 10 SPb 20			10 PbF 2
		1.0723	15 S 20	1.0725	15 SMn 13		210 A 15	SUM 32	
		1.0726	35 S 20	1.0726	35 S20		212 M 36		35 MF 4
		1.0727	46 S 20	1.0727	46 S20		212 M 44		45 MF 4
		1.0736	9 SMn 36	1.0736	11 SMn 37	CF 9 SMn 36	240 M 07		S 300
		1.0765	36 SMnPb 14		36 SMnPb 14	CF 35 SMnPb 10	216 M 36		35 MF 6 Pb
		1.1141	Ck 15	1.1141	C 15R	C 15, C 16	080 M 15	S 15 C, S 15 CK	XC 15, XC 18
	Ck 25			C 25	060 A 25	S 25 C	XC 25		
P2	Carbon steel and low alloy steel Rm 500÷700 N/mm <sup>2</sup>	1.0501	C 35		C 35	C 35	060 A 35		55 C 35
		1.0503	C 45	1.0503	E 335	C 45	80 M 46	S 45 C	65 C 45
		1.0511	C 40		C 40	C 40	080 M 40	S 40 C	60 C 40
		1.0535	St 70-2	1.0070	E 360	Fe 690			A 70-2
		1.0601	C 60	1.0601	C60	C 60	080 A 62		CC 55
		1.1157	40 Mn 4				150 M 36		35 M 5
		1.1165	30 Mn 5	1.1165	G 28 Mn6		120 M 36	SMn 1 H, SCMn 2	
		1.1181	Ck 35	1.1181	C 35E	C 35	080 M 36	S 35 C	XC 38 H1
		1.1191	Ck 45	1.1191	C 45E	C 45	080 M 46	S 45 C	XC 42
		1.1221	Ck 60	1.1221	C 60E	C 60	080 A 62	S 58 C	XC 60
		1.1740	C 60 W					SK 7	Y3 55
		1.2162	21 MnCr 5					SCR 420 H	20 NC 5
		1.5415	15 Mo 3	1.5415	16 Mo 3	16 Mo 3	1501-240		15 D 3
		1.5423	16 Mo 5			16 Mo 5	1503-245-420	SB 450 M	
		1.5752	14 NiCr 14	1.5752	14 NiCr 14		655 M 13	SNC 815 (H)	12 NC 15
		1.5919	15 CrNi 6			16 CrNi 4	S 107		16 NC 6
		1.6587	18 CrNiMo 7 6	1.6587	18 NiCrMo 7 6	18 NiCrMo 7	820 A 16		18 NCD 6
1.7131	16 MnCr 5	1.7131	16 MnCr 5	16 MnCr 5	527 M 17	SCR 415	16 MC 5		
1.7139	16 MnCrS 5	1.7139	16 MnCrS 5						
1.7147	20 MnCr 5	1.7147	20 MnCr 5	20 MnCr 5		SMnC 420 (H)	20 MC 5		
1.7149	20 MnCrS 5	1.7149	20 MnCrS 5			SMnC 21 H	20 MnCrS 5		
1.7335	13 CrMo 4 4	1.7335	13 CrMo 4 5	14 CrMo 4 5	1501-620 Gr. 27		15 CD 3.5		
1.7337	16 CrMo 4 4			14 CrMo 4 5	1501-620 Gr. 27		15 CD 4.5		
1.7380	10 CrMo 9 10	1.7380	10 CrMo 9 10	12 CrMo 9 10	1501-622 Gr. 31		10 CD 9.10		
P3	Medium alloy steel Rm 600÷800 N/mm <sup>2</sup>	1.0904	55 Si 7	1.7100	55 SiCr7	55 Si 8	250 A 53		55 S 7
		1.2330	35 CrMo 4			35 CrMo 4	708 A 37		34 CD 4
		1.2542	45 WCrV 7			45 WCrV 8 KU	BS 1		
		1.2714	56 NiCrMoV 7	1.2714		56 NiCrMoV7-KU	BH 224-5	SKT 4	
		1.5121	46 MnSi 4						
		1.5710	36 NiCr 6				640 A 35	SNC 236	35 NC 6
		1.5736	36 NiCr 10			35 NiCr 9		SNC 631 (H)	35 NC 11
		1.6511	36 CrNiMo 4		36 CrNiMo 4	38 NiCrMo 4 (KB)	816 M 40		40 NCD 3
		1.6582	34 CrNiMo 6	1.6582	34 CrNiMo 6	35 NiCrMo 6 (KW)	817 M 40	SNCM 447	35 NCD 6
		1.7033	34 Cr 4	1.7033	34 Cr 4	34 Cr 4 (KB)	530 A 32	SCR 430 (H)	32 C 4
		1.7035	41 Cr 4	1.7035	41 Cr 4	41 Cr 4	530 M 40	SCR 440 (H)	42 C 4
		1.7218	25 CrMo 4	1.7218	25 CrMo 4	25 CrMo 4 (KB)	708 M 25	SCM 425	25 CD 4 S
		1.7225	42 CrMo 4	1.7225	42 CrMo 4	42 CrMo 4	708 M 40	SCM 440 (H)	42 CD 4
		1.7361	32 CrMo 12			32 CrMo 12	722 M 24		30 CD 12
		1.8159	50 CrV 4	1.8159	50 CrV 4	51 CrV 4	735 A 50	SUP 10	50 CV 4
		1.8509	41 CrAlMo 7	1.8509	41 CrAlMo 7 10	41 CrAlMo 7	905 M 39	SACM 645	40 CAD 6.12



SS	UNS	U.N.E. / I.H.A.	AISI-ASTM	GOST	ČSN	Trade Mark	Structure
1311				16D			
1312, 1313			A573 Grade 58	18kp	11 378		
1412, 1414			A573 Grade 70	St14kP	11 448		
	G10100		1010	10			
1350	G10170	F.1110	1015	15			
1450	G10200		1020, 1023	20	12 024		
2172, 2132				17G1S	11 523		
1912	G12130		1213			AVP	
1914	G12134		12 L 13				
			1108				
			11 L 08				
1922							
1957	G11400		1140	40			
1973	G11460		1146				
	G12150		12 L14			AVZ	
			11 L 37	AS35G2		PR80	
1370	G10170	F.1511	1015	15			
	G10250	F.1120	1025	25			
1550	G10350	F.1130	1035	35	12 040		
1650	G10430	F.5110	1045	45	12 050		
			1040	40	12 041		
1655		F.1150	1055	55			
	G10600		1060	60	12 061		
	G10390		1039	40G			
	G13300		1330	30G2			
1572	G10340	F.1135	1035	35			
1672	G10420	F.1140	1045	45	12 050		
1665, 1678	G10640	F.1150	1064	60			
			1060	60			
2912			A204 Grade A		15 020		
	G45200		4520				
	G33106		3310, 9314	20X2H4A	16 420		
			4320		16 220		
2511	G51170	F.1516	5115	12KHN2	14 220		
				18HG			
	G51200		5120	20KH	14 221		
			5120 H	20KH			
2216			A182-F11, A182-F12	12KHM	15 121		
2216			A387 Grade 12 Cl. 2				
2218	J21890	F.155	A182-F22	12KH8	15 313		
2085, 2090		F.144	9255	55S2			
2234	T51620	F.1250	4135	35KHM			
2710	T41901	F.5241	S1	5KHV2S			
	T61206		L6	5KHNV			
			5045				
			3135				
			3435				
	G98400		9840				
2541	G43400	F.1280	4340	38H2N2MA	16 343		
	G51320		5132	35KH			
	G51400		5140	40H	14 140		
2225	G41300	F.1251	4130	20KHM	15 130		
2244	G41400	F.1252	4142, 4140	38HM	15 142		
2240							
2230	H61500	F.143	6150	50KHFA	15 260		
2940	K24065	F.1740	A355 Cl. A				

INFO

CARBIDE  
DRILLS

PU/HPU  
TA/4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

CARBIDE  
DRILLS

PU/HPU  
TA/4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
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HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

Gr.	Materials	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
P4	High alloy steel Rm 800÷1000 N/mm <sup>2</sup>	1.1231	Ck 67	1.1231	C 67S	C 70	060 A 67		XC 68
		1.1274	Ck 101	1.1274	C 100S			060 A 96	SUP 4
		1.1545	C 105 W1	1.1545	C 105U	C 100 KU			Y1 105
		1.1645	C 105 W2			C 100 KU		SK 3	Y1 105
		1.1663	C 125 W			C 120 KU		SK 2	Y2 120
		1.2210	115 CrV 3	1.2210	107 CrV 3	107 CrV 3 KU			100 C 3
		1.2510	100 MnCrW 4			95 MnWCr 5 KU	BO 1	SKS 3	90 MWCV 5
		1.2842	90 MnCrV 8	1.2842	90 MnCrV 8	90 MnVCr 8 KU	BO 2		90 MV 8
		1.3505	100 Cr 6	1.3505	100 Cr 6	100 Cr 6	534 A 99	SUJ 2	100 C 6
P5	Tool steel Rm 900÷1200 N/mm <sup>2</sup>	1.2080	X 210 Cr 12	1.2080	X 210 Cr 12	X 210 Cr 13 KU	BD 3	SKD 1	Z 200 C 12
		1.2311	40 CrMnMo 7						
		1.2312	40 CrMnMoS 86						
		1.2343	X 38 CrMoV 5 1			X 37 CrMoV 5 1 KU	BH 11	SKD 6	Z 38 CDV 5
		1.2344	X 40 CrMoV 5 1	1.2344	X 40 CrMoV 5 1	X 40 CrMo 5 1 1 KU	BH 13	SKD 61	Z 40 CDV 5
		1.2363	X 100 CrMoV 5	1.2363	X 100 CrMoV 5 1	X 100 CrMoV 5 1 KU	BA 2	SKD 12	Z 100 CDV 5
		1.2365	X 32 CrMoV 3 3			30 CrMoV 12 27 KU	BH 10	SKD 7	32 DCV 28
		1.2379	X 155 CrVMo 12 1			X 155 CrMo 12 KU			
		1.2436	X 210 CrW 12			X 215 CrW 12 1 KU		SKD 2	
		1.2601	X 165 CrMoV 12			X 165 CrMoW 12 KU			
		1.2713	55 NiCrMoV 6					SKT 4	55 NCDV 7
		1.2714	56 NiCrMoV 7			56 NiCrMoV 7 KU			
		1.3243	S 6-5-2-5	1.3243	HS 6-5-2-5	HS 6-5-2-5		SKH 55	Z 85 WDKCV 06-05-05-04-02
		1.3247	S 2-10-1-8	1.3247	HS 2-10-1-8	HS 2-9-1-8	BM 42	SKH 51	Z 110 DKCVV 09-08-04
		1.3255	S 18-1-2-5	1.3255	HS 18-1-2-5	HS 18-1-1-5	BT 4	SKH 3	Z 80 WKCV 18-05-04-01
		1.3343	S 6-5-2	1.3343	HS 6-5-2	HS 6-5-2	BM 2	SKH 9, SKH 51	Z 85 WDCV 06-05-04-02
1.3348	S 2-9-2	1.3348	HS 2-9-2	HS 2-9-2		SKH 58	Z 100 DCVW 09-04-02-02		
1.3355	S 18-0-1	1.3355	HS 18-0-1	HS 18-0-1	BT 1	SKH 2	Z 80 WCV 18-04-01		
P6	High tensile strength steel Rm 1200÷1480 N/mm <sup>2</sup> HRC 38÷45	1.6546	40 NiCrMo 2 2	1.6546	40 NiCrMo 2 KD	40NiCrMo2	311 - Type 7	SNCM 240	40 NCD 2
		1.7045	42 Cr 4	1.7045		41Cr4	530 A 40	SCR 440	42 C 4 TS
P7	Ferritic - Martensitic stainless steel	1.4000	X 6 Cr 13	1.4000	X 6 Cr 13	X 6 Cr 13	403 S 17	SUS 403	Z 6 C 12
		1.4006	X 10 Cr 13	1.4006	X 12 Cr 13	X 12 Cr 13	410 S 21	SUS 410	Z 10 C 13
		1.4016	X 6 Cr 17	1.4016	X 6 Cr 17	X 8 Cr 17	430 S 15	SUS 430	Z 8 C 17
		1.4021	X 20 Cr 13	1.4021	X 20 Cr 13	X 20 Cr 13	420 S 37	SUS 420 J 1	Z 20 C 13
		1.4031	X 40 Cr 13	1.4031	X 39 Cr 13	X 40 Cr 14	420 S 45	SUS 420	Z 40 C 14
		1.4109	X 65 CrMo 14	1.4109	X 70 CrMo 15			SUS 440 A	Z 70 D 14
		1.4112	X 90 CrMoV 18	1.4112	X 90 CrMoV 18	X CrTi 12	409 S 19	SUS 440 B	Z 2 CND 18 05
		1.4125	X 105 CrMo 17	1.4125	X 105 CrMo 17	X 105 CrMo 17		SUS 440 C	Z 100 CD 17
		1.4313	X 5 CrNi 13 4	1.4313	X 5 CrNiMo 13 3	X 6 CrNi 13 04	425 C 11	SCS 5	Z 5 CN 13.4
		1.4749	X 18 CrN 28	1.4749	X 18 CrN 28				Z 18 C 25
P8	PH stainless steel	1.4534	X 3 CrNiMoAl 13 8 2	1.4534	X 6 NiCrTiMoV 25 15				
		1.4540	X 4 CrNiCuNb 16 4	1.4540	X 4 CrNiCuNb 16 4	Z 4 CNUNb 16.4 M			Z 4 CNUNb 16.4 M
		1.4548	X 5 CrNiCuNb 17 4	1.4548	X 5 CrNiCuNb 17 4	Z 6 CNU 17.4		SCS 24, SUS 630	
		1.4568	X 7 CrNiAl 17 7	1.4564	X 3 CrNiMoAl 13 8 2	X 7 CrNiAl 17 7	301 S 81	SUS 631	Z 9 CAN 17.7
		1.6356	X 2 NiCoMoTi 18 12 4	1.6356	X 2 NiCoMoTi 18 12 4				

SS	UNS	U.N.E. / I.H.A.	AISI-ASTM	GOST	ČSN	Trade Mark	Structure
1770	G10700	F.5103	1070	70			
1870	G10950	F.5117	1095				
1880		F.5118	W1	U10A			
				U10			
			W1	U13			
	T61202	F.520L	L2	11KHF			
2140	T31501	F.5220	O1	9KHVG			
	T31502		O2	9G2F		K720	
2258	G51986	F.5230	52100	SHKH15	14 109		
						TOOLOX 33	
	T30403	F.5212	D3	KH12		K100	
						M201	
						M200 - HOLDAX	
	T20811		H11	4KH5MFS		VIDAR - W300	
2242	T20813	F.5318	H13	4KH5MF1S		ORVAR - W302	
2260	T30102	F.5227	A2	9KH5VF			
	T20810		H10	3KH3M3F		W320	
						K110	
2312		F.5213		KH12			
2310				KH12MF			
	T61206	F.520.S	L6	5KHNM			
			L6			W500	
2723		F.5613	M35	R6M5K5			
	T11342		M42	R2AM9K5			
	T12004		T4	R18K5F2			
2722	T11302	F.5603	M2	R6M5		S600	
2782	T11307		M7				
	T12001		T1	R18			
	G86400		8640			Monix	
2245			5140				
						HARDOX 400®	
						HARDOX 450®	
						TOOLOX 40®	
						TOOLOX 44®	
2301	S41008		403	08KH13			Ferritic
2302	S41000	F.3401	410, CA-15	12KH13			Martensitic
2320	S43000	F.3113	430	12KH17			Ferritic
2303	S42000	F.5261	420	20KH13	17 022		Martensitic
2304	S40280	F.3404	420 C	40KH13			Martensitic
	S44002		440 A				Martensitic
2327	S44003		440 B	95KH18			Martensitic
	S44004		440 C	95KH18			Martensitic
2385	S41500		A182 F6NM				Martensitic
2322	S44600		446	15KH28			Ferritic
	S13800		XM-13			PH13-8 Mo	Austenitic
	S15500		XM-12			15-5-PH	Martensitic
	S17400		630			17-4-PH	Martensitic
2388	S17700		631	09KH17N7YU1		17-7-PH	Austenitic/Ferritic
	K93160		AMS 6515				Martensitic

INFO

CARBIDE  
DRILLS

PU/HPU  
 TA/4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

HSS  
DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

CARBIDE DRILLS

PU/HPU  
TA/4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

Gr.	Materials	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
<b>M1</b>	Austenitic stainless steel (good machinability)	1.4300	X 12 CrNi 18 8	1.4300	X 12 CrNi 18 8		302 S 25	SUS 302	Z 12 CN 18
		1.4301	X 5 CrNi 18 10	1.4301	X 5 CrNi 18 10	X 5 CrNi 18 11	304 S 31	SUS 304	Z 6 CN 18.09
		1.4305	X 10 CrNiS 18 9	1.4305	X 10 CrNiS 18 9	X 10 CrNi 18 09	303 S 31	SUS 303	Z 10 CNF 18.09
		1.4306	X 2 CrNi 19 11	1.4306	X 2 CrNi 19 11	X 3 Cr Ni 18 11	304 S 12	SUS 304 L	Z 2 CN 18.10
		1.4310	X 12 CrNi 17 7	1.4310	X 9 CrNi 18 8	X 12 CrNi 17 07	301 S 21	SUS 301	Z 12 CN 17.07
		1.4550	X 6 CrNiNb 18 10	1.4550	X 6 CrNiNb 18 10	X 6 CrNiNb 18 11	347 S 31	SUS 347	Z 6 CNNb 18.10
<b>M2</b>	Austenitic stainless steel (medium machinability) and Duplex	1.4311	X 2 CrNiN 19 11	1.4311	X 2 CrNiN 18 10	X 2 CrNiN 18 11	304 S 62	SUS 304 LN	Z 2 CN 18.10 Az
		1.4335	X 12 CrNi 25 21	1.4335	X 12 CrNi 25 21	X 6 CrNi 26 20	310 S 24	SUH 310, SUS 310 S	Z 12 CN 25.20
		1.4401	X 5 CrNiMo 17 12 2	1.4401	X 5 CrNiMo 17 12 2	X 5 CrNiMo 17 12	316 S 31	SUS 316	Z 3 CND 17.11.1
		1.4417	X 2 CrNiMoSi 19 5	1.4424	X 2 CrNiMoSi 19 5				Z 2 CND 18.05.03
		1.4429	X 2 CrNiMoN 17 13 3	1.4429	X 2 CrNiMoN 17 13 3	X 2 CrNiMoN 17 13 3	316 S 62	SUS 316 LN	Z 2 CND 17.13 Az
		1.4435	X 2 CrNiMo 18 14 3	1.4435	X 2 CrNiMo 18 14 3	X 2 CrNiMo 17 13 2	316 S 12	SCS 16, SUS 316 L	Z 2 CND 17.13
		1.4438	X 2 CrNiMo 18 16			X 2 CrNiMo 18 16	317 S 12	SUS 317 L	Z 2 CND 19.15
		1.4460	X 4 CrNiMo 27 5 2	1.4460	X 3 CrNiMo 27 5 2	X 3 CrNiMo 27 5 2		SUS 329 J 1	Z 3 CND 25.7 Az
		1.4462	X 2 CrNiMoN 22 5	1.4462	X 2 CrNiMoN 22 5 3	X 2 CrNiMoN 22 5	332 S 15		Z 2 CND 22.05 Az
		1.4466	X 5 CrNi 18 15	1.4466	X 3 CrNiMo 18 12 3	X 5 CrNi 18 15	317 S 16	SUS 317	
		1.4541	X 10 CrNiTi 18 9	1.4541		X 6 CrNiTi 18 11	321 S 12	SUS 321	Z 6 CND 18.10
		1.4550	X 6 CrNiNb 18 10	1.4550	X 6 CrNiNb 18 10	X 6 CrNiNb 18 11	347 S 31	SUS 347	Z 6 CNNb 18.10
		1.4571	X 10 CrNiMoTi 18 10			X 6 CrNiMoTi 17 12	320 S 17	-	Z 6 CNDT 17.12
		1.4893	X 9 CrNiSiN 21 11 2	1.4835	X 9 CrNiSiN 21 11 2		310 S 31		
<b>M3</b>	Super austenitic stainless steel and super Duplex	1.4410	X 2 CrNiMoN 25 7 4	1.4410	X 2 CrNiMoN 25 7 4	X 2 CrNiMoN 25 7 4			Z 3 CND 25.07 Az
		1.4501	X 2 CrNiMoCuWN 15 7 4			X 2 CrNiMoCuWN 15 7 4			
		1.4529	X 1 CrNiMoN 20 18 7	1.4547	X 1 CrNiMoN 20 18 7	X 1 CrNiMoN 20 18 7			Z 1 CNDU 20.18.05 Az
		1.4539	X 2 NiCrMoCu 25 20 5	1.4539	X 2 NiCrMoCu 25 20 5		904 S 13		Z 2 NCDU 25 20
		1.4652	X 2 CrNiMoN 25 22 7	1.4652	X 1 CrNiMoN 25 22 8				
		1.4876	X 10 NiCrAlTi 32 20	1.4876	X 10 NiCrAlTi 32 20			NCF 800	Z 10 NC 32.21
		1.4943	X 4 NiCrTi 25 15	1.4980	X 5 CrNiCuNb 16 4			HR 51	Z 6 NCTDV 25.15
<b>K1</b>	Grey cast iron 150 ÷ 250 HB	0.6015	GG-15	5.1200	EN-GJL-150	G15	Grade 150	FC 150	Ft 15 D
		0.6020	GG-20	5.1300	EN-GJL-200	G20	Grade 220	FC 200	Ft 20 D
		0.6025	GG-25	5.1301	EN-GJL-250	G25	Grade 260	FC 250	Ft 25 D
		0.6027	GG-220 HB		EN-GJL-215				
		0.6035	GG-35	5.1303	EN-GJL-350	G35	Grade 350	FC 350	Ft 35 D
		<b>K2</b>	Nodular cast iron 150 ÷ 350 HB	0.7033	GGG 35.3	5.3100	EN-GJS-350-22		Grade 350/22
0.7040	GGG 40			5.3106	EN-GJS-400-15	GS400-12	Grade 420/12		FGS 400-12
0.7043	GGG 40.3			5.3105	EN-GJS-400-18	GSO 42/17	Grade 370/17	FCD 400-18L	FGS 370-17
0.7050	GGG 50			5.3200	EN-GJS-500-7	GS500-7	Grade 500/7	FCD 500-7	FGS 500-7
0.7060	GGG 60			5.3201	EN-GJS-600-3	GS600-3	Grade 600/3	FCD 600-3	FGS 600-3
0.7070	GGG 70			5.3300	EN-GJS-700-2	GS700-2	Grade 700/2	FCD 700-2	FGS 700-2
0.8155	GTS-55-04				EN-GJMB-550-4	P 55-04	P 540/5	PCMP55-04	P 540/5
0.9990	GGV-40			5.2201	EN-GJV-400				
	GGV-45			5.2300	EN-GJV-450				
	GGV-50			5.2301	EN-GJV-500				
<b>K3</b>	ADI cast iron 250 ÷ 500 HB		GJS-800-8	5.3301	EN-GJS-800-8				
			GJS-1000-5		EN-GJS-1000-5				
			GJS-1200-2		EN-GJS-1200-2				
			GJS-1400-1	5.3405	EN-GJS-1400-1				
<b>K4</b>	Austenitic cast iron 120 ÷ 260 HB	0.6655	GGL-NiCuCr 15 6 2		EN-GJLA-XNiCuCr 15-6-2		Grade F1		FGL Ni15 Cu6 Cr2
		0.6660	GGL-NiCr 20 2		EN-GJLA-XNiCr 20-2		Grade F2		FGL Ni20 Cr2
		0.6676	GGL-NiCr 30 3		EN-GJLA-XNiCr 30-3		Grade F3		FGL Ni30 Cr3
		0.7652	GGG-NiMn 13 7		EN-GJSA-XNiMn 13-7		Grade S6		FGS Ni13 Mn7
		0.7660	GGG-NiCr 20 2	5.3500	EN-GJSA-XNiCr 20-2		Grade S2		FGS Ni20 Cr2
		0.7673	GGG-NiMn 23 4		EN-GJSA-XNiMn 23-4		Grade S2M		FGS Ni23 Mn4
		0.7676	GGG-NiCr 30 3	5.3507	EN-GJSA-XNiCr 30-3		Grade S3		FGS Ni30 Cr3
		0.7683	GGG-Ni 35	5.3504	EN-GJSA-XNi 35				FGS Ni35

SS	UNS	U.N.E. / I.H.A.	AISI-ASTM	GOST	ČSN	Trade Mark	Structure
2331	S30200		302	12KH18N9			Austenitic
2333	S30400	F.3504	304	08KH18N10	17 240		Austenitic
2346	S30300	F.3508	303	12KH19N9			Austenitic
2352	S30403	F.3504	304 L	03KH18N11			Austenitic
	S30100	F.3517	301	07KH16N6			Austenitic
2338	S34700		347	08KH18N12B			Austenitic
2371	S30453	F.3541	304 LN	03KH18N11			Austenitic
2361	S31008		310 S	12KH25N20			Austenitic
2347	S31600	F.3534	316	08KH17H13M2T	17 346		Austenitic
2376	S31500						Duplex
2375	S31653		316 LN	03KH16N15M3			Austenitic
2353	S31603	F.3533	316 L	03KH17N14M3	17 349		Austenitic
2367			317 L				Austenitic
2324	S32900		329				Duplex
2377	S31803		329 LN				Duplex
2366	S31700		317	08KH17H15M3T			Austenitic
2337			321				Austenitic
2338	S34700	F.3524	347	08KH18N12B			Austenitic
2350			316 Ti				Austenitic
2368	S30815						Austenitic
2328	S32750		F 53				Super duplex
	S32760		F 55-329 S				Super duplex
2778	S31254						Super Austenitic
2562	N08904		904L				Super Austenitic
	S32654						Super Austenitic
	N08800					Alloy 800	Austenitic
2570	S66286		660			A286	Austenitic
01 15-00	F11601		A48 25 B	Sc 15	422 415		Lamellar
01 20-00	F12101		A48 30 B	Sc 20	422 420		Lamellar
01 25-00	F12401		A48 35 B	Sc 25	422 425		Lamellar
02 19							Lamellar
01 35-00	F13502		A48 50 B	Sc 35			Lamellar
07 17-15					422 303		Nodular
07 17-02		FGE 38-17		Vc 42-12	422 304		Nodular
07 17-12	F32800		60-40-18	Vc 42-12	422 314		Nodular
07 27-02	F33800	FGE 50-7	A536, 80-55-06	Vc 50-2	422 305		Nodular
07 32-03	F34100	FGE 60-2	A476, 80-60-03	Vc 60-2	422 306		Nodular
07 37-01	F34800	FGE 70-2	A536, 100-70-03	Vc 70-2	422 307		Nodular
08 54-00	F24130		A220 60004				Malleable
			Grade 400-15				Vermicular
			Grade 450				Vermicular
			Grade 500				Vermicular
	ADI grade 1		850/550/10			ADI 800	Ductile austempered
	ADI grade 2		1050/700/7			ADI 1000	Ductile austempered
	ADI grade 3		1200/850/4			ADI 1200	Ductile austempered
	ADI grade 4		1400/1100/1			ADI 1400	Ductile austempered
	F41000		A436 Type 1			Ni-Resist 1	Lamellar
05 23-00	F41002		A436 Type 2			Ni-Resist 2	Lamellar
	F41004		A436 Type 3			Ni-Resist 3	Lamellar
07 72-00						Nodumag	Nodular
	F43000		A436 Type D-2			Ni-Resist D-2	Nodular
	F43010		A439 Type D-2M			Ni-Resist D-2M	Nodular
	F43003		A436 Type D-3			Ni-Resist D-3	Nodular
	F43006		A439 Type D-5			Ni-Resist D-5	Nodular

INFO

CARBIDE DRILLS

PU/HPU  
 TA/4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

HSS DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS

G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

CARBIDE DRILLS  
 PU/HPU  
 TA/4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

HSS DRILLS  
 LF TA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS  
 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS

Gr.	Materials	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR	
N1	Aluminium alloy < 12% Si	3.0205	Al 99			9001/1	1C	A1x3	A4	
		3.0255	Al99.5	Al99.5	AW-1050A	9001/2	1B	(A1050)	A-5/1050A	
		3.0505	AlMn0,5Mg0,5					N31		
		3.0517	AlMn1Cu	AlMn1Cu	AW-3003				A3003	A-M1/3003
		3.0615	AlMgSiPb							ASGPB
		3.1255	AlCuSiMn	AlCuSiMn	AW-2014			H15		A-U4SG
		3.1305	AlCuMg0,5				9002/1	L86		AU2G
		3.1325	AlCuMg 1				9002/2	(H14)	A3x2	AU4G
		3.1355	AlCuMg 2				9002/4	DTD5090	A3x4	AU4G1
		3.1645	AlCuMgPb				9002/8	-	-	AU4Pb
		3.1655	AlCuBiPb	AlCuBiPb	AW-2011			FC1	A2011	A-U5PbBi
		3.2161	G-AlSi8Cu3	AlSi8Cu3(Si)	AC-46200					
		3.2315	AlSi1MgMn	AlMgSi1	AW-6082		90006/4	H30		A-SGM0.7
		3.2341	G-AlSi5Mg		AC-42000		3599	LM25	AC 4C	A-S7G
		3.2381	G-AlSi10Mg	AlSi10Mg(Fe)	AC-43400			LM9		A-S10G
		3.2383	G-AlSi10Mg (Cu)		43200			(LM9)		A-S10UG
		33.206	AlMgSi0.5	AlMgSi0.5	AW-6060			(H9)		A-GS/6060
		3.3210	AlMgSi0.7	AlMgSi0.7	AW-6063			(H10)	(A6063)	A-GSUC/6061
		3.3211	AlMg1SiCu				9006/2	H20	A2x4	AGSUC
		3.3315	AlMg1	AlMg1	AW-5005			N41		A-G0.6
		3.3316	AlMg1,5				9005/7			
		3.3523	AlMg2,5				9005/2		A2x1	AG2,5C
		3.3535	AlMg3				9005/8	N5/N56		AG3
		3.3547	AlMg4.5Mn0.7				9005/5	N8	A2x7	AG4,5MC
		3.3555	AlMg5					N6		A-G5
		3.4335	AlZn4.5Mg1	AlZn4.5Mg1	AW-7020			H17		A-Z5G
		34.365	AlZn5.5MgCu		AW-7075		9007/2	2L95	A7075	A-Z5GU
		3.5612	G-MgAl6Zn	MgAl6Zn	MG-P-63			MAG-E-121		G-A6-Z1
3.5812	G-MgAl8Zn	MgAl8Zn	MG-P-61					(G-A7-Z1)		
N2	Aluminium alloy > 12% Si and Aluminium-Magnesium	32.382	G-AlSi12	AlSi12	AC-44200	4514	LM6	AC3A	AS 13	
		3.2583	G-AlSi12 (Cu)	AlSi12 (Cu)	AC-47000		LM20	Al-Si12Cu		
		3.5101	G-MgZn4SE1Zr1				MAG5		G-Z4TR	
		3.5102	G-MgZn5Th2Zr1							
		35.103	G-MgSe3Zn2Zr1	MgSe3Zn2Zr1	MN65120			MAG6-TE		ZRE1
		3.5106	G-MgAg3SE2Zr1					MAG 12		G-Ag22,5
		3.5312	G-MgAl3Zn					MAG-E-111		
3.5912	G-MgAl9Zn1					MAG7		G-A9Z1		
N3	Copper alloy	2.0040	OF Cu		CW008A		C103	C1020	Cu/c1	
		2.0060	E-Cu57		CW004A	E-Cu57	C101	C1100	Cu/a1	
		2.0070	SE Cu		CW021A					
		2.0090	SF Cu		CW024A		C106	C1220	Cu/b	
		2.0240	CuZn15	CuZn15	CW502L		CZ102	C2300	CuZn15	
		2.0321	CuZn37		CW508L		CZ108		CuZn37	
		2.0401	CuZn39Pb3	CuZn39Pb3	CW614N		CZ121		CuZn39Pb3	
		2.0402	CuZn40Pb2	CuZn40Pb2	CW612N		CZ120		CuZn39Pb2	
		20.530	CuZn38Sn1	CuZn38Sn1	CW717R					
		2.0790	CuNi18Zn19Pb	CW408J					CuNi18Zn19Pb1	
		2.0872	CuNi10Fe1Mn	CuNi10Fe1Mn					CuNi10Fe1Mn	
		2.0940	CuAl10Fe		CC331G		AB1		CuAl10Fe	
		2.0975	CuAl10Ni		CC333G		AB2		CuAl10Ni5Fe5	
		2.1050	CuSn10		CC480K		CT1		CuSn10	
2.1087	CuSn10Zn									
2.1176	CuPb10Sn		CW352H		LB2		CuSn10Pb10			
2.1202	SB Cu				C107					

Materiali 
 Werkstoffmaterialien 
 Matériaux 
 Materiales 
 Материалы

SS	UNS	U.N.E. / I.H.A.	AISI-ASTM	GOST	ČSN	Trade Mark	Structure
4010			A1200				
4007	AA1050A		A1050/1050A				
			3105				
	AA3003					Aluman 100	
			6012				
4338	AA2014		2014			Avional 660	
			2117			Avional 050	
			2017			Avional 100	
			2024			Avional 150	
4335			2030				
4355	AA2011		2011			Recidal 11	
4251	A13800		A380				
4212	A96082		6082			Anticorodal 100	
4244			B26				
4253	A13600		B85				
4103	AA6060					Anticorodal 063	
4104, 4107	AA6005						
			6061			Anticorodal 061	
4106	AA5005					Peraluman 080	
			5050			Peraluman 150	
4120			5052			Peraluman 250	
			5154			Peraluman 350	
4140	A95083		5083			Peraluman 440	
			5056			Peraluman 500	
4425	AA7020		7020				
	A97075		7075	B95		Ergal	
	M11600		AZ61A				
			AZ80A				
			A413.2				
	M12330		AMS 4442				
			AZ31B				
	C10200						
	C11000						
	C10300						
	C12200						
5112	C23000			L90			
5150	C27200						
5170	C38500						
5168	C37800						
	C46400			LO60-1			
	C76300						
5667	C70600						
5710	C95200		CA952	BrA9ZH3L			
5716	C95500		CA955	BrA10ZH4N4L			
5443	C90700						
5458	C90500						
5640	C93700		CA937				
	C14200						

INFO

CARBIDE DRILLS

PU/HPU  
 TA/4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

HSS DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS

G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

CARBIDE DRILLS  
PU/HPU  
TA/4HTA  
SUH  
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HRC  
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CARBIDE END-MILLS  
G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

Gr.	Materials	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR	
N4	Brass alloy and Bronze alloy	2.0220	CuZn5		CW500L		CZ125	C2100		
		2.0230	CuZn10		CW501L		CZ101	C2200		
		2.0250	CuZn20		CW503L		CZ103	C2400		
		2.0265	CuZn30		CW505L		CZ106	C2600		
		2.0331	CuZn36Pb1.5		CW600N		CZ119	C3501		
		2.0360	CuZn40		CW509L		CZ109	C2800		
		2.0372	CuZn39Pb0.5		CW610N		CZ123			
		2.0375	CuZn36Pb3		CW603N		CZ124	C3601		
		2.0380	CuZn39Pb2		CW612N		CZ 131	C3771		
		2.0401	CuZn39Pb3	12164	CW614N	5705	CZ121	C3603		
		2.0402	CuZn40Pb2		CW617N		CZ122			
		2.0410	CuZn44Pb2	CuZn44Pb2	CW622N		CZ104			
		2.0460	CuZn20Al2				CZ110			
		2.0470	CuZn28Sn1	CuZn28Sn1	CW706R				CuZn29Sn1	
		2.0932	CuAl8Fe3		CW303G					
		2.0966	CuAl10Ni5Fe4		CW307G		CA104			
2.1010	CuSn2				-	-				
2.1016	CuSn4					PB101	C5111			
21.020	CuSn6	CuSn6	CW452K			PB103	C5191	CuSn6		
2.1030	CUSn8					PB104	C5212			
N5	Plastic material									
N6	Carbon fiber and composite									
S1	Heat resistant super alloy (HRSA) Ni base (good machinability) < 25 HRC	1.4980							Z3NCT25	
		2.4617							NiMo28	
			NiCr17Mo17Few							NC17DWY
		2.4816	NiCr15Fe							NC15Fe
		2.4851	NiCr23Fe							NC15FeA
		2.4856	NiCr22Mo9Nb							NC22DNb
		2.4669	NiCr 15 Fe 7 TiAl					HR505		NC19FeNB
S2	Heat resistant super alloy (HRSA) Ni base (medium machinability) 25 ÷ 35 HRC	1.4876	X10NiCrAlTi32-21				3075			
		2.4858	NiCr21Mo						NC21FeDU	
		2.4665	NiCr22FeMo				HR6,204		NC22FeD	
		2.4856	NiCr22Mo9Nb						NC22DNb	
		2.4856	NiCr22Mo9Nb						NC22DNb	
		2.4668	NiCr19Fe19NbMo				HR8		NC19FeNb	
		2.4668	NiCr19Fe19NbMo				HR8		NC19FeNb	
		2.4630	NiCr20Ti				HR5,203-4		NC20T	
		2.4631	NiCr20TiAl				HR401,601		NC20TA	
		2.4654	NiCr20Co14MoTi						NC20K14	
S3	Heat resistant super alloy (HRSA) Ni base (low machinability) 35 ÷ 45 HRC	2.4654	NiCr20Co14MoTi						NC20K14	
		2.4668	NiCr19Fe19NbMo				HR8		NC19FeNb	
		2.4669	NiCr 15 Fe 7 TiAl				HR505		NC19FeNB	
			NiW13Co10Cr9AlTi							
			NiCo10W10Cr9AlTi							
			NiCr18cCoMoAlTi						NCK19DAT	
	NiCo15Cr15MoAlTi						NCKD20AT			



SS	UNS	U.N.E. / I.H.A.	AISI-ASTM	GOST	ČSN	Trade Mark	Structure
	C21000						
	C22000						
	C24000						
	C26000						
	C34000						
	C28000						
	C36500						
	C36000						
	C37700						
	C38500					OT-58	
	C38000						
5272	C68700			LAMsh77-2-0.05			
	C68700						
5220	C44300			LOMsh70-1-0.05			
	C61400						
	C63000						
	C50700						
	C51100						
5428	C51900			BrOF6.5-0.15			
	C52100						
							Polycarbonate
							E-glass
							Epoxy
							HTA
							HX
							Kevlar
							PEEK
							PPS
							T300
							T700
							T800
			5725			Discolloy	HRSA Iron-based
	N10665					Hastelloy B-2	HRSA Nickel-based
	N10002					Hastelloy C (casting)	HRSA Nickel-based
	N06600					Inconel 600	HRSA Nickel-based
	N06601					Inconel 601	HRSA Nickel-based
	N06625					Inconel 625 (casting)	HRSA Nickel-based
						Inconel 706	HRSA Nickel-based
	N07750					Inconel X750 (solubilized)	HRSA Nickel-based
						Stellite	HRSA Cobalt-based
	N08800					Incoloy 800	HRSA Iron-based
	N08825					Incoloy 825	HRSA Iron-based
	N06002					Hastelloy X	HRSA Nickel-based
	N06625					Inconel 625 (forged)	HRSA Nickel-based
	N06625					Inconel 625 (pipe)	HRSA Nickel-based
	N07718					Inconel 718 (casting)	HRSA Nickel-based
	N07718					Inconel 718 (pipe)	HRSA Nickel-based
	N06075					Nimonic 80	HRSA Nickel-based
	N07080					Nimonic 81	HRSA Nickel-based
	N07001					Waspalloy (casting)	HRSA Nickel-based
						Haynes	HRSA Cobalt-based
	N07001					Waspalloy (forged)	HRSA Nickel-based
	N07718					Inconel 718 (forged)	HRSA Nickel-based
	N07750					Inconel X750 (precipitation)	HRSA Nickel-based
						Mar-M 200	HRSA Nickel-based
						Mar-M 247	HRSA Nickel-based
						Rene 95	HRSA Nickel-based
						Udimet 500	HRSA Nickel-based
						Udimet 700	HRSA Nickel-based

INFO

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PU/HPU  
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HSS DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS

G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

CARBIDE DRILLS  
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 TA/4HTA  
 SUH  
 ALH  
 HRC  
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 HSD  
 C-SD-TA

HSS DRILLS  
 LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS  
 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS

Gr.	Materials	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
S4	Titanium alloy good machinability		TiAl2Sn4Zr2MoSi						
			TiAl2Sn4Zr6Mo						
		3.7055	Ti 99,6						
		3.7195	Ti3Al2.5V						
		3.7115	TiAl5Sn2.5				TA14/17		
		3.7124	TiCu2.5						
		3.7155	TiAl6Zr5Mo0,5						
		3.7165	TiAl6V4 ELI				TA11		
		3.7175	TiAl6V6Sn2						
		3.7185	TiAl4Mo4Sn2						
3.7025	Ti 99,8					TA 1			
3.7035	Ti 99,7a					TA 2-5			
S5	Titanium alloy medium machinability	3.7164	TiAl6V4						
			Ti5Al2.5Sn						
			TiAl2Sn4Zr2MoSi						
			TiAl2Sn4Zr6Mo						
H1	Hardened steel 50 ÷ 56 HRC	1.1231	Ck 67	1.1231	C 67S	C 70	060 A 67		XC 68
		1.1248	Ck 75	1.1248	C 75S	C 75	060 A 78		XC 75
		1.1274	Ck 101	1.1274	C 100S		060 A 96	SUP 4	
		1.1545	C 105 W1	1.1545	C 105U	C 100 KU			Y1 105
		1.2550	60 WCrV 7			55 WCrV 8 KU			55 WC 20
		1.7131	16 MnCr 5	1.7131	16 MnCr 5	16 MnCr 5	527 M 17	SCR 415	16 MC 5
		1.7176	55 Cr 3	1.7176	55 Cr 3	55 Cr 3	527 A 60	SUP 9 (A)	55 C 3
		2.4669	NiCr 15 Fe 7 TiAl				HR505		NC19FeNB
H2	Hardened bearing steel 54 ÷ 62 HRC	1.2210	115 CrV 3	1.2210	107 CrV 3	107 CrV 3 KU			100 C 3
		1.2510	100 MnCrW 4			95 MnWCr 5 KU	BO 1	SKS 3	90 MWCV 5
		1.2842	90 MnCrV 8	1.2842	90 MnCrV 8	90 MnWCr 8 KU	BO 2		90 MV 8
		1.3505	100 Cr 6	1.3505	100 Cr 6	100 Cr 6	534 A 99	SUJ 2	100 C 6
		1.2344	X 40 CrMoV 5 1	1.2344	X 40 CrMoV 5 1	X 40 CrMo 5 1 1 KU	BH 13	SKD 61	Z 40 CDV 5
H3	Hardened tool steel 60 ÷ 65 HRC	1.2363	X 100 CrMoV 5 1	1.2363	X 100 CrMoV 5	X 100 CrMoV 5 1 KU	BA 2	SKD 12	Z 100 CDV 5
		1.2379	X 155 CrVMo 12 1		X 155 CrVMo 12 1	X 155 CrVMo 12 1 KU	BD 2	SKD 11	Z 160 CDV 12
		1.2436	X 210 CrW 12			X 215 CrW 12 1 KU		SKD 2	
		1.2601	X 165 CrMoV 12			X 165 CrMoV 12 KU			
		1.2713	55 NiCrMoV 6					SKT 4	55 NCDV 7
		1.3243	S 6-5-2-5	1.3243	HS 6-5-2-5	HS 6-5-2-5		SKH 55	Z 85 WDKCV 06-05-05-04-02
		1.3247	S 2-10-1-8	1.3247	HS 2-10-1-8	HS 2-9-1-8	BM 42	SKH 51	Z 110 DKCWW 09-08-
		1.3355	S 18-0-1	1.3355	HS 18-0-1	HS 18-0-1	BT 1	SKH 2	Z 80 WCV 18-04-01
H4	Hardened martensitic stainless steel 50 ÷ 56 HRC	1.4021	X 20 Cr 13	1.4021	X 20 Cr 13	X 20 Cr 13	420 S 37	SUS 420 J 1	Z 20 C 13
		1.4109	X 65 CrMo 14	1.4109	X 70 CrMo 15			SUS 440 A	Z 70 D 14
		1.4112	X 90 CrMoV 18	1.4112	X 90 CrMoV 18	X CrTi 12	409 S 19	SUS 440 B	Z 2 CND 18 05
		1.4125	X 105 CrMo 17	1.4125	X 105 CrMo 17	X 105 CrMo 17		SUS 440 C	Z 100 CD 17
		1.4542	X 5 CrNiCuNb 16 4	1.4542	X 5 CrNiCuNb 16 4			SUS 630	
		1.4568	X 7 CrNiAl 17 7	1.4568	X 7 CrNiAl 17 7	X 7 CrNiAl 17 7	301 S 81	SUS 631	Z 9 CAN 17.7
		1.4943	X 4 NiCrTi 25 15	1.4980	X 6 NiCrTiMoV 25 15		HR 51	SUH 660	Z 6 NCTDV 25.15
H5	Hardened white cast iron 48 ÷ 55 HRC	0.9620	G-X330 NiCr 4 2	0.9620	EN-GJN-HV520		Grade 2 A		FB Ni4 Cr2 BC
		0.9625	G-X260 NiCr 4 2	0.9625	EN-GJN-HV550		Grade 2 B		FB Ni4 Cr2 HC
		0.9630	G-X300 CrNiSi 9 5 2	0.9630	EN-GJN-HV600		Grade 2 C, D, E		FB Cr9 Ni5



Durezza 
 Härte 
 Dureté 
 Dureza 
 Твёрдость

INFO

HRC	VICKERS	BRINELL HARDNESS		ROCKWELL HARDNESS			ROCKWELL SUPERFICIAL HARDNESS			SHORE HARDNESS	N/mm <sup>2</sup> TENSILE STRENGTH	HRC
		standard ball	tungsten carbide ball	A scale	B scale	D scale	15-N scale	30-N scale	45-N scale			
68	940	-	-	85.6	-	76.9	93.2	84.4	75.4	97	-	68
67	900	-	-	85.0	-	76.1	92.9	83.6	74.2	95	-	67
66	865	-	-	84.5	-	75.4	92.5	82.8	73.3	92	-	66
65	832	-	(739)	83.9	-	74.5	92.2	81.9	72.0	91	-	65
64	800	-	(722)	83.4	-	73.8	91.8	81.1	71.0	88	-	64
63	772	-	(705)	82.8	-	73.0	91.4	80.1	69.9	87	-	63
62	746	-	(688)	82.3	-	72.2	91.1	79.3	68.8	85	-	62
61	720	-	(670)	81.8	-	71.5	90.7	78.4	67.7	83	-	61
60	697	-	(654)	81.2	-	70.7	90.2	77.5	66.7	81	-	60
59	674	-	(634)	80.7	-	69.9	89.8	76.6	65.5	80	-	59
58	653	-	615	80.1	-	69.2	89.3	75.7	64.3	78	-	58
57	633	-	595	79.6	-	68.5	88.9	74.8	63.2	76	-	57
56	613	-	577	79.0	-	67.7	88.3	73.9	62.0	75	-	56
55	595	-	560	78.5	-	66.9	87.9	73.0	60.9	74	2075	55
54	577	-	543	78.0	-	66.1	87.4	72.0	59.8	72	2015	54
53	560	-	525	77.4	-	65.4	86.9	71.2	58.6	71	1950	53
52	544	(500)	512	76.8	-	64.6	86.4	70.2	57.4	69	1880	52
51	528	(487)	496	76.3	-	63.8	85.9	69.4	56.1	68	1820	51
50	513	(475)	481	75.9	-	63.1	85.5	68.5	55.0	67	1760	50
49	498	(464)	469	75.2	-	62.1	85.0	67.6	53.8	66	1695	49
48	484	451	455	74.7	-	61.4	84.5	66.7	52.5	64	1635	48
47	471	442	443	74.1	-	60.8	83.9	65.8	51.4	63	1580	47
46	458	432	432	73.6	-	60.0	83.5	64.8	50.3	62	1530	46
45	446	421	421	73.1	-	59.2	83.0	64.0	49.0	60	1480	45
44	434	409	409	72.5	-	58.5	82.5	63.1	47.8	58	1435	44
43	423	400	400	72.0	-	57.7	82.0	62.2	46.7	57	1385	43
42	412	390	390	71.5	-	56.9	81.5	61.3	45.5	56	1340	42
41	402	381	381	70.9	-	56.2	80.9	60.4	44.3	55	1295	41
40	392	371	371	70.4	-	55.4	80.4	59.5	43.1	54	1250	40
39	382	362	362	69.9	-	54.6	79.9	58.6	41.9	52	1215	39
38	372	353	353	69.4	-	53.8	79.4	57.7	40.8	51	1180	38
37	363	344	344	68.9	-	53.1	78.8	56.8	39.6	50	1160	37
36	354	336	336	68.4	(109.0)	52.3	78.3	55.9	38.4	49	1115	36
35	345	327	327	67.9	(108.5)	51.5	77.7	55.0	37.2	48	1080	35
34	336	319	319	67.4	(108.0)	50.8	77.2	54.2	36.1	47	1055	34
33	327	311	311	66.8	(107.5)	50.0	76.6	53.3	34.9	46	1025	33
32	318	301	301	66.3	(107.0)	49.2	76.1	52.1	33.7	44	1000	32
31	310	294	294	65.8	(106.0)	48.4	75.6	51.3	32.5	43	980	31
30	302	286	286	65.3	(105.5)	47.7	75.0	50.4	31.3	42	950	30
29	294	279	279	64.7	(104.5)	47.0	74.5	49.5	30.1	41	930	29
28	286	271	271	64.3	(104.0)	46.1	73.9	48.6	28.9	41	910	28
27	279	264	264	63.8	(103.0)	45.2	73.3	47.7	27.8	40	880	27
26	272	258	258	63.3	(102.5)	44.6	72.8	46.8	26.7	38	860	26
25	266	253	253	62.8	(101.5)	43.8	72.2	45.9	25.5	38	840	25
24	260	247	247	62.4	(101.0)	43.1	71.6	45.0	24.3	37	825	24
23	254	243	243	62.0	100.0	42.1	71.0	44.0	23.1	36	805	23
22	248	237	237	61.5	99.0	41.6	70.5	43.2	22.0	35	785	22
21	243	231	231	61.0	98.5	40.9	69.9	42.3	20.7	35	770	21
20	238	226	226	60.5	97.8	40.1	69.4	41.5	19.6	34	760	20
(18)	230	219	219	-	96.7	-	-	-	-	33	730	(18)
(16)	222	212	212	-	95.5	-	-	-	-	32	705	(16)
(14)	213	203	203	-	93.9	-	-	-	-	31	675	(14)
(12)	204	194	194	-	92.3	-	-	-	-	29	650	(12)
(10)	196	187	187	-	90.7	-	-	-	-	28	620	(10)
(8)	188	179	179	-	89.5	-	-	-	-	27	600	(8)
(6)	180	171	171	-	87.1	-	-	-	-	26	580	(6)
(4)	173	165	165	-	85.5	-	-	-	-	25	550	(4)
(2)	166	158	158	-	83.5	-	-	-	-	24	530	(2)
(0)	160	152	152	-	81.7	-	-	-	-	24	515	(0)

CARBIDE DRILLS

PU/HPU  
 TA/4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

HSS DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS

G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS

⚙️ CUTTING SPEED 
 🇮🇹 VELOCITÀ DI TAGLIO 
 🇩🇪 SCHNITTGESCHWINDIGKEIT  
🇫🇷 VITESSE DE COUPE 
 🇪🇸 VELOCIDAD DE CORTE 
 🇷🇺 СКОРОСТЬ РЕЗАНИЯ

$$V_c = \frac{D \times \pi \times n}{1000} \quad \text{m/min}$$

⚙️ SPLINDLE SPEED 
 🇮🇹 VELOCITÀ DI ROTAZIONE MANDRINO 
 🇩🇪 SPINDELGESCHWINDIGKEIT  
🇫🇷 VITESSE DE ROTATION DU MANDRIN 
 🇪🇸 VELOCIDAD DE ROTACIÓN DEL MANDRIL 
 🇷🇺 ЧАСТОТА ВРАЩЕНИЯ ШПИНДЕЛЯ

$$n = \frac{V_c \times 1000}{\pi \times D} \quad \text{rpm}$$

⚙️ FEED PER REVOLUTION 
 🇮🇹 AVANZAMENTO PER GIRO 
 🇩🇪 VORSCHUB PRO UMDREHUNG  
🇫🇷 AVANCE PAR TOUR 
 🇪🇸 AVANCE POR VUELTA 
 🇷🇺 ОБОРОТНАЯ ПОДАЧА

$$f_n = \frac{V_f}{n} \quad \text{mm/rev} \qquad f_n = f_z \times z \quad \text{mm/rev}$$

⚙️ FEED RATE 
 🇮🇹 VELOCITÀ DI AVANZAMENTO 
 🇩🇪 VORSCHUBSGESCHWINDIGKEIT  
🇫🇷 VITESSE D'AVANCE 
 🇪🇸 VELOCIDAD DE AVANCE 
 🇷🇺 МИНУТНАЯ ПОДАЧА

$$V_f = f_n \times n \quad \text{mm/min}$$

⚙️ FEED/TOOTH 
 🇮🇹 AVANZAMENTO/TAGLIENTE 
 🇩🇪 VORSCHUB/SCHNEIDE  
🇫🇷 AVANCE/ARÊTE DE COUPE 
 🇪🇸 AVANCE/FILO 
 🇷🇺 ПОДАЧА НА ЗУБ

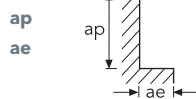
$$f_z = \frac{V_f}{n \times z} \quad \text{mm}$$

⚙️ METAL (CHIP) REMOVAL RATE 
 🇮🇹 VOLUME TRUCIOLO ASPORTATO 
 🇩🇪 VOLUMEN ABGETRAGENER SPÄNE  
🇫🇷 VOLUME DE COPEAU 
 🇪🇸 VOLUMEN VIRUTA EXTRAÍDA 
 🇷🇺 ОБЪЕМ УДАЛЕННОЙ СТРУЖКИ

$$Q = \frac{a_p \times a_e \times V_f}{1000} \quad \text{cm}^3/\text{min}$$

⚙️ D 
 🇮🇹 DIAMETER 
 🇩🇪 DURCHMESSER 
 🇫🇷 DIAMÈTRE 
 🇪🇸 DIÁMETRO 
 🇷🇺 ДИАМЕТР

⚙️ Z 
 🇮🇹 NUMBER OF TEETH 
 🇩🇪 SCHNEIDENANZAHL 
 🇫🇷 NUMÉRO DE DENTS 
 🇪🇸 NÚMERO DE DIENTES 
 🇷🇺 КОЛИЧЕСТВО ЗУБЬЕВ



INFO

CARBIDE DRILLS

PU/HPU  
 TA/4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

HSS DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS

G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS



## CARBIDE DRILLS



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🇮🇹 Legenda 🇩🇪 Verzeichnis 🇫🇷 Légende 🇪🇸 Leyenda 🇷🇺 Условные обозначения

STOCK		
●	<ul style="list-style-type: none"> <li>🇮🇹 stock standard</li> <li>🇩🇪 stock standard</li> <li>🇩🇪 Standard Lager</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 stock standard</li> <li>🇪🇸 stock estándar</li> <li>🇷🇺 складская позиция</li> </ul>
○	<ul style="list-style-type: none"> <li>🇮🇹 non-standard stock</li> <li>🇩🇪 stock non standard</li> <li>🇩🇪 nicht Standard Lager</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 stock non standard</li> <li>🇪🇸 stock no estándar</li> <li>🇷🇺 не складская позиция</li> </ul>
▽	<ul style="list-style-type: none"> <li>🇮🇹 stock exhaustion</li> <li>🇩🇪 esaurimento stock</li> <li>🇩🇪 Vorraterschöpfung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 épuisement du stock</li> <li>🇪🇸 agotamiento de stock</li> <li>🇷🇺 складские остатки</li> </ul>



🇮🇹 APPLICATION GUIDELINES 🇫🇷 INDICAZIONI PER L'APPLICAZIONE 🇩🇪 LEITFADEN ZUR ANWENDUNG  
 🇫🇷 INDICATIONS POUR L'APPLICATION 🇪🇸 INDICACIONES PARA SU APLICACIÓN 🇷🇺 УКАЗАНИЯ ПО ПРИМЕНЕНИЮ

★	<ul style="list-style-type: none"> <li>🇮🇹 1st choice</li> <li>🇩🇪 1a scelta</li> <li>🇩🇪 1. Wahl</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 1er choix</li> <li>🇪🇸 1ª elección</li> <li>🇷🇺 1-й выбор</li> </ul>
☆	<ul style="list-style-type: none"> <li>🇮🇹 suitable</li> <li>🇩🇪 adatto</li> <li>🇩🇪 geeignet</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 adapté</li> <li>🇪🇸 adecuado</li> <li>🇷🇺 пригоден</li> </ul>

🇮🇹 SHANK 🇫🇷 ATTACCO 🇩🇪 SCHAFT 🇫🇷 QUEUE 🇪🇸 MANGO 🇷🇺 ХВОСТОВИК












	<ul style="list-style-type: none"> <li>🇮🇹 cylindrical shank</li> <li>🇩🇪 attacco cilindrico</li> <li>🇩🇪 zylindrischer Schaft</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 queue cylindrique</li> <li>🇪🇸 mango cilíndrico</li> <li>🇷🇺 цилиндрическое крепление</li> </ul>
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🇮🇹 GEOMETRY 🇫🇷 GEOMETRIA 🇩🇪 GEOMETRIE 🇫🇷 GÉOMÉTRIE 🇪🇸 GEOMETRÍA 🇷🇺 ГЕОМЕТРИЯ


			<ul style="list-style-type: none"> <li>🇮🇹 universal application</li> <li>🇩🇪 applicazione universale</li> <li>🇩🇪 Universelle Anwendung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 application universelle</li> <li>🇪🇸 aplicación universal</li> <li>🇷🇺 универсальное применение</li> </ul>
			<ul style="list-style-type: none"> <li>🇮🇹 universal application with inside coolant</li> <li>🇩🇪 applicazione universale con refrigerazione interna</li> <li>🇩🇪 Universelle Anwendung mit Innenkühlung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 application universelle avec lubrification interne</li> <li>🇪🇸 aplicación universal con refrigeración interna</li> <li>🇷🇺 универсальное применение с внутренним охлаждением</li> </ul>
			<ul style="list-style-type: none"> <li>🇮🇹 general purpose</li> <li>🇩🇪 uso generico</li> <li>🇩🇪 allgemeine Anwendung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 applications génériques</li> <li>🇪🇸 uso genérico</li> <li>🇷🇺 общего назначения</li> </ul>
			<ul style="list-style-type: none"> <li>🇮🇹 4 guides chamfer with inside coolant</li> <li>🇩🇪 4 fasi con refrigerazione interna</li> <li>🇩🇪 4 Führungsfasen mit innerer Kühlmittelzuführung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 4 listels à trous d'huile</li> <li>🇪🇸 4 fases con refrigeración interna</li> <li>🇷🇺 4 направляющих с внутренней подачей СОЖ</li> </ul>
			<ul style="list-style-type: none"> <li>🇮🇹 stainless steel with inside coolant</li> <li>🇩🇪 acciaio inossidabile con refrigerazione interna</li> <li>🇩🇪 rostfreien Stahl mit innerer Kühlmittelzuführung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 acier inoxydable à trous d'huile</li> <li>🇪🇸 acero inoxidable con refrigeración interna</li> <li>🇷🇺 нержавеющей сталь с внутренней подачей СОЖ</li> </ul>
			<ul style="list-style-type: none"> <li>🇮🇹 aluminium with inside coolant</li> <li>🇩🇪 alluminio con refrigerazione interna</li> <li>🇩🇪 Aluminium mit innerer Kühlmittelzuführung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 aluminium à trous d'huile</li> <li>🇪🇸 aluminio con refrigeración interna</li> <li>🇷🇺 алюминий с внутренней подачей СОЖ</li> </ul>
			<ul style="list-style-type: none"> <li>🇮🇹 hardened steel</li> <li>🇩🇪 acciaio temprato</li> <li>🇩🇪 Hartstahl</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 acier trempé</li> <li>🇪🇸 acero templado</li> <li>🇷🇺 закалённая сталь</li> </ul>



🇮🇹 Legenda 🇩🇪 Verzeichnis 🇫🇷 Légende 🇪🇸 Leyenda 🇷🇺 Условные обозначения

* GEOMETRY 🇮🇹 GEOMETRIA 🇩🇪 GEOMETRIE 🇫🇷 GÉOMÉTRIE 🇪🇸 GEOMETRÍA 🇷🇺 ГЕОМЕТРИЯ	
 Suh Mini  135°  30°	<p>* wide range of materials, with inside coolant, mini            🇮🇹 ampia gamma di materiali, con refrigerazione interna, mini            🇩🇪 breite Auswahl an Materialien, mit Innenkühlung, mini</p> <p>🇫🇷 large gamme de matériaux, avec lubrification interne, mini            🇪🇸 amplia gama de materiales, con refrigeración interna, mini            🇷🇺 широкий выбор материалов, с внутренним охлаждением, мини</p>
 HL  135°  30°	<p>* wide range of materials, with inside coolant, long            🇮🇹 ampia gamma di materiali, con refrigerazione interna, lunga            🇩🇪 breite Auswahl an Materialien, mit Innenkühlung, lang</p> <p>🇫🇷 large gamme de matériaux, avec lubrification interne, longue            🇪🇸 amplia gama de materiales, con refrigeración interna, larga            🇷🇺 широкий выбор материалов, с внутренним охлаждением, длинная</p>
 HSD  140°  30°	<p>* universal application with inside coolant            🇮🇹 applicazione universale con refrigerazione interna            🇩🇪 Universelle Anwendung mit Innenkühlung</p> <p>🇫🇷 application universelle avec lubrification interne            🇪🇸 aplicación universal con refrigeración interna            🇷🇺 универсальное применение с внутренним охлаждением</p>
 SD  90-120°  30°	<p>* NC starting drill            🇮🇹 punte da centri NC            🇩🇪 NC Anbohrer mit Spitzenwinkel</p> <p>🇫🇷 forets à centrer NC            🇪🇸 brocas de hacer punto NC            🇷🇺 центровочные сверла для станков с ЧПУ</p>

* MATERIAL 🇮🇹 MATERIALE 🇩🇪 WERKSTOFF 🇫🇷 MATIÈRE 🇪🇸 MATERIAL 🇷🇺 МАТЕРИАЛ	
 MG  ...	<p>* micrograin            🇮🇹 micrograna            🇩🇪 Mikrokörnung</p> <p>🇫🇷 micrograin            🇪🇸 micrograno            🇷🇺 микрoзернистый твёрдый сплав</p>

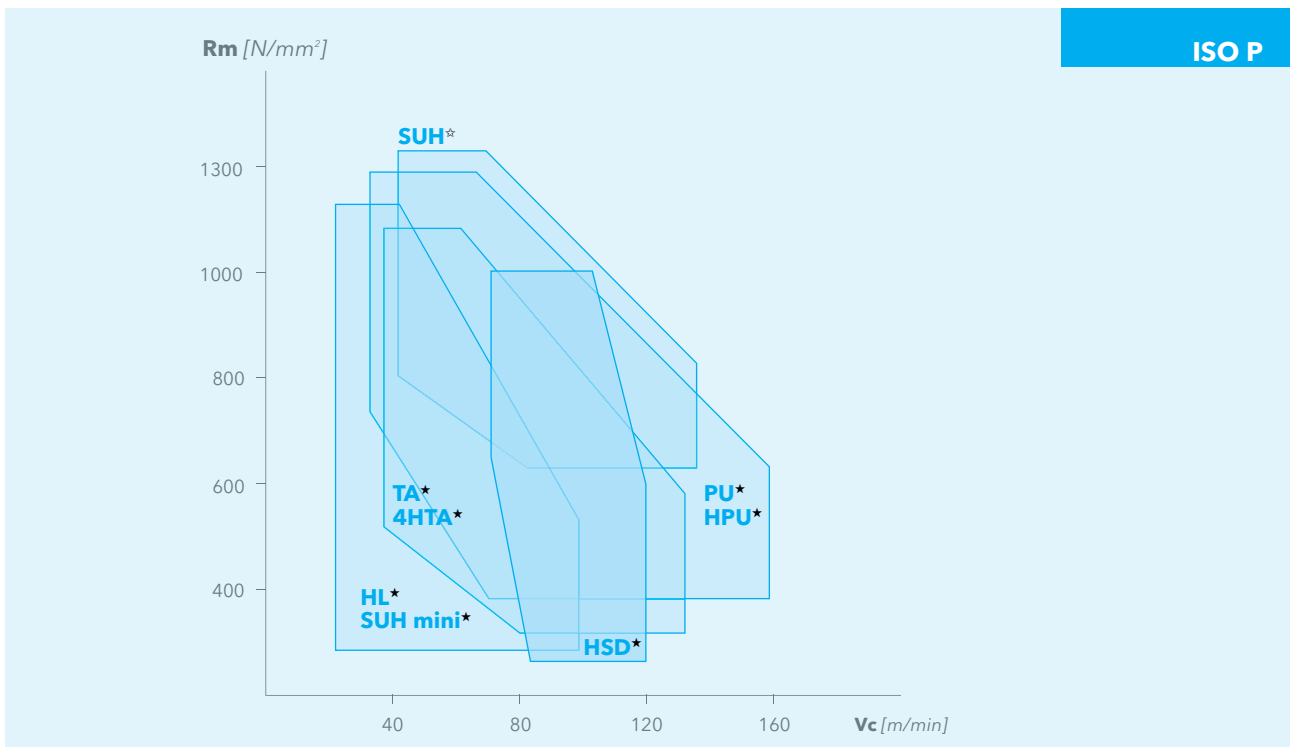
* SURFACE TREATMENT 🇮🇹 TRATTAMENTO SUPERFICIALE 🇩🇪 OBERFLÄCHENBEHANDLUNG 🇫🇷 TREATMENT DE SURFACE 🇪🇸 TRATAMIENTO SUPERFICIAL 🇷🇺 ОБРАБОТКА ПОВЕРХНОСТИ	
 BR  ...	<p>* uncoated            🇮🇹 non rivestito            🇩🇪 unbeschichtet</p> <p>🇫🇷 non revêtu            🇪🇸 no revestido            🇷🇺 без покрытия</p>
 POLISHED  ...	<p>* polished            🇮🇹 lappato            🇩🇪 geläpft</p> <p>🇫🇷 poli            🇪🇸 pulido            🇷🇺 полированный</p>

* COATINGS 🇮🇹 RIVESTIMENTI 🇩🇪 BESCHICHTUNGEN 🇫🇷 REVÊTEMENTS 🇪🇸 RECUBRIMENTOS 🇷🇺 ПОКРЫТИЕ					
		...	...	..	..
		PV200	PV250	PV300	PV1000
<p>* hardness (HV)            🇮🇹 durezza (HV)            🇩🇪 Härte (HV)</p> <p>🇫🇷 durezza (HV)            🇪🇸 dureza (HV)            🇷🇺 твёрдость (HV)</p>	<p>3300</p>	<p>3300</p>	<p>3300</p>	<p>3600</p>	
<p>* friction coefficient            🇮🇹 coefficiente d'attrito            🇩🇪 Reibungskoeffizient</p> <p>🇫🇷 coefficient de frottement            🇪🇸 coeficiente de rozamiento            🇷🇺 коэффициент трения</p>	<p>0.3</p>	<p>0.3</p>	<p>0.3</p>	<p>0.25</p>	
<p>* thickness (μ)            🇮🇹 spessore (μ)            🇩🇪 dicke (μ)</p> <p>🇫🇷 épaisseur (μ)            🇪🇸 espesor (μ)            🇷🇺 толщина (мкм)</p>	<p>3</p>	<p>2.5÷3.5</p>	<p>2.5÷3.5</p>	<p>2÷3</p>	
<p>* max working temperature (°C)            🇮🇹 temperatura max (°C)            🇩🇪 höchste Temperatur (°C)</p> <p>🇫🇷 température maximale (°C)            🇪🇸 temperatura máx (°C)            🇷🇺 макс. температура (°C)</p>	<p>950°</p>	<p>900°</p>	<p>1100°</p>	<p>1200°</p>	

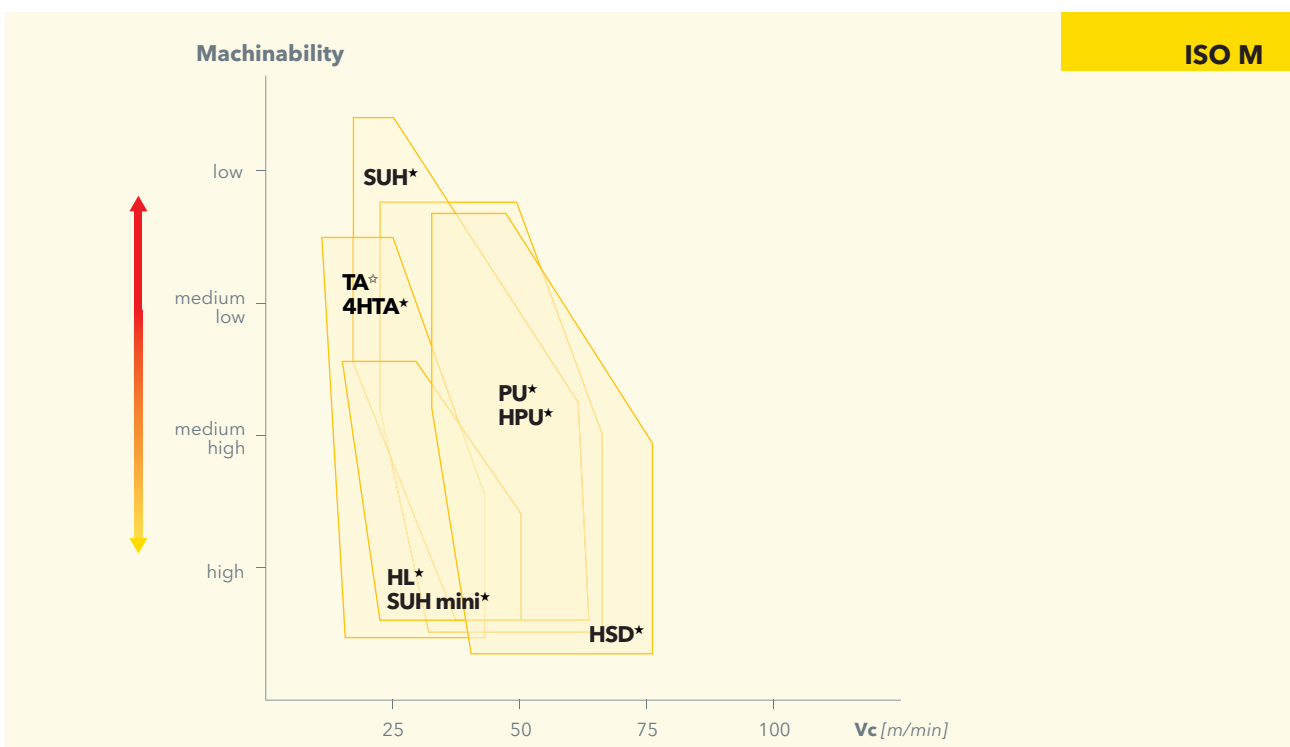
	ITEM No.	PAGE	
PU-HPU universal application 3xD - 5xD	<b>353PU</b>	43	
	<b>353HPU</b>	43	
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	<b>355HPU</b>	52	
TA-4HTA general purpose 3xD - 8xD	<b>343TA</b>	66	
	<b>318N</b>	66	
	<b>3584HTA</b>	70	
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	<b>355SUH</b>	85	
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	<b>355ALH</b>	97	
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HL long and extra long 12xD ÷ 30xD	<b>3512HL</b>	147	
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HSD step drill for 90° chamfering	<b>372HSD</b>	175	
NC spotting 90° - 120°	<b>CS-D-TA 90</b>	180	
	<b>CS-D-TA 120</b>	180	

RANGE	DRILLING DEPTH	NORM	TYPE	MATERIAL / COATING	HRC	POINT ANGLE	HELIX ANGLE	CHAMFER	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H
3-20	3xD	DIN6537K	PU	MG PV250		140°	30°	45°	★	★	★	☆	★	
3-20	3xD	DIN6537K	HPU	MG PV250		140°	30°	45°	★	★	★	☆	★	
3-20	5xD	DIN6537L	PU	MG PV250		140°	30°	45°	★	★	★	☆	★	
3-20	5xD	DIN6537L	HPU	MG PV250		140°	30°	45°	★	★	★	☆	★	
1-16	3xD	DIN6539	TA	MG PV200		140°	30°		★	☆	☆	☆		
1-13	3xD	DIN6539	TA	MG BR		140°	30°		★	☆	☆	☆		
3-16	8xD	OSAWA	4HTA	MG PV300		140°	30°		★	★	★	☆	☆	
3-20	3xD	DIN6537K	SUH	MG PV300		140°	30°		☆	★	☆	☆	☆	
3-20	5xD	DIN6537L	SUH	MG PV300		140°	30°		☆	★	☆	☆	☆	
3-20	3xD	DIN6537K	ALH	MG POLISHED		130°	30°					★		
3-20	5xD	DIN6537L	ALH	MG POLISHED		130°	30°					★		
2.6-14.2	3xD	DIN6537K	HRC	MG PV1000	45-62	150°	15°	45°						★
1-3	5xD	OSAWA	SUH MINI	MG PV300		135°	30°		★	★	★	☆	☆	
1-3	8xD	OSAWA	SUH MINI	MG PV300		135°	30°		★	★	★	☆	☆	
1-3	12xD	OSAWA	SUH MINI	MG PV300		135°	30°		★	★	★	☆	☆	
1-3	20xD	OSAWA	SUH MINI	MG PV300		135°	30°		★	★	★	☆	☆	
1-3	25xD	OSAWA	SUH MINI	MG PV300		135°	30°		★	★	★	☆	☆	
1-3	30xD	OSAWA	SUH MINI	MG PV300		135°	30°		★	★	★	☆	☆	
3.1-10	12xD	OSAWA	HL	MG PV250		135°	30°		★	★	★	☆	☆	
3.1-10	15xD	OSAWA	HL	MG PV250		135°	30°		★	★	★	☆	☆	
3.1-10	20xD	OSAWA	HL	MG PV250		135°	30°		★	★	★	☆	☆	
3.1-9.5	25xD	OSAWA	HL	MG PV250		135°	30°		★	★	★	☆	☆	
3.1-8	30xD	OSAWA	HL	MG PV250		135°	30°		★	★	★	☆	☆	
8.3-10.3	2xD	OSAWA	HSD	MG PV250		140°	30°	90°	★	★			★	
6-16		OSAWA	SD	MG PV200		90°	30°		★	★	★	★	☆	
6-16		OSAWA	SD	MG PV200		120°	30°		★	★	★	★	☆	

STEEL APPLICATION



STAINLESS STEEL APPLICATION



PU : universal purpose (page 43)

HPU : universal purpose with inside coolant (page 43)

TA : general purpose (page 66)

4HTA : 4 margins general purpose with inside coolant (page 70)

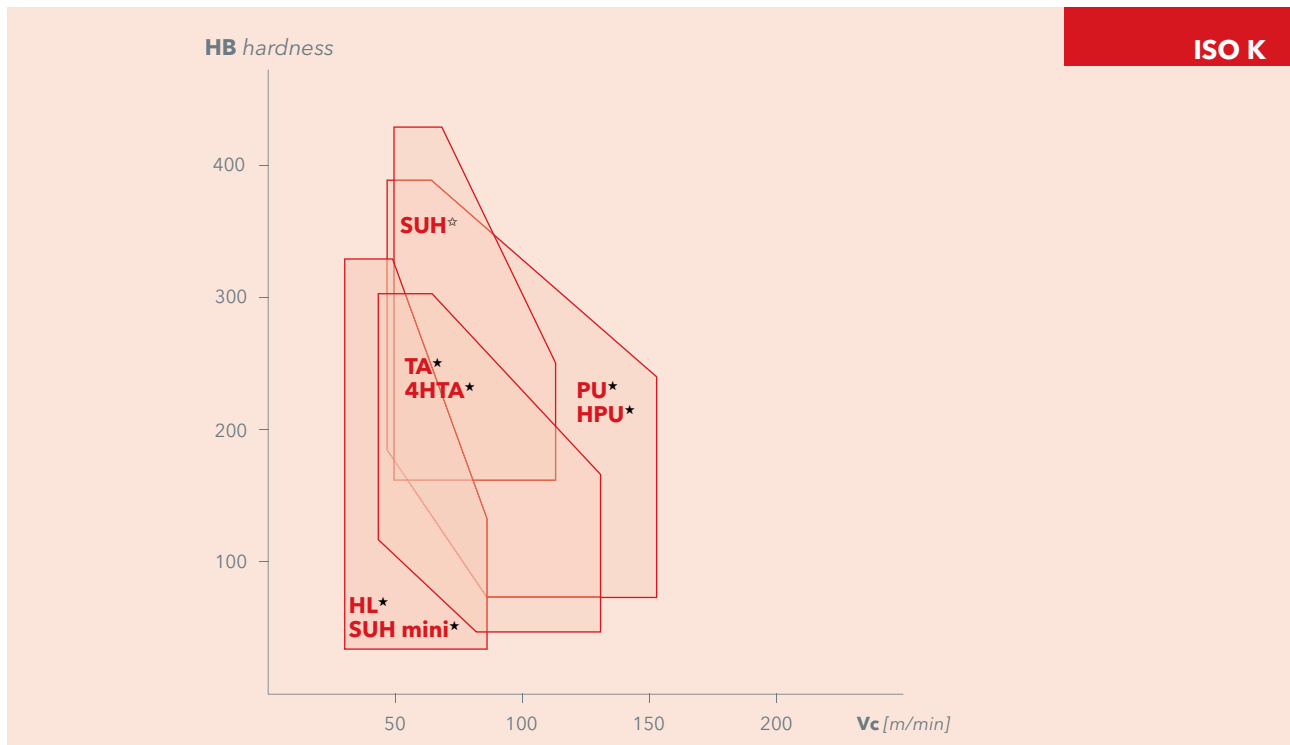
SUH : special purpose with inside coolant (page 79)

SUH MINI : miniature 5xD ÷ 30xD with inside coolant (page 114)

HL : long 12xD ÷ 30xD (page 147)

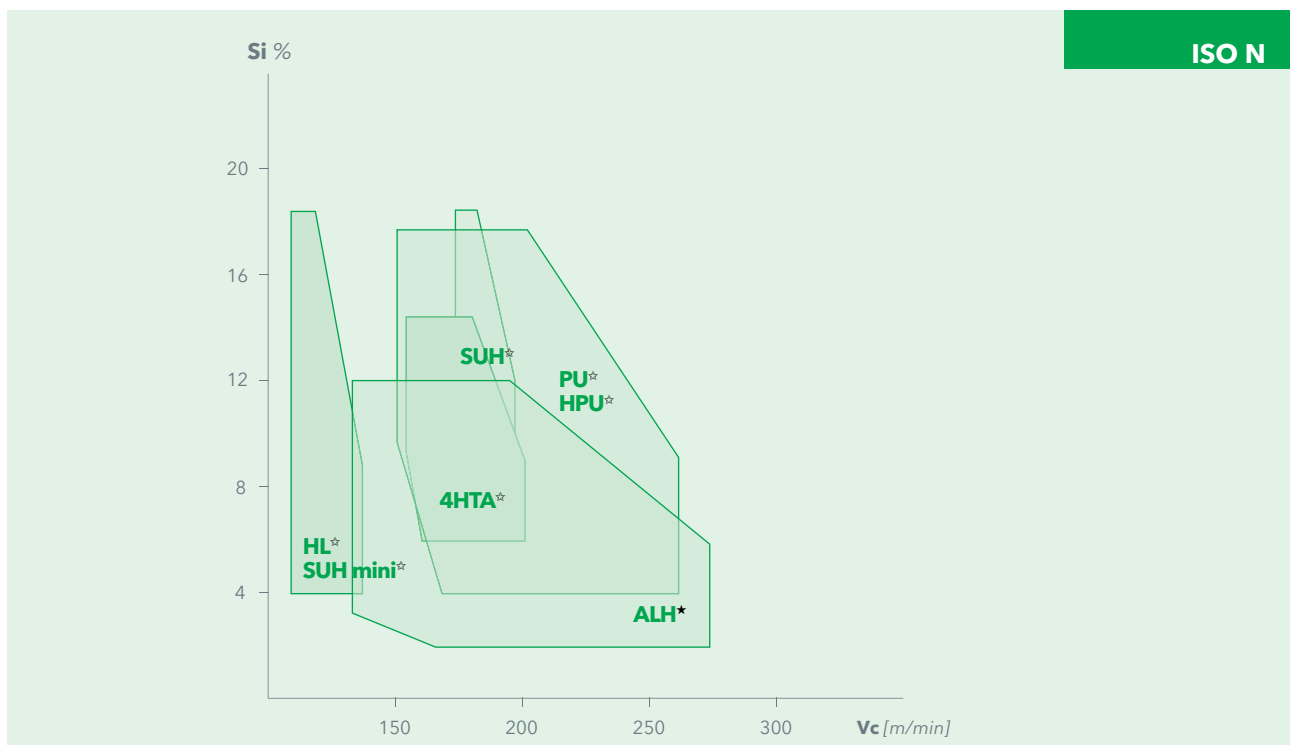
HSD : step drill with inside coolant (page 175)

CAST IRON APPLICATION



★ 1st choice ☆ suitable

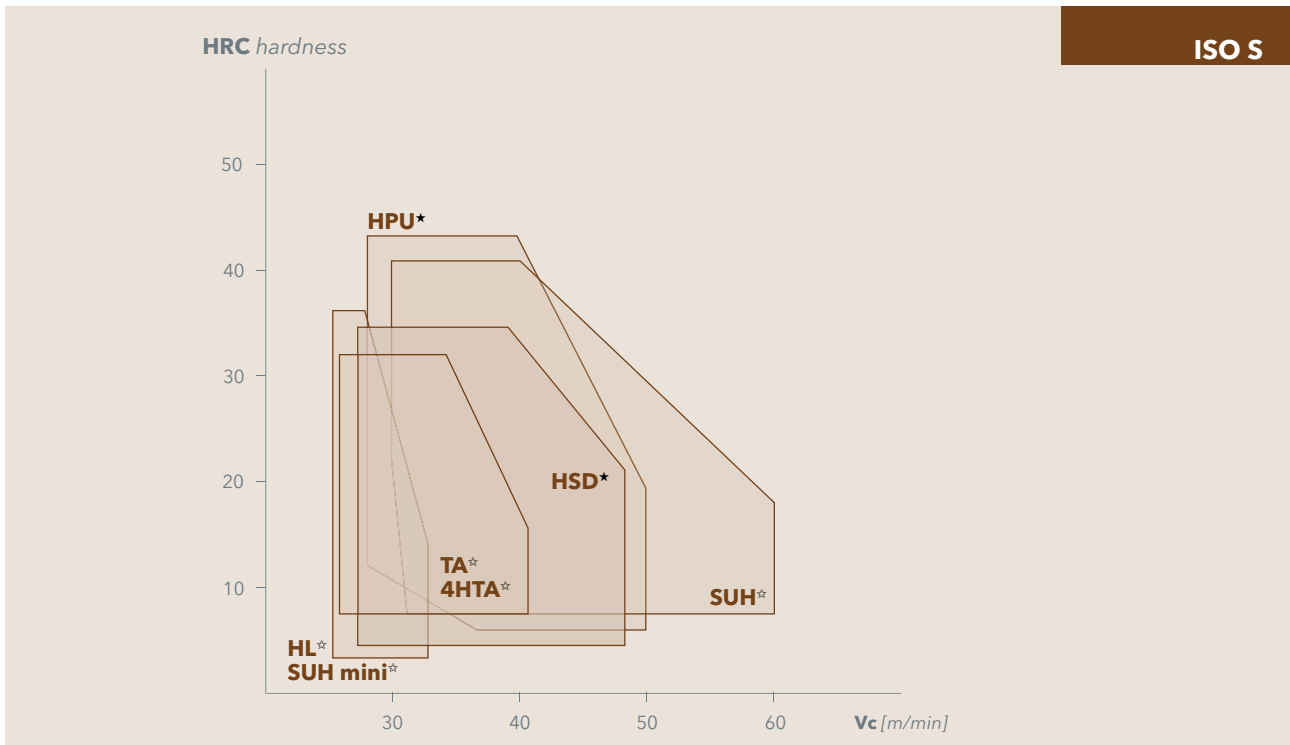
NON-FERROUS MATERIALS APPLICATION



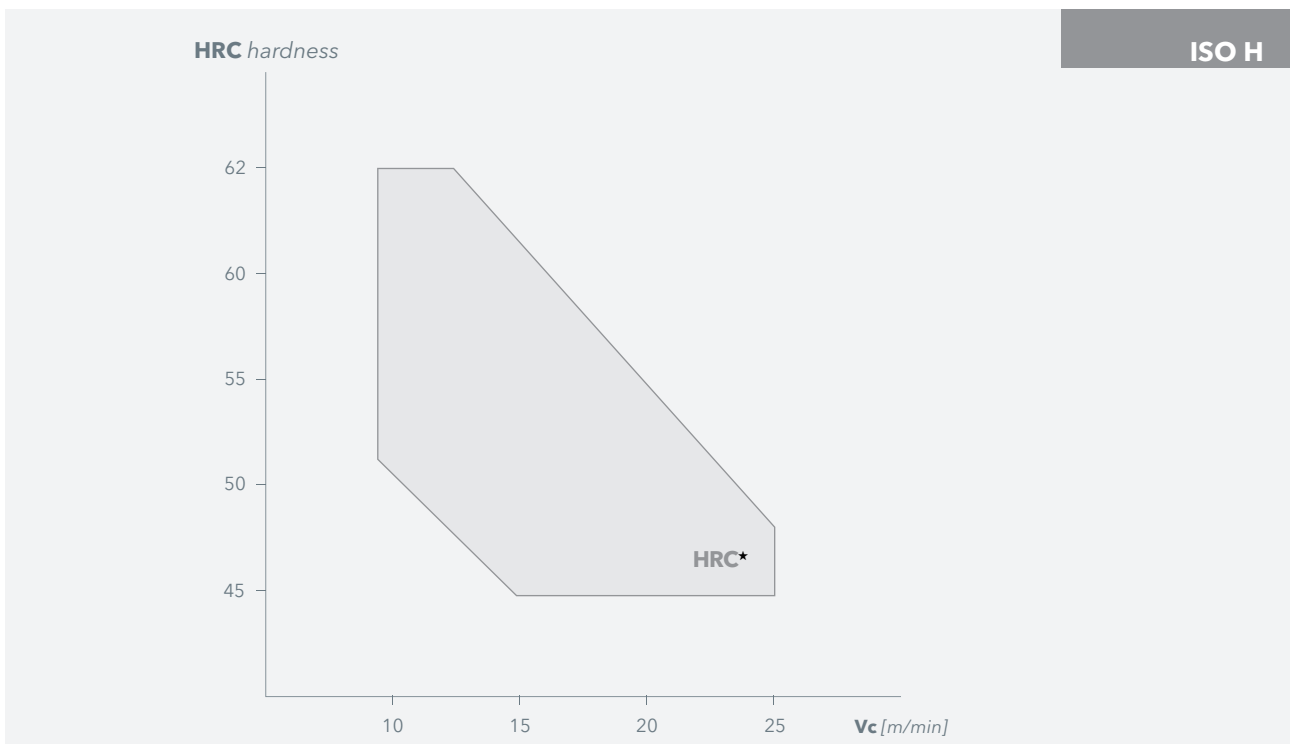
★ 1st choice ☆ suitable

- PU : universal purpose (page 43)
- HPU : universal purpose with inside coolant (page 43)
- TA : general purpose (page 66)
- 4HTA : 4 margins general purpose with inside coolant (page 70)
- SUH : special purpose with inside coolant (page 79)
- ALH : special purpose with inside coolant (page 93)
- SUH MINI : miniature 5xD ÷ 30xD with inside coolant (page 114)
- HL : long 12xD ÷ 30xD (page 147)

SUPER ALLOYS APPLICATION



HARDENED STEEL APPLICATION



- PU : universal purpose (page 43)
- HPU : universal purpose with inside coolant (page 43)
- TA : general purpose (page 66)
- 4HTA : 4 margins general purpose with inside coolant (page 70)
- SUH : special purpose with inside coolant (page 79)
- HRC : special purpose (page 103)
- SUH MINI : miniature 5xD ÷ 30xD with inside coolant (page 114)
- HL : long 12xD ÷ 30xD (page 147)
- HSD : step drill with inside coolant (page 175)



INFO

CARBIDE  
DRILLS

**PU-HPU**

TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

## TYPHOON PU-HPU

HIGH PERFORMANCE - UNIVERSAL APPLICATION

- 🇺🇸 Universal high performance drills for ISO P, M, K, N, S.
- 🇮🇹 Punte universali ad alto rendimento per applicazione su materiali ISO P, M, K, N, S.
- 🇩🇪 Universelle Hochleistungsbohrer für Anwendungen auf den Materialien ISO P, M, K, N, S.
- 🇫🇷 Forets universels haute performance pour des applications sur des matériaux ISO P, M, K, N, S.
- 🇪🇸 Puntas universales de alto rendimiento para aplicación en materiales ISO P, M, K, N, S.
- 🇷🇺 Универсальные высокопроизводительные сверла для обработки материалов по ISO P, M, K, N, S.

**TYPHOON PU-HPU**
**HIGH PERFORMANCE - UNIVERSAL APPLICATION**

INFO

**CARBIDE  
DRILLS**
**PU-HPU**

 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

**PU**

**HPU**


- Self-centering geometry for accurate holes
- Reinforced geometry for higher feed rate
- Wide flute for smoother chip ejection
- Straight cutting edge: high chipping resistance and short chip shape
- Thicker chisel edge: enables higher feed rate
- 45° chamfer for wear and chipping protection
- Selected substrate and last generation coating for great wear resistance and long life even at high cutting speed



- Affûtage autocentré pour des trous précis
- Géométrie renforcée pour des vitesses d'avance élevées
- Géométrie des goujures large pour une évacuation meilleure des copeaux
- Géométrie de l'arête rectiligne : très robuste, elle permet de former des copeaux courts
- Géométrie de l'arête transversale : épaissie pour permettre des avancements plus élevés
- Angles de l'arête biseautés à 45° pour les protéger de l'usure et des éclats
- Substrat en carbure et revêtement spécifique pour garantir une longue durée à des vitesses de coupe élevées



- Affilatura autocentrante per fori precisi
- Geometria rinforzata per elevati avanzamenti
- Geometria gole ampia per una migliore evacuazione dei trucioli
- Geometria del tagliente rettilineo: molto robusta che permette di formare trucioli corti
- Geometria del tagliente trasversale: inspessita per consentire avanzamenti più elevati
- Spigoli del tagliente smussati a 45° per proteggerli da usura e scheggiature
- Substrato in metallo duro e rivestimento specifici per garantire lunga durata anche a velocità di taglio elevate



- Afilado autocentrante para agujeros precisos
- Geometría reforzada para elevados avances
- Geometría de las ranuras amplia para una mejor evacuación de las virutas
- Geometría del filo rectilíneo: muy resistente, que permite formar virutas cortas
- Geometría del filo transversal: engrosada para permitir avances más elevados
- Ángulos del filo redondeados a 45° para protegerlos del desgaste y astillado
- Sustrato en metal duro y revestimiento específicos para garantizar una larga duración incluso a velocidades de corte elevadas



- Selbstzentrierender Schliff für präzise Bohrungen
- Verstärkte Geometrie für erhöhten Vorschub
- Breite Geometrie der Nuten für eine verbesserte Späneabführung
- Gerade Geometrie der Schneidkante: äußerst robust, wodurch kurze Späne erzeugt werden
- Transversale Geometrie der Schneidkante: verstärkt für erhöhten Vorschub
- Im 45°-Winkel angefasste Schneidkanten zum Schutz gegen Verschleiß und Absplittern
- Trägermaterial aus Hartmetall und spezielle Beschichtung zur Gewährleistung einer langen Lebensdauer auch bei hohen Schnittgeschwindigkeiten



- Самоцентрирующаяся заточка для сверления отверстий высокой точности
- Усиленная геометрия для работы с высокими подачами
- Широкие канавки для хорошего отвода стружки
- Прямые режущие кромки: формирование короткой стружки и предотвращение ее пакетирования
- Увеличенная перемычка: позволяет увеличить подачу
- Фаски 45° для защиты от износа и пакетирования стружки
- Специальное покрытие последнего поколения для повышения стойкости и надежности при работе с высокими скоростями резания

 HSS  
 DRILLS

 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE  
END-MILLS**

 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

 HSS  
 END-MILLS

**CARBIDE  
BURRS**



# 353PU-353HPU

universal application, high productivity

3XD

DIN  
6537K

PU

HPU

MG  
PV250

140°+C45°

30°

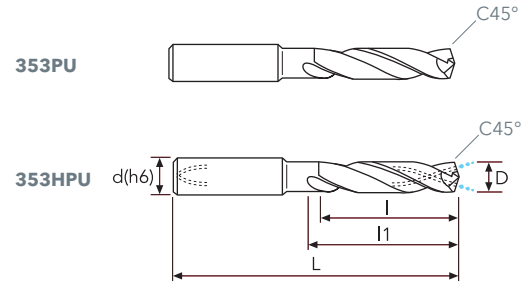
**353PU 353HPU**

INFO



P	M	K	N	S	H
★	★	★	☆	★	

★ 1st choice ☆ suitable



CARBIDE  
DRILLS

- PU-HPU**
- TA-4HTA
  - SUH
  - ALH
  - HRC
  - SUH MINI
  - HL
  - HSD
  - C-SD-TA

D(m7)	D Tol.	d(h6)	l	l1	L	353PU		353HPU	
						EDP No.	Stock	EDP No.	Stock
3.00	+0.012/+0.002	6	14	20	62	353PU0300	●	353HPU0300	●
3.10	+0.016/+0.004	6	14	20	62	353PU0310	●	353HPU0310	●
3.20	+0.016/+0.004	6	14	20	62	353PU0320	●	353HPU0320	●
3.30	+0.016/+0.004	6	14	20	62	353PU0330	●	353HPU0330	●
3.40	+0.016/+0.004	6	14	20	62	353PU0340	●	353HPU0340	●
3.50	+0.016/+0.004	6	14	20	62	353PU0350	●	353HPU0350	●
3.60	+0.016/+0.004	6	14	20	62	353PU0360	●	353HPU0360	●
3.70	+0.016/+0.004	6	14	20	62	353PU0370	●	353HPU0370	●
3.80	+0.016/+0.004	6	17	24	66	353PU0380	●	353HPU0380	●
3.90	+0.016/+0.004	6	17	24	66	353PU0390	●	353HPU0390	●
4.00	+0.016/+0.004	6	17	24	66	353PU0400	●	353HPU0400	●
4.10	+0.016/+0.004	6	17	24	66	353PU0410	●	353HPU0410	●
4.20	+0.016/+0.004	6	17	24	66	353PU0420	●	353HPU0420	●
4.30	+0.016/+0.004	6	17	24	66	353PU0430	●	353HPU0430	●
4.40	+0.016/+0.004	6	17	24	66	353PU0440	●	353HPU0440	●
4.50	+0.016/+0.004	6	17	24	66	353PU0450	●	353HPU0450	●
4.60	+0.016/+0.004	6	17	24	66	353PU0460	●	353HPU0460	●
4.70	+0.016/+0.004	6	17	24	66	353PU0470	●	353HPU0470	●
4.80	+0.016/+0.004	6	20	28	66	353PU0480	●	353HPU0480	●
4.90	+0.016/+0.004	6	20	28	66	353PU0490	●	353HPU0490	●
5.00	+0.016/+0.004	6	20	28	66	353PU0500	●	353HPU0500	●
5.10	+0.016/+0.004	6	20	28	66	353PU0510	●	353HPU0510	●
5.20	+0.016/+0.004	6	20	28	66	353PU0520	●	353HPU0520	●
5.30	+0.016/+0.004	6	20	28	66	353PU0530	●	353HPU0530	●
5.40	+0.016/+0.004	6	20	28	66	353PU0540	●	353HPU0540	●
5.50	+0.016/+0.004	6	20	28	66	353PU0550	●	353HPU0550	●
5.60	+0.016/+0.004	6	20	28	66	353PU0560	●	353HPU0560	●
5.70	+0.016/+0.004	6	20	28	66	353PU0570	●	353HPU0570	●
5.80	+0.016/+0.004	6	20	28	66	353PU0580	●	353HPU0580	●
5.90	+0.016/+0.004	6	20	28	66	353PU0590	●	353HPU0590	●
6.00	+0.016/+0.004	6	20	28	66	353PU0600	●	353HPU0600	●
6.10	+0.021/+0.006	8	24	34	79	353PU0610	●	353HPU0610	●
6.20	+0.021/+0.006	8	24	34	79	353PU0620	●	353HPU0620	●
6.30	+0.021/+0.006	8	24	34	79	353PU0630	●	353HPU0630	●
6.40	+0.021/+0.006	8	24	34	79	353PU0640	●	353HPU0640	●
6.50	+0.021/+0.006	8	24	34	79	353PU0650	●	353HPU0650	●
6.60	+0.021/+0.006	8	24	34	79	353PU0660	●	353HPU0660	●
6.70	+0.021/+0.006	8	24	34	79	353PU0670	●	353HPU0670	●
6.80	+0.021/+0.006	8	24	34	79	353PU0680	●	353HPU0680	●

HSS  
DRILLS

- LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

- G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

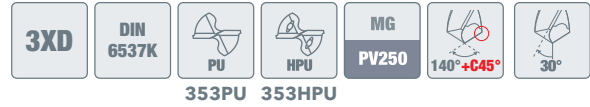
CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 353PU-353HPU

universal application, high productivity



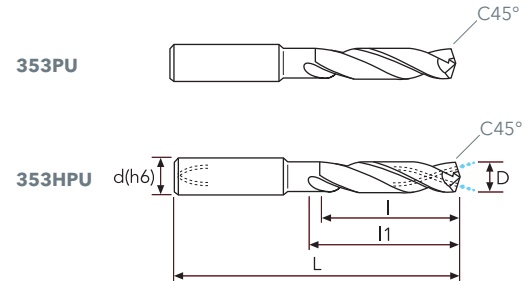
CARBIDE DRILLS

PU-HPU

- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	★	☆	★	★

★ 1st choice ☆ suitable



D(m7)	D Tol.	d(h6)	l	l1	L	353PU		353HPU	
						EDP No.	Stock	EDP No.	Stock
6.90	+0.021/+0.006	8	24	34	79	353PU0690	●	353HPU0690	●
7.00	+0.021/+0.006	8	24	34	79	353PU0700	●	353HPU0700	●
7.10	+0.021/+0.006	8	29	41	79	353PU0710	●	353HPU0710	●
7.20	+0.021/+0.006	8	29	41	79	353PU0720	●	353HPU0720	●
7.30	+0.021/+0.006	8	29	41	79	353PU0730	●	353HPU0730	●
7.40	+0.021/+0.006	8	29	41	79	353PU0740	●	353HPU0740	●
7.50	+0.021/+0.006	8	29	41	79	353PU0750	●	353HPU0750	●
7.60	+0.021/+0.006	8	29	41	79	353PU0760	●	353HPU0760	●
7.70	+0.021/+0.006	8	29	41	79	353PU0770	●	353HPU0770	●
7.80	+0.021/+0.006	8	29	41	79	353PU0780	●	353HPU0780	●
7.90	+0.021/+0.006	8	29	41	79	353PU0790	●	353HPU0790	●
8.00	+0.021/+0.006	8	29	41	79	353PU0800	●	353HPU0800	●
8.10	+0.021/+0.006	10	35	47	89	353PU0810	●	353HPU0810	●
8.20	+0.021/+0.006	10	35	47	89	353PU0820	●	353HPU0820	●
8.30	+0.021/+0.006	10	35	47	89	353PU0830	●	353HPU0830	●
8.40	+0.021/+0.006	10	35	47	89	353PU0840	●	353HPU0840	●
8.50	+0.021/+0.006	10	35	47	89	353PU0850	●	353HPU0850	●
8.60	+0.021/+0.006	10	35	47	89	353PU0860	●	353HPU0860	●
8.70	+0.021/+0.006	10	35	47	89	353PU0870	●	353HPU0870	●
8.80	+0.021/+0.006	10	35	47	89	353PU0880	●	353HPU0880	●
8.90	+0.021/+0.006	10	35	47	89	353PU0890	●	353HPU0890	●
9.00	+0.021/+0.006	10	35	47	89	353PU0900	●	353HPU0900	●
9.10	+0.021/+0.006	10	35	47	89	353PU0910	●	353HPU0910	●
9.20	+0.021/+0.006	10	35	47	89	353PU0920	●	353HPU0920	●
9.30	+0.021/+0.006	10	35	47	89	353PU0930	●	353HPU0930	●
9.40	+0.021/+0.006	10	35	47	89	353PU0940	●	353HPU0940	●
9.50	+0.021/+0.006	10	35	47	89	353PU0950	●	353HPU0950	●
9.60	+0.021/+0.006	10	35	47	89	353PU0960	●	353HPU0960	●
9.70	+0.021/+0.006	10	35	47	89	353PU0970	●	353HPU0970	●
9.80	+0.021/+0.006	10	35	47	89	353PU0980	●	353HPU0980	●
9.90	+0.021/+0.006	10	35	47	89	353PU0990	●	353HPU0990	●
10.00	+0.021/+0.006	10	35	47	89	353PU1000	●	353HPU1000	●
10.10	+0.025/+0.007	12	40	55	102	353PU1010	●	353HPU1010	●
10.20	+0.025/+0.007	12	40	55	102	353PU1020	●	353HPU1020	●
10.30	+0.025/+0.007	12	40	55	102	353PU1030	●	353HPU1030	●
10.40	+0.025/+0.007	12	40	55	102	353PU1040	●	353HPU1040	●
10.50	+0.025/+0.007	12	40	55	102	353PU1050	●	353HPU1050	●
10.60	+0.025/+0.007	12	40	55	102	353PU1060	●	353HPU1060	●
10.70	+0.025/+0.007	12	40	55	102	353PU1070	●	353HPU1070	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

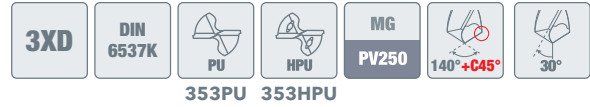
HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

# 353PU-353HPU

universal application, high productivity

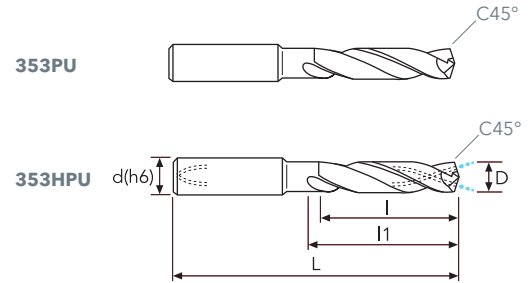


INFO



P	M	K	N	S	H
★	★	★	☆	★	

★ 1st choice ☆ suitable



CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D(m7)	D Tol.	d(h6)	l	l1	L	353PU		353HPU	
						EDP No.	Stock	EDP No.	Stock
10.80	+0.025/+0.007	12	40	55	102	353PU1080	●	353HPU1080	●
10.90	+0.025/+0.007	12	40	55	102	353PU1090	●	353HPU1090	●
11.00	+0.025/+0.007	12	40	55	102	353PU1100	●	353HPU1100	●
11.10	+0.025/+0.007	12	40	55	102	353PU1110	●	353HPU1110	●
11.20	+0.025/+0.007	12	40	55	102	353PU1120	●	353HPU1120	●
11.30	+0.025/+0.007	12	40	55	102	353PU1130	●	353HPU1130	●
11.40	+0.025/+0.007	12	40	55	102	353PU1140	●	353HPU1140	●
11.50	+0.025/+0.007	12	40	55	102	353PU1150	●	353HPU1150	●
11.60	+0.025/+0.007	12	40	55	102	353PU1160	●	353HPU1160	●
11.70	+0.025/+0.007	12	40	55	102	353PU1170	●	353HPU1170	●
11.80	+0.025/+0.007	12	40	55	102	353PU1180	●	353HPU1180	●
11.90	+0.025/+0.007	12	40	55	102	353PU1190	●	353HPU1190	●
12.00	+0.025/+0.007	12	40	55	102	353PU1200	●	353HPU1200	●
12.10	+0.025/+0.007	14	43	60	107	353PU1210	●	353HPU1210	●
12.20	+0.025/+0.007	14	43	60	107	353PU1220	●	353HPU1220	●
12.30	+0.025/+0.007	14	43	60	107	353PU1230	●	353HPU1230	●
12.40	+0.025/+0.007	14	43	60	107	353PU1240	●	353HPU1240	●
12.50	+0.025/+0.007	14	43	60	107	353PU1250	●	353HPU1250	●
12.60	+0.025/+0.007	14	43	60	107	353PU1260	●	353HPU1260	●
12.70	+0.025/+0.007	14	43	60	107	353PU1270	●	353HPU1270	●
12.80	+0.025/+0.007	14	43	60	107	353PU1280	●	353HPU1280	●
12.90	+0.025/+0.007	14	43	60	107	353PU1290	●	353HPU1290	●
13.00	+0.025/+0.007	14	43	60	107	353PU1300	●	353HPU1300	●
13.10	+0.025/+0.007	14	43	60	107	353PU1310	●	353HPU1310	●
13.20	+0.025/+0.007	14	43	60	107	353PU1320	●	353HPU1320	●
13.30	+0.025/+0.007	14	43	60	107	353PU1330	●	353HPU1330	●
13.40	+0.025/+0.007	14	43	60	107	353PU1340	●	353HPU1340	●
13.50	+0.025/+0.007	14	43	60	107	353PU1350	●	353HPU1350	●
13.60	+0.025/+0.007	14	43	60	107	353PU1360	●	353HPU1360	●
13.70	+0.025/+0.007	14	43	60	107	353PU1370	●	353HPU1370	●
13.80	+0.025/+0.007	14	43	60	107	353PU1380	●	353HPU1380	●
13.90	+0.025/+0.007	14	43	60	107	353PU1390	●	353HPU1390	●
14.00	+0.025/+0.007	14	43	60	107	353PU1400	●	353HPU1400	●
14.10	+0.025/+0.007	16	45	65	115	353PU1410	●	353HPU1410	●
14.20	+0.025/+0.007	16	45	65	115	353PU1420	●	353HPU1420	●
14.30	+0.025/+0.007	16	45	65	115	353PU1430	●	353HPU1430	●
14.50	+0.025/+0.007	16	45	65	115	353PU1450	●	353HPU1450	●
14.60	+0.025/+0.007	16	45	65	115	353PU1460	●	353HPU1460	●
14.70	+0.025/+0.007	16	45	65	115	353PU1470	●	353HPU1460	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 353PU-353HPU

universal application, high productivity

3XD

DIN  
6537K

PU

HPU

MG  
PV250

140°+C45°

30°

**353PU 353HPU**



**353PU**



**353HPU**

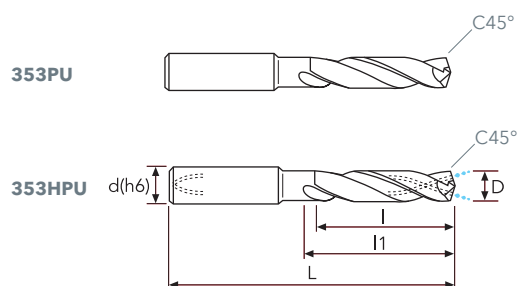
CARBIDE  
DRILLS

PU-HPU

- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	★	☆	★	

★ 1st choice ☆ suitable



HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

D(m7)	D Tol.	d(h6)	l	l1	L	353PU		353HPU	
						EDP No.	Stock	EDP No.	Stock
14.80	+0.025/+0.007	16	45	65	115	353PU1480	●	353HPU1480	●
15.00	+0.025/+0.007	16	65	65	115	353PU1500	●	353HPU1500	●
15.10	+0.025/+0.007	16	65	65	115	353PU1510	●	353HPU1510	●
15.20	+0.025/+0.007	16	65	65	115	353PU1520	●	353HPU1520	●
15.30	+0.025/+0.007	16	65	65	115	353PU1530	●	353HPU1530	●
15.50	+0.025/+0.007	16	65	65	115	353PU1550	●	353HPU1550	●
15.60	+0.025/+0.007	16	65	65	115	353PU1560	●	353HPU1560	●
15.70	+0.025/+0.007	16	65	65	115	353PU1570	●	353HPU1570	●
15.80	+0.025/+0.007	16	65	65	115	353PU1580	●	353HPU1580	●
16.00	+0.025/+0.007	16	65	65	115	353PU1600	●	353HPU1600	●
16.10	+0.025/+0.007	18	73	73	123			353HPU1610	●
16.20	+0.025/+0.007	18	73	73	123			353HPU1620	●
16.30	+0.025/+0.007	18	73	73	123			353HPU1630	●
16.50	+0.025/+0.007	18	73	73	123	353PU1650	●	353HPU1650	●
16.70	+0.025/+0.007	18	73	73	123			353HPU1670	●
16.80	+0.025/+0.007	18	73	73	123			353HPU1680	●
17.00	+0.025/+0.007	18	73	73	123	353PU1700	●	353HPU1700	●
17.10	+0.025/+0.007	18	73	73	123			353HPU1710	●
17.20	+0.025/+0.007	18	73	73	123			353HPU1720	●
17.50	+0.025/+0.007	18	73	73	123	353PU1750	●	353HPU1750	●
17.60	+0.025/+0.007	18	73	73	123			353HPU1760	●
17.70	+0.025/+0.007	18	73	73	123			353HPU1770	●
17.80	+0.025/+0.007	18	73	73	123			353HPU1780	●
18.00	+0.025/+0.007	18	73	73	123	353PU1800	●	353HPU1800	●
18.10	+0.029/+0.008	20	79	79	131			353HPU1810	●
18.20	+0.029/+0.008	20	79	79	131			353HPU1820	●
18.30	+0.029/+0.008	20	79	79	131			353HPU1830	●
18.50	+0.029/+0.008	20	79	79	131	353PU1850	●	353HPU1850	●
18.60	+0.029/+0.008	20	79	79	131			353HPU1860	●
18.70	+0.029/+0.008	20	79	79	131			353HPU1870	●
18.80	+0.029/+0.008	20	79	79	131			353HPU1880	●
19.00	+0.029/+0.008	20	79	79	131	353PU1900	●	353HPU1900	●
19.20	+0.029/+0.008	20	79	79	131			353HPU1920	●
19.30	+0.029/+0.008	20	79	79	131			353HPU1930	●
19.50	+0.029/+0.008	20	79	79	131	353PU1950	●	353HPU1950	●
19.60	+0.029/+0.008	20	79	79	131			353HPU1960	●
19.80	+0.029/+0.008	20	79	79	131			353HPU1980	●
20.00	+0.029/+0.008	20	79	79	131	353PU2000	●	353HPU2000	●

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

### 353PU

Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8	
	Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
	Vc (m/min)	<b>100÷140</b>	<b>80÷120</b>	<b>60÷85</b>	<b>50÷65</b>	<b>35÷50</b>	<b>20÷30</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
3	0.120	0.108	0.096	0.084	0.074	0.044	
4	0.142	0.128	0.114	0.099	0.087	0.052	
5	0.164	0.147	0.131	0.115	0.101	0.061	
6	0.186	0.167	0.149	0.130	0.120	0.072	
7	0.208	0.187	0.166	0.145	0.134	0.081	
8	0.229	0.206	0.184	0.161	0.148	0.089	
9	0.251	0.226	0.201	0.176	0.162	0.097	
10	0.273	0.246	0.219	0.191	0.177	0.106	
11	0.284	0.256	0.227	0.199	0.184	0.110	
12	0.306	0.275	0.245	0.214	0.198	0.119	
13	0.328	0.295	0.262	0.229	0.212	0.127	
14	0.350	0.315	0.280	0.245	0.226	0.136	
15	0.371	0.334	0.297	0.260	0.240	0.144	
16	0.393	0.354	0.315	0.275	0.246	0.147	
17	0.404	0.364	0.323	0.283	0.249	0.149	
18	0.415	0.374	0.332	0.291	0.256	0.153	
19	0.426	0.383	0.341	0.298	0.262	0.157	
20	0.437	0.393	0.350	0.306	0.269	0.161	



### 353HPU

Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8	
	Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
	Vc (m/min)	<b>120÷160</b>	<b>100÷140</b>	<b>70÷100</b>	<b>60÷80</b>	<b>50÷70</b>	<b>25÷40</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
3	0.127	0.114	0.101	0.089	0.082	0.049	
4	0.150	0.135	0.120	0.105	0.097	0.058	
5	0.173	0.155	0.138	0.121	0.112	0.067	
6	0.196	0.176	0.156	0.137	0.133	0.080	
7	0.219	0.197	0.175	0.153	0.149	0.089	
8	0.242	0.217	0.193	0.169	0.165	0.099	
9	0.265	0.238	0.212	0.185	0.181	0.108	
10	0.288	0.259	0.230	0.201	0.196	0.118	
11	0.299	0.269	0.239	0.209	0.204	0.122	
12	0.322	0.290	0.258	0.225	0.220	0.132	
13	0.345	0.311	0.276	0.242	0.235	0.141	
14	0.368	0.331	0.294	0.258	0.251	0.151	
15	0.391	0.352	0.313	0.274	0.267	0.160	
16	0.414	0.373	0.331	0.290	0.273	0.163	
17	0.426	0.383	0.340	0.298	0.277	0.166	
18	0.437	0.393	0.350	0.306	0.284	0.170	
19	0.449	0.404	0.359	0.314	0.292	0.175	
20	0.460	0.414	0.368	0.322	0.299	0.179	



INFO

CARBIDE  
DRILLS

PU-HPU

TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

### 353PU

CARBIDE  
DRILLS

PU-HPU

TA-4HTA

SUH

ALH

HRC

SUH MINI

HL

HSD

C-SD-TA



Material Group ISO 513	M1	M2	M3			
Hardness/Rm	<750 N/mm <sup>2</sup>	550÷850 N/mm <sup>2</sup>	650÷950 N/mm <sup>2</sup>			
Vc (m/min)	<b>35÷50</b>	<b>30÷45</b>	<b>20÷35</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
3	0.067	0.053	0.047			
4	0.079	0.063	0.055			
5	0.101	0.081	0.064			
6	0.114	0.091	0.072			
7	0.128	0.102	0.081			
8	0.141	0.113	0.089			
9	0.155	0.124	0.097			
10	0.168	0.135	0.106			
11	0.175	0.140	0.110			
12	0.188	0.151	0.119			
13	0.202	0.161	0.127			
14	0.215	0.172	0.136			
15	0.229	0.183	0.144			
16	0.242	0.194	0.153			
17	0.249	0.199	0.157			
18	0.256	0.205	0.161			
19	0.262	0.210	0.165			
20	0.269	0.215	0.170			

HSS  
DRILLS

### 353HPU

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2

MDTA

HF VH/UP

MEF

ALU

MEX/MH

UH/MH



Material Group ISO 513	M1	M2	M3			
Hardness/Rm	<750 N/mm <sup>2</sup>	550÷850 N/mm <sup>2</sup>	650÷950 N/mm <sup>2</sup>			
Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>30÷45</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
3	0.074	0.059	0.052			
4	0.087	0.070	0.061			
5	0.112	0.090	0.071			
6	0.127	0.102	0.080			
7	0.142	0.114	0.089			
8	0.157	0.126	0.099			
9	0.172	0.138	0.108			
10	0.187	0.150	0.118			
11	0.194	0.155	0.122			
12	0.209	0.167	0.132			
13	0.224	0.179	0.141			
14	0.239	0.191	0.151			
15	0.254	0.203	0.160			
16	0.269	0.215	0.170			
17	0.277	0.221	0.174			
18	0.284	0.227	0.179			
19	0.292	0.233	0.184			
20	0.299	0.239	0.188			

HSS  
END-MILLS

CARBIDE  
BURRS

CUTTING PARAMETERS

### 353PU

	Material Group ISO 513	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>K4</b>		
	Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
	Vc (m/min)	<b>110÷150</b>	<b>90÷120</b>	<b>60÷80</b>	<b>40÷60</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
	<b>3</b>	0.120	0.108	0.096	0.084		
<b>4</b>	0.142	0.128	0.114	0.099			
<b>5</b>	0.164	0.147	0.131	0.115			
<b>6</b>	0.186	0.167	0.149	0.130			
<b>7</b>	0.208	0.187	0.166	0.145			
<b>8</b>	0.229	0.206	0.184	0.161			
<b>9</b>	0.251	0.226	0.201	0.176			
<b>10</b>	0.273	0.246	0.219	0.191			
<b>11</b>	0.284	0.256	0.227	0.199			
<b>12</b>	0.306	0.275	0.245	0.214			
<b>13</b>	0.328	0.295	0.262	0.229			
<b>14</b>	0.350	0.315	0.280	0.245			
<b>15</b>	0.371	0.334	0.297	0.260			
<b>16</b>	0.393	0.354	0.315	0.275			
<b>17</b>	0.404	0.364	0.323	0.283			
<b>18</b>	0.415	0.374	0.332	0.291			
<b>19</b>	0.426	0.383	0.341	0.298			
<b>20</b>	0.437	0.393	0.350	0.306			

### 353HPU

	Material Group ISO 513	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>K4</b>		
	Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
	Vc (m/min)	<b>120÷160</b>	<b>100÷140</b>	<b>80÷100</b>	<b>60÷80</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
	<b>3</b>	0.127	0.114	0.101	0.089		
<b>4</b>	0.150	0.135	0.120	0.105			
<b>5</b>	0.173	0.155	0.138	0.121			
<b>6</b>	0.196	0.176	0.156	0.137			
<b>7</b>	0.219	0.197	0.175	0.153			
<b>8</b>	0.242	0.217	0.193	0.169			
<b>9</b>	0.265	0.238	0.212	0.185			
<b>10</b>	0.288	0.259	0.230	0.201			
<b>11</b>	0.299	0.269	0.239	0.209			
<b>12</b>	0.322	0.290	0.258	0.225			
<b>13</b>	0.345	0.311	0.276	0.242			
<b>14</b>	0.368	0.331	0.294	0.258			
<b>15</b>	0.391	0.352	0.313	0.274			
<b>16</b>	0.414	0.373	0.331	0.290			
<b>17</b>	0.426	0.383	0.340	0.298			
<b>18</b>	0.437	0.393	0.350	0.306			
<b>19</b>	0.449	0.404	0.359	0.314			
<b>20</b>	0.460	0.414	0.368	0.322			

INFO

CARBIDE DRILLS

PU-HPU

- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

### 353PU

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	N1	N2	N3	N4		
Hardness/Rm	> 5%Si					
Vc (m/min)	<b>220±260</b>	<b>200±240</b>	<b>160±200</b>	<b>160±200</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3	0.144	0.132	0.120	0.120		
4	0.170	0.156	0.142	0.142		
5	0.197	0.180	0.164	0.164		
6	0.223	0.204	0.186	0.186		
7	0.249	0.228	0.208	0.208		
8	0.275	0.252	0.229	0.229		
9	0.302	0.276	0.251	0.251		
10	0.328	0.300	0.273	0.273		
11	0.341	0.312	0.284	0.284		
12	0.367	0.336	0.306	0.306		
13	0.393	0.361	0.328	0.328		
14	0.420	0.385	0.350	0.350		
15	0.446	0.409	0.371	0.371		
16	0.472	0.433	0.393	0.393		
17	0.485	0.445	0.404	0.404		
18	0.498	0.457	0.415	0.415		
19	0.511	0.469	0.426	0.426		
20	0.524	0.481	0.437	0.437		

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

### 353HPU

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	N1	N2	N3	N4		
Hardness/Rm	> 5%Si					
Vc (m/min)	<b>260±300</b>	<b>220±260</b>	<b>180±220</b>	<b>180±220</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3	0.152	0.139	0.127	0.127		
4	0.179	0.164	0.150	0.150		
5	0.207	0.190	0.173	0.173		
6	0.235	0.215	0.196	0.196		
7	0.262	0.240	0.219	0.219		
8	0.290	0.266	0.242	0.242		
9	0.317	0.291	0.265	0.265		
10	0.345	0.316	0.288	0.288		
11	0.359	0.329	0.299	0.299		
12	0.386	0.354	0.322	0.322		
13	0.414	0.380	0.345	0.345		
14	0.442	0.405	0.368	0.368		
15	0.469	0.430	0.391	0.391		
16	0.497	0.455	0.414	0.414		
17	0.511	0.468	0.426	0.426		
18	0.524	0.481	0.437	0.437		
19	0.538	0.493	0.449	0.449		
20	0.552	0.506	0.460	0.460		

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

### 353PU

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	<b>15÷25</b>	<b>10÷20</b>	<b>20÷30</b>	<b>15÷25</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
	3	0.054	0.049	0.037	0.031		
4	0.064	0.058	0.043	0.037			
5	0.074	0.066	0.050	0.042			
6	0.084	0.075	0.057	0.048			
7	0.093	0.084	0.064	0.053			
8	0.103	0.093	0.070	0.059			
9	0.113	0.102	0.077	0.065			
10	0.123	0.111	0.084	0.070			
11	0.128	0.115	0.087	0.073			
12	0.138	0.124	0.094	0.079			
13	0.147	0.133	0.100	0.084			
14	0.157	0.142	0.107	0.090			
15	0.167	0.150	0.114	0.096			
16	0.177	0.159	0.120	0.101			
17	0.182	0.164	0.124	0.104			
18	0.187	0.168	0.127	0.107			
19	0.192	0.173	0.130	0.110			
20	0.197	0.177	0.134	0.113			

### 353HPU

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	<b>30÷40</b>	<b>25÷35</b>	<b>40÷50</b>	<b>30÷40</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
	3	0.057	0.054	0.046	0.039		
4	0.067	0.064	0.054	0.046			
5	0.078	0.074	0.063	0.053			
6	0.088	0.084	0.071	0.060			
7	0.098	0.093	0.079	0.067			
8	0.109	0.103	0.088	0.074			
9	0.119	0.113	0.096	0.081			
10	0.129	0.123	0.104	0.088			
11	0.135	0.128	0.109	0.091			
12	0.145	0.138	0.117	0.099			
13	0.155	0.147	0.125	0.106			
14	0.166	0.157	0.134	0.113			
15	0.176	0.167	0.142	0.120			
16	0.186	0.177	0.150	0.127			
17	0.191	0.182	0.155	0.130			
18	0.197	0.187	0.159	0.134			
19	0.202	0.192	0.163	0.137			
20	0.207	0.197	0.167	0.141			

INFO

CARBIDE DRILLS

PU-HPU

- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

# 355PU-355HPU

universal application, high productivity

5XD

DIN 6537L

MG  
PV250

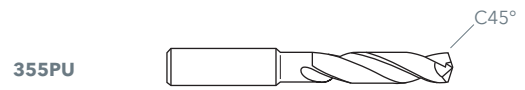
**355PU 355HPU**



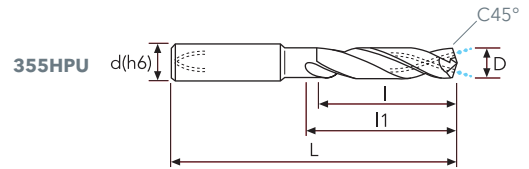
355PU



355HPU



355PU



355HPU

CARBIDE DRILLS

PU-HPU

TA-4HTA

SUH

ALH

HRC

SUH MINI

HL

HSD

C-SD-TA

P	M	K	N	S	H
★	★	★	☆	★	

★ 1st choice ☆ suitable

HSS DRILLS

LFTA

SUTA

HSS-HSS/CO

CARBIDE END-MILLS

G2

MDTA

HFVH/UP

MEF

ALU

MEX/MH

UH/MH

HSS END-MILLS

CARBIDE BURRS

D(m7)	D Tol.	d(h6)	l	l1	L	355PU		355HPU	
						EDP No.	Stock	EDP No.	Stock
3.00	+0.012/+0.002	6	23	28	66	355PU0300	●	355HPU0300	●
3.10	+0.016/+0.004	6	23	28	66	355PU0310	●	355HPU0310	●
3.20	+0.016/+0.004	6	23	28	66	355PU0320	●	355HPU0320	●
3.25	+0.016/+0.004	6	23	28	66			355HPU0325	●
3.30	+0.016/+0.004	6	23	28	66	355PU0330	●	355HPU0330	●
3.40	+0.016/+0.004	6	23	28	66	355PU0340	●	355HPU0340	●
3.50	+0.016/+0.004	6	23	28	66	355PU0350	●	355HPU0350	●
3.60	+0.016/+0.004	6	23	28	66	355PU0360	●	355HPU0360	●
3.70	+0.016/+0.004	6	23	28	66	355PU0370	●	355HPU0370	●
3.80	+0.016/+0.004	6	29	36	74	355PU0380	●	355HPU0380	●
3.90	+0.016/+0.004	6	29	36	74	355PU0390	●	355HPU0390	●
4.00	+0.016/+0.004	6	29	36	74	355PU0400	●	355HPU0400	●
4.10	+0.016/+0.004	6	29	36	74	355PU0410	●	355HPU0410	●
4.20	+0.016/+0.004	6	29	36	74	355PU0420	●	355HPU0420	●
4.30	+0.016/+0.004	6	29	36	74	355PU0430	●	355HPU0430	●
4.40	+0.016/+0.004	6	29	36	74	355PU0440	●	355HPU0440	●
4.50	+0.016/+0.004	6	29	36	74	355PU0450	●	355HPU0450	●
4.60	+0.016/+0.004	6	29	36	74	355PU0460	●	355HPU0460	●
4.65	+0.016/+0.004	6	29	36	74			355HPU0465	●
4.70	+0.016/+0.004	6	29	36	74	355PU0470	●	355HPU0470	●
4.80	+0.016/+0.004	6	35	44	82	355PU0480	●	355HPU0480	●
4.90	+0.016/+0.004	6	35	44	82	355PU0490	●	355HPU0490	●
5.00	+0.016/+0.004	6	35	44	82	355PU0500	●	355HPU0500	●
5.10	+0.016/+0.004	6	35	44	82	355PU0510	●	355HPU0510	●
5.20	+0.016/+0.004	6	35	44	82	355PU0520	●	355HPU0520	●
5.30	+0.016/+0.004	6	35	44	82	355PU0530	●	355HPU0530	●
5.40	+0.016/+0.004	6	35	44	82	355PU0540	●	355HPU0540	●
5.50	+0.016/+0.004	6	35	44	82	355PU0550	●	355HPU0550	●
5.55	+0.016/+0.004	6	35	44	82			355HPU0555	●
5.60	+0.016/+0.004	6	35	44	82	355PU0560	●	355HPU0560	●
5.70	+0.016/+0.004	6	35	44	82	355PU0570	●	355HPU0570	●
5.80	+0.016/+0.004	6	35	44	82	355PU0580	●	355HPU0580	●
5.90	+0.016/+0.004	6	35	44	82	355PU0590	●	355HPU0590	●
6.00	+0.016/+0.004	6	35	44	82	355PU0600	●	355HPU0600	●
6.10	+0.021/+0.006	8	43	53	91	355PU0610	●	355HPU0610	●
6.20	+0.021/+0.006	8	43	53	91	355PU0620	●	355HPU0620	●
6.30	+0.021/+0.006	8	43	53	91	355PU0630	●	355HPU0630	●
6.40	+0.021/+0.006	8	43	53	91	355PU0640	●	355HPU0640	●
6.50	+0.021/+0.006	8	43	53	91	355PU0650	●	355HPU0650	●

● stock standard ○ non-standard stock ▽ stock exhaustion

# 355PU-355HPU

universal application, high productivity

5XD

DIN  
6537L

PU

HPU

MG  
PV250

140°+C45°

30°

**355PU 355HPU**

INFO



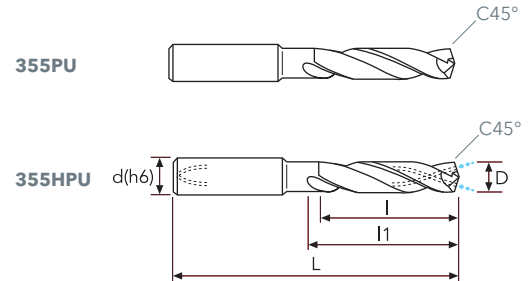
355PU



355HPU

P	M	K	N	S	H
★	★	★	☆	★	

★ 1st choice ☆ suitable



CARBIDE  
DRILLS

- PU-HPU**
- TA-4HTA
  - SUH
  - ALH
  - HRC
  - SUH MINI
  - HL
  - HSD
  - C-SD-TA

D(m7)	D Tol.	d(h6)	l	l1	L	355PU		355HPU	
						EDP No.	Stock	EDP No.	Stock
6.60	+0.021/+0.006	8	43	53	91	355PU0660	●	355HPU0660	●
6.70	+0.021/+0.006	8	43	53	91	355PU0670	●	355HPU0670	●
6.80	+0.021/+0.006	8	43	53	91	355PU0680	●	355HPU0680	●
6.90	+0.021/+0.006	8	43	53	91	355PU0690	●	355HPU0690	●
7.00	+0.021/+0.006	8	43	53	91	355PU0700	●	355HPU0700	●
7.10	+0.021/+0.006	8	43	53	91	355PU0710	●	355HPU0710	●
7.20	+0.021/+0.006	8	43	53	91	355PU0720	●	355HPU0720	●
7.30	+0.021/+0.006	8	43	53	91	355PU0730	●	355HPU0730	●
7.40	+0.021/+0.006	8	43	53	91	355PU0740	●	355HPU0740	●
7.45	+0.021/+0.006	8	43	53	91			355HPU0745	●
7.50	+0.021/+0.006	8	43	53	91	355PU0750	●	355HPU0750	●
7.60	+0.021/+0.006	8	43	53	91	355PU0760	●	355HPU0760	●
7.70	+0.021/+0.006	8	43	53	91	355PU0770	●	355HPU0770	●
7.80	+0.021/+0.006	8	43	53	91	355PU0780	●	355HPU0780	●
7.90	+0.021/+0.006	8	43	53	91	355PU0790	●	355HPU0790	●
8.00	+0.021/+0.006	8	43	53	91	355PU0800	●	355HPU0800	●
8.10	+0.021/+0.006	10	49	61	103	355PU0810	●	355HPU0810	●
8.20	+0.021/+0.006	10	49	61	103	355PU0820	●	355HPU0820	●
8.30	+0.021/+0.006	10	49	61	103	355PU0830	●	355HPU0830	●
8.40	+0.021/+0.006	10	49	61	103	355PU0840	●	355HPU0840	●
8.50	+0.021/+0.006	10	49	61	103	355PU0850	●	355HPU0850	●
8.60	+0.021/+0.006	10	49	61	103	355PU0860	●	355HPU0860	●
8.70	+0.021/+0.006	10	49	61	103	355PU0870	●	355HPU0870	●
8.80	+0.021/+0.006	10	49	61	103	355PU0880	●	355HPU0880	●
8.90	+0.021/+0.006	10	49	61	103	355PU0890	●	355HPU0890	●
9.00	+0.021/+0.006	10	49	61	103	355PU0900	●	355HPU0900	●
9.10	+0.021/+0.006	10	49	61	103	355PU0910	●	355HPU0910	●
9.20	+0.021/+0.006	10	49	61	103	355PU0920	●	355HPU0920	●
9.25	+0.021/+0.006	10	49	61	103			355HPU0925	●
9.30	+0.021/+0.006	10	49	61	103	355PU0930	●	355HPU0930	●
9.35	+0.021/+0.006	10	49	61	103			355HPU0935	●
9.40	+0.021/+0.006	10	49	61	103	355PU0940	●	355HPU0940	●
9.45	+0.021/+0.006	10	49	61	103			355HPU0945	●
9.50	+0.021/+0.006	10	61	61	103	355PU0950	●	355HPU0950	●
9.60	+0.021/+0.006	10	61	61	103	355PU0960	●	355HPU0960	●
9.70	+0.021/+0.006	10	61	61	103	355PU0970	●	355HPU0970	●
9.80	+0.021/+0.006	10	61	61	103	355PU0980	●	355HPU0980	●
9.90	+0.021/+0.006	10	61	61	103	355PU0990	●	355HPU0990	●
10.00	+0.021/+0.006	10	61	61	103	355PU1000	●	355HPU1000	●

HSS  
DRILLS

- LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

- G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 355PU-355HPU

universal application, high productivity

5XD

DIN 6537L

PU

HPU

MG  
PV250

140°+C45°

30°

**355PU 355HPU**



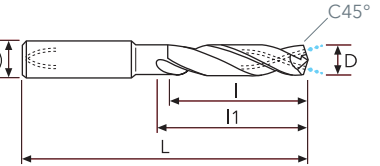
355PU



355HPU



355PU



355HPU

CARBIDE DRILLS

PU-HPU

- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	★	☆	★	

★ 1st choice ☆ suitable

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

D(m7)	D Tol.	d(h6)	l	l1	L	355PU		355HPU	
						EDP No.	Stock	EDP No.	Stock
10.10	+0.025/+0.007	12	71	71	118	355PU1010	●	355HPU1010	●
10.20	+0.025/+0.007	12	71	71	118	355PU1020	●	355HPU1020	●
10.30	+0.025/+0.007	12	71	71	118	355PU1030	●	355HPU1030	●
10.40	+0.025/+0.007	12	71	71	118	355PU1040	●	355HPU1040	●
10.50	+0.025/+0.007	12	71	71	118	355PU1050	●	355HPU1050	●
10.60	+0.025/+0.007	12	71	71	118	355PU1060	●	355HPU1060	●
10.70	+0.025/+0.007	12	71	71	118	355PU1070	●	355HPU1070	●
10.80	+0.025/+0.007	12	71	71	118	355PU1080	●	355HPU1080	●
10.90	+0.025/+0.007	12	71	71	118	355PU1090	●	355HPU1090	●
11.00	+0.025/+0.007	12	71	71	118	355PU1100	●	355HPU1100	●
11.10	+0.025/+0.007	12	71	71	118	355PU1110	●	355HPU1110	●
11.20	+0.025/+0.007	12	71	71	118	355PU1120	●	355HPU1120	●
11.25	+0.025/+0.007	12	71	71	118			355HPU1125	●
11.30	+0.025/+0.007	12	71	71	118	355PU1130	●	355HPU1130	●
11.40	+0.025/+0.007	12	71	71	118	355PU1140	●	355HPU1140	●
11.50	+0.025/+0.007	12	71	71	118	355PU1150	●	355HPU1150	●
11.60	+0.025/+0.007	12	71	71	118	355PU1160	●	355HPU1160	●
11.70	+0.025/+0.007	12	71	71	118	355PU1170	●	355HPU1170	●
11.80	+0.025/+0.007	12	71	71	118	355PU1180	●	355HPU1180	●
11.90	+0.025/+0.007	12	71	71	118	355PU1190	●	355HPU1190	●
12.00	+0.025/+0.007	12	71	71	118	355PU1200	●	355HPU1200	●
12.10	+0.025/+0.007	14	77	77	124	355PU1210	●	355HPU1210	●
12.20	+0.025/+0.007	14	77	77	124	355PU1220	●	355HPU1220	●
12.30	+0.025/+0.007	14	77	77	124			355HPU1230	●
12.40	+0.025/+0.007	14	77	77	124			355HPU1240	●
12.50	+0.025/+0.007	14	77	77	124	355PU1250	●	355HPU1250	●
12.60	+0.025/+0.007	14	77	77	124			355HPU1260	●
12.70	+0.025/+0.007	14	77	77	124	355PU1270	●	355HPU1270	●
12.80	+0.025/+0.007	14	77	77	124	355PU1280	●	355HPU1280	●
12.90	+0.025/+0.007	14	77	77	124			355HPU1290	●
13.00	+0.025/+0.007	14	77	77	124	355PU1300	●	355HPU1300	●
13.10	+0.025/+0.007	14	77	77	124	355PU1310	●	355HPU1310	●
13.20	+0.025/+0.007	14	77	77	124	355PU1320	●	355HPU1320	●
13.30	+0.025/+0.007	14	77	77	124	355PU1330	●	355HPU1330	●
13.40	+0.025/+0.007	14	77	77	124			355HPU1340	●
13.50	+0.025/+0.007	14	77	77	124	355PU1350	●	355HPU1350	●
13.60	+0.025/+0.007	14	77	77	124			355HPU1360	●
13.70	+0.025/+0.007	14	77	77	124	355PU1370	●	355HPU1370	●
13.80	+0.025/+0.007	14	77	77	124	355PU1380	●	355HPU1380	●

● stock standard ○ non-standard stock ▽ stock exhaustion

# 355PU-355HPU

universal application, high productivity

5XD

DIN 6537L

MG PV250

**355PU 355HPU**

INFO



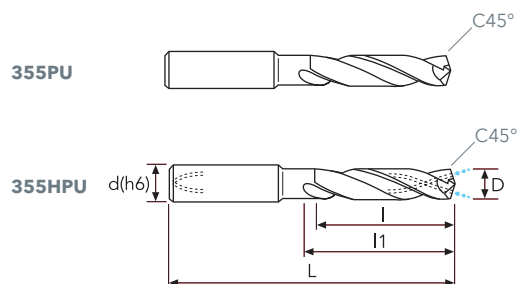
355PU



355HPU

P	M	K	N	S	H
★	★	★	☆	★	

★ 1st choice ☆ suitable



**CARBIDE DRILLS**

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D(m7)	D Tol.	d(h6)	l	l1	L	355PU		355HPU	
						EDP No.	Stock	EDP No.	Stock
13.90	+0.025/+0.007	14	77	77	124			355HPU1390	●
14.00	+0.025/+0.007	14	77	77	124	355PU1400	●	355HPU1400	●
14.10	+0.025/+0.007	16	83	83	133			355HPU1410	●
14.20	+0.025/+0.007	16	83	83	133			355HPU1420	●
14.30	+0.025/+0.007	16	83	83	133			355HPU1430	●
14.40	+0.025/+0.007	16	83	83	133			355HPU1440	●
14.50	+0.025/+0.007	16	83	83	133	355PU1450	●	355HPU1450	●
14.60	+0.025/+0.007	16	83	83	133			355HPU1460	●
14.70	+0.025/+0.007	16	83	83	133			355HPU1470	●
14.80	+0.025/+0.007	16	83	83	133			355HPU1480	●
14.90	+0.025/+0.007	16	83	83	133			355HPU1490	●
15.00	+0.025/+0.007	16	83	83	133	355PU1500	●	355HPU1500	●
15.10	+0.025/+0.007	16	83	83	133			355HPU1510	●
15.20	+0.025/+0.007	16	83	83	133			355HPU1520	●
15.30	+0.025/+0.007	16	83	83	133	355PU1530	●	355HPU1530	●
15.40	+0.025/+0.007	16	83	83	133			355HPU1540	●
15.50	+0.025/+0.007	16	83	83	133	355PU1550	●	355HPU1550	●
15.60	+0.025/+0.007	16	83	83	133			355HPU1560	●
15.70	+0.025/+0.007	16	83	83	133			355HPU1570	●
15.80	+0.025/+0.007	16	83	83	133	355PU1580	●	355HPU1580	●
15.90	+0.025/+0.007	16	83	83	133			355HPU1590	●
16.00	+0.025/+0.007	16	83	83	133	355PU1600	●	355HPU1600	●
16.10	+0.025/+0.007	18	93	93	143			355HPU1610	●
16.20	+0.025/+0.007	18	93	93	143			355HPU1620	●
16.30	+0.025/+0.007	18	93	93	143			355HPU1630	●
16.40	+0.025/+0.007	18	93	93	143			355HPU1640	●
16.50	+0.025/+0.007	18	93	93	143	355PU1650	●	355HPU1650	●
16.60	+0.025/+0.007	18	93	93	143			355HPU1660	●
16.70	+0.025/+0.007	18	93	93	143			355HPU1670	●
16.80	+0.025/+0.007	18	93	93	143			355HPU1680	●
16.90	+0.025/+0.007	18	93	93	143			355HPU1690	●
17.00	+0.025/+0.007	18	93	93	143	355PU1700	●	355HPU1700	●
17.10	+0.025/+0.007	18	93	93	143			355HPU1710	●
17.20	+0.025/+0.007	18	93	93	143			355HPU1720	●
17.30	+0.025/+0.007	18	93	93	143			355HPU1730	●
17.40	+0.025/+0.007	18	93	93	143			355HPU1740	●
17.50	+0.025/+0.007	18	93	93	143	355PU1750	●	355HPU1750	●
17.60	+0.025/+0.007	18	93	93	143			355HPU1760	●
17.70	+0.025/+0.007	18	93	93	143			355HPU1770	●

**HSS DRILLS**

- LFTA
- SUTA
- HSS-HSS/CO

**CARBIDE END-MILLS**

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

**HSS END-MILLS**

**CARBIDE BURRS**

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 355PU-355HPU

universal application, high productivity

5XD

DIN  
6537L

PU

HPU

MG  
PV250

140°+C45°

30°

**355PU 355HPU**



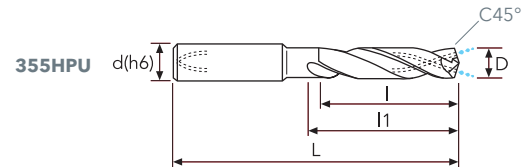
355PU



355HPU



355PU



355HPU

CARBIDE  
DRILLS

PU-HPU

TA-4HTA

SUH

ALH

HRC

SUH MINI

HL

HSD

C-SD-TA

P	M	K	N	S	H
★	★	★	☆	★	

★ 1st choice ☆ suitable

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

D(m7)	D Tol.	d(h6)	l	l1	L	355PU		355HPU	
						EDP No.	Stock	EDP No.	Stock
17.80	+0.025/+0.007	18	93	93	143			355HPU1780	●
17.90	+0.025/+0.007	18	93	93	143			355HPU1790	●
18.00	+0.025/+0.007	18	93	93	143	355PU1800	●	355HPU1800	●
18.10	+0.029/+0.008	20	101	101	153			355HPU1810	●
18.20	+0.029/+0.008	20	101	101	153			355HPU1820	●
18.30	+0.029/+0.008	20	101	101	153			355HPU1830	●
18.40	+0.029/+0.008	20	101	101	153			355HPU1840	●
18.50	+0.029/+0.008	20	101	101	153	355PU1850	●	355HPU1850	●
18.60	+0.029/+0.008	20	101	101	153			355HPU1860	●
18.70	+0.029/+0.008	20	101	101	153			355HPU1870	●
18.80	+0.029/+0.008	20	101	101	153			355HPU1880	●
18.90	+0.029/+0.008	20	101	101	153			355HPU1890	●
19.00	+0.029/+0.008	20	101	101	153	355PU1900	●	355HPU1900	●
19.10	+0.029/+0.008	20	101	101	153			355HPU1910	●
19.20	+0.029/+0.008	20	101	101	153			355HPU1920	●
19.30	+0.029/+0.008	20	101	101	153			355HPU1930	●
19.40	+0.029/+0.008	20	101	101	153			355HPU1940	●
19.50	+0.029/+0.008	20	101	101	153	355PU1950	●	355HPU1950	●
19.60	+0.029/+0.008	20	101	101	153			355HPU1960	●
19.70	+0.029/+0.008	20	101	101	153			355HPU1970	●
19.80	+0.029/+0.008	20	101	101	153			355HPU1980	●
19.90	+0.029/+0.008	20	101	101	153			355HPU1990	●
20.00	+0.029/+0.008	20	101	101	153	355PU2000	●	355HPU2000	●

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

### 355PU

Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8	
	Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
	Vc (m/min)	<b>100÷140</b>	<b>80÷120</b>	<b>60÷85</b>	<b>50÷65</b>	<b>35÷50</b>	<b>20÷30</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
3	0.114	0.103	0.091	0.080	0.070	0.042	
4	0.135	0.121	0.108	0.094	0.083	0.050	
5	0.156	0.140	0.125	0.109	0.096	0.058	
6	0.176	0.159	0.141	0.124	0.114	0.068	
7	0.197	0.177	0.158	0.138	0.128	0.077	
8	0.218	0.196	0.174	0.153	0.141	0.085	
9	0.239	0.215	0.191	0.167	0.154	0.093	
10	0.259	0.234	0.208	0.182	0.168	0.101	
11	0.270	0.243	0.216	0.189	0.174	0.105	
12	0.291	0.262	0.232	0.203	0.188	0.113	
13	0.311	0.280	0.249	0.218	0.201	0.121	
14	0.332	0.299	0.266	0.232	0.215	0.129	
15	0.353	0.318	0.282	0.247	0.228	0.137	
16	0.374	0.338	0.299	0.262	0.233	0.139	
17	0.384	0.346	0.307	0.269	0.236	0.142	
18	0.394	0.355	0.316	0.276	0.243	0.146	
19	0.405	0.364	0.324	0.283	0.249	0.150	
20	0.415	0.374	0.332	0.291	0.256	0.153	



### 355HPU

Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8	
	Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
	Vc (m/min)	<b>120÷160</b>	<b>100÷140</b>	<b>70÷100</b>	<b>60÷80</b>	<b>50÷70</b>	<b>25÷40</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
3	0.120	0.108	0.096	0.084	0.078	0.047	
4	0.142	0.128	0.114	0.099	0.092	0.055	
5	0.164	0.147	0.131	0.115	0.107	0.064	
6	0.186	0.167	0.149	0.130	0.127	0.076	
7	0.208	0.187	0.166	0.145	0.142	0.085	
8	0.229	0.206	0.184	0.161	0.157	0.094	
9	0.251	0.226	0.201	0.176	0.171	0.103	
10	0.273	0.246	0.219	0.191	0.186	0.112	
11	0.284	0.256	0.227	0.199	0.194	0.116	
12	0.306	0.275	0.245	0.214	0.209	0.125	
13	0.328	0.295	0.262	0.229	0.224	0.134	
14	0.350	0.315	0.280	0.245	0.239	0.143	
15	0.371	0.334	0.297	0.260	0.254	0.152	
16	0.393	0.356	0.315	0.275	0.259	0.155	
17	0.404	0.364	0.323	0.283	0.263	0.158	
18	0.415	0.374	0.332	0.291	0.270	0.162	
19	0.426	0.383	0.341	0.298	0.277	0.166	
20	0.437	0.393	0.350	0.306	0.284	0.170	



INFO

CARBIDE  
DRILLS

PU-HPU

TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

### 355PU

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	M1	M2	M3			
Hardness/Rm	<750 N/mm <sup>2</sup>	550÷850 N/mm <sup>2</sup>	650÷950 N/mm <sup>2</sup>			
Vc (m/min)	<b>35÷50</b>	<b>30÷45</b>	<b>20÷35</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
3	0.063	0.051	0.044			
4	0.075	0.060	0.052			
5	0.096	0.077	0.060			
6	0.109	0.087	0.068			
7	0.121	0.097	0.077			
8	0.134	0.107	0.085			
9	0.147	0.118	0.093			
10	0.160	0.128	0.101			
11	0.166	0.133	0.105			
12	0.179	0.143	0.113			
13	0.192	0.153	0.121			
14	0.205	0.164	0.129			
15	0.217	0.174	0.137			
16	0.230	0.184	0.145			
17	0.236	0.189	0.149			
18	0.243	0.194	0.153			
19	0.249	0.199	0.157			
20	0.256	0.205	0.161			

HSS DRILLS

### 355HPU

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



Material Group ISO 513	M1	M2	M3			
Hardness/Rm	<750 N/mm <sup>2</sup>	550÷850 N/mm <sup>2</sup>	650÷950 N/mm <sup>2</sup>			
Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>30÷45</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
3	0.070	0.056	0.049			
4	0.083	0.066	0.058			
5	0.107	0.085	0.067			
6	0.121	0.097	0.076			
7	0.135	0.108	0.085			
8	0.149	0.119	0.094			
9	0.163	0.131	0.103			
10	0.178	0.142	0.112			
11	0.185	0.148	0.116			
12	0.199	0.159	0.125			
13	0.213	0.170	0.134			
14	0.227	0.182	0.143			
15	0.241	0.193	0.152			
16	0.256	0.205	0.161			
17	0.263	0.210	0.166			
18	0.270	0.216	0.170			
19	0.277	0.222	0.174			
20	0.284	0.227	0.179			

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

### 355PU

	Material Group ISO 513	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>K4</b>		
	Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
	Vc (m/min)	<b>110÷150</b>	<b>90÷120</b>	<b>60÷80</b>	<b>40÷60</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
	3	0.114	0.103	0.091	0.080		
4	0.135	0.121	0.108	0.094			
5	0.156	0.140	0.125	0.109			
6	0.176	0.159	0.141	0.124			
7	0.197	0.177	0.158	0.138			
8	0.218	0.196	0.174	0.153			
9	0.239	0.215	0.191	0.167			
10	0.259	0.234	0.208	0.182			
11	0.270	0.243	0.216	0.189			
12	0.291	0.262	0.232	0.203			
13	0.311	0.280	0.249	0.218			
14	0.332	0.299	0.266	0.232			
15	0.353	0.318	0.282	0.247			
16	0.374	0.338	0.299	0.262			
17	0.384	0.346	0.307	0.269			
18	0.394	0.355	0.316	0.276			
19	0.405	0.364	0.324	0.283			
20	0.415	0.374	0.332	0.291			

### 355HPU

	Material Group ISO 513	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>K4</b>		
	Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
	Vc (m/min)	<b>120÷160</b>	<b>100÷140</b>	<b>80÷100</b>	<b>60÷80</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
	3	0.120	0.108	0.096	0.084		
4	0.142	0.128	0.114	0.099			
5	0.164	0.147	0.131	0.115			
6	0.186	0.167	0.149	0.130			
7	0.208	0.187	0.166	0.145			
8	0.229	0.206	0.184	0.161			
9	0.251	0.226	0.201	0.176			
10	0.273	0.246	0.219	0.191			
11	0.284	0.256	0.227	0.199			
12	0.306	0.275	0.245	0.214			
13	0.328	0.295	0.262	0.229			
14	0.350	0.315	0.280	0.245			
15	0.371	0.334	0.297	0.260			
16	0.393	0.356	0.315	0.275			
17	0.404	0.364	0.323	0.283			
18	0.415	0.374	0.332	0.291			
19	0.426	0.383	0.341	0.298			
20	0.437	0.393	0.350	0.306			

INFO

CARBIDE DRILLS

**PU-HPU**

- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

### 355PU

CARBIDE DRILLS

PU-HPU

TA-4HTA

SUH

ALH

HRC

SUH MINI

HL

HSD

C-SD-TA



Material Group ISO 513	N1	N2	N3	N4		
Hardness/Rm	> 5%Si					
Vc (m/min)	<b>220±260</b>	<b>200±240</b>	<b>160±200</b>	<b>160±200</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3	0.137	0.126	0.114	0.114		
4	0.162	0.148	0.135	0.135		
5	0.187	0.171	0.156	0.156		
6	0.212	0.194	0.176	0.176		
7	0.237	0.217	0.197	0.197		
8	0.262	0.240	0.218	0.218		
9	0.286	0.263	0.239	0.239		
10	0.311	0.285	0.259	0.259		
11	0.324	0.297	0.270	0.270		
12	0.349	0.320	0.291	0.291		
13	0.374	0.342	0.311	0.311		
14	0.399	0.365	0.332	0.332		
15	0.423	0.388	0.353	0.353		
16	0.448	0.411	0.374	0.374		
17	0.461	0.422	0.384	0.384		
18	0.473	0.434	0.394	0.394		
19	0.486	0.445	0.405	0.405		
20	0.498	0.457	0.415	0.415		

HSS DRILLS

### 355HPU

LFTA

SUTA

HSS-HSS/CO

CARBIDE END-MILLS

G2

MDTA

HF VH/UP

MEF

ALU

MEX/MH

UH/MH



Material Group ISO 513	N1	N2	N3	N4		
Hardness/Rm	> 5%Si					
Vc (m/min)	<b>260±300</b>	<b>220±260</b>	<b>180±220</b>	<b>180±220</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3	0.144	0.132	0.120	0.120		
4	0.170	0.156	0.142	0.142		
5	0.197	0.180	0.164	0.164		
6	0.223	0.204	0.186	0.186		
7	0.249	0.228	0.208	0.208		
8	0.275	0.252	0.229	0.229		
9	0.302	0.276	0.251	0.251		
10	0.328	0.300	0.273	0.273		
11	0.341	0.312	0.284	0.284		
12	0.367	0.336	0.306	0.306		
13	0.393	0.361	0.328	0.328		
14	0.420	0.385	0.350	0.350		
15	0.446	0.409	0.371	0.371		
16	0.472	0.433	0.393	0.393		
17	0.485	0.445	0.404	0.404		
18	0.498	0.457	0.415	0.415		
19	0.511	0.469	0.426	0.426		
20	0.524	0.481	0.437	0.437		

HSS END-MILLS

CARBIDE BURRS

### 355PU

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	<b>15÷25</b>	<b>10÷20</b>	<b>20÷30</b>	<b>15÷25</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
	3	0.051	0.044	0.035	0.029		
4	0.061	0.052	0.041	0.035			
5	0.070	0.060	0.048	0.040			
6	0.079	0.068	0.054	0.045			
7	0.089	0.076	0.060	0.051			
8	0.098	0.084	0.067	0.056			
9	0.107	0.092	0.073	0.062			
10	0.117	0.100	0.079	0.067			
11	0.121	0.104	0.083	0.070			
12	0.131	0.112	0.089	0.075			
13	0.140	0.120	0.095	0.080			
14	0.149	0.128	0.102	0.086			
15	0.159	0.136	0.108	0.091			
16	0.168	0.144	0.114	0.096			
17	0.173	0.148	0.118	0.099			
18	0.177	0.152	0.121	0.102			
19	0.182	0.156	0.124	0.104			
20	0.187	0.160	0.127	0.107			

### 355HPU

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	<b>30÷40</b>	<b>25÷35</b>	<b>40÷50</b>	<b>30÷40</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
	3	0.054	0.049	0.044	0.037		
4	0.064	0.058	0.052	0.043			
5	0.074	0.067	0.060	0.050			
6	0.084	0.075	0.067	0.057			
7	0.093	0.084	0.075	0.064			
8	0.103	0.093	0.083	0.070			
9	0.113	0.102	0.091	0.077			
10	0.123	0.111	0.099	0.084			
11	0.128	0.115	0.103	0.087			
12	0.138	0.124	0.111	0.094			
13	0.147	0.133	0.119	0.100			
14	0.157	0.142	0.127	0.107			
15	0.167	0.151	0.135	0.114			
16	0.177	0.160	0.143	0.120			
17	0.182	0.164	0.147	0.124			
18	0.187	0.169	0.151	0.127			
19	0.192	0.173	0.155	0.130			
20	0.197	0.177	0.159	0.134			

INFO

CARBIDE DRILLS

PU-HPU

TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS





INFO

CARBIDE  
DRILLS

PU-HPU  
**TA-4HTA**  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

## TYPHOON TA-4HTA

HIGH PERFORMANCE - GENERAL PURPOSE

🇬🇧 The tool of choice for multi-purpose drilling on ISO P, M, K below 1100 N/mm<sup>2</sup>.

🇮🇹 La soluzione ideale per la foratura di materiali ISO P, M, K sino a 1100 N/mm<sup>2</sup>.

🇩🇪 Die optimale Lösung für das Bohren der Materialien ISO P, M, K bis zu 1100 N/mm<sup>2</sup>.

🇫🇷 La solution idéale pour le perçage de matériaux ISO P, M, K jusqu'à 1100 N/mm<sup>2</sup>.

🇪🇸 La solución ideal para el taladro de materiales ISO P, M, K hasta 1100 N/mm<sup>2</sup>.

🇷🇺 Идеальное решение для сверления материалов по ISO P, M, K до 1100 Н/мм<sup>2</sup>.

INFO


**TA**
**CARBIDE DRILLS**

 PU-HPU  
**TA-4HTA**  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

**TA**

- Self-centering geometry for accurate holes
- Curved cutting edge for low cutting forces.
- High relief angle: reduces cutting forces, improves chip shape and ejection
- Wide chip pocket: improves chip ejection
- Back taper geometry: improves the cutting performance
- Substrate and coating: specifically selected for high wear resistance, long and reliable life


**TA**

- Affûtage autocentré pour un perçage plus précis
- Profil de l'arête ondulé pour faible effort de coupe
- Géométrie de l'arête avec dépouille accentuée pour réduire l'effort de coupe et améliorer la forme et le contrôle des copeaux
- Goujures recourbées et larges pour améliorer l'évacuation des copeaux
- Géométrie du corps avec conicité arrière pour faciliter la coupe
- Substrat et revêtement spécifiques pour garantir durée et fiabilité


**TA**

- Affilatura autocentrante per fori precisi
- Profilo del tagliente ondulato per basso sforzo di taglio
- Geometria del tagliente con spoglia accentuata per ridurre lo sforzo di taglio e migliorare la forma e il controllo dei trucioli
- Gole ricurve e ampie per migliorare l'evacuazione dei trucioli
- Geometria del corpo con conicità posteriore per agevolare l'azione di taglio
- Substrato e rivestimento specifici per garantire durata e affidabilità


**TA**

- Afilado autocentrante para agujeros precisos
- Perfil del filo ondulado, para bajo esfuerzo de corte
- Geometría del filo con salida acentuada para reducir el esfuerzo de corte y mejorar la forma y el control de las virutas
- Ranuras curvadas y amplias para mejorar la evacuación de las virutas
- Geometría del cuerpo con conicidad posterior para facilitar la acción de corte
- Sustrato y revestimiento específicos para garantizar duración y fiabilidad


**TA**

- Selbstzentrierender Schliff für präzise Bohrungen
- Gewelltes Schneidkantenprofil für geringen Schneiddruck
- Geometrie der Schneidkante mit ausgeprägtem Hinterschliff zur Reduzierung des Schneiddrucks und zur Verbesserung der Späneform und -kontrolle
- Gebogene und breite Nuten zur Verbesserung der Späneabführung
- Geometrie des Körpers mit konischem hinteren Bereich zur Erleichterung des Schnittvorgangs
- Spezielles Trägermaterial und spezielle Beschichtung zur Gewährleistung von Standzeit und Zuverlässigkeit


**TA**

- Самоцентрирующаяся заточка для сверления отверстий высокой точности
- Закругленный профиль режущей кромки для низких режущих усилий
- Большой угол наклона спиральной канавки для уменьшения сил резания и улучшения условий удаления стружки
- Широкие стружечные канавки для лучшего вывода стружки
- Геометрия с обратным конусом для повышения производительности
- Специальное покрытие для повышения стойкости инструмента

HSS DRILLS

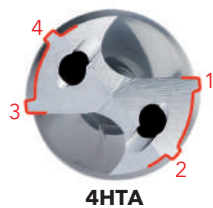
 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE END-MILLS**

 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

**CARBIDE BURRS**


**4HTA**

**4HTA 8xD**

- Self-centering geometry for accurate holes
- 4 margin lands: reliable machining for highly accurate and straight holes even in deep drilling
- Straight cutting edge: short chips for easy evacuation and high reliability
- Special edge design: high performance and edge protection
- Back taper geometry: improves the cutting performance
- Chip pocket finishing: highly polished to reduce welding and improves chip ejection
- Large oil holes: improves coolant feed
- Substrate and coating: specifically selected for high wear resistance, long and reliable life


**4HTA 8xD**

- Affilatura autocentrante per fori precisi
- Geometria con "4 Margini": fori rettilinei e precisi, anche nel caso di profondità elevate.
- Profilo del tagliente diritto e rinforzato: genera trucioli corti e garantisce grande affidabilità
- Geometria del tagliente con affilatura specifica a protezione del tagliente e degli spigoli
- Geometria del corpo con conicità posteriore per agevolare l'azione di taglio
- Finitura gole: lappate per ridurre il problema dell'incollaggio e facilitare l'evacuazione dei trucioli
- Fori di refrigerazione con geometria modificata per un maggior apporto di refrigerante
- Substrato e rivestimento specifici per garantire durata e affidabilità


**4HTA 8xD**

- Selbstzentrierender Schliff für präzise Bohrungen
- Geometrie mit „4 Fasen“: gerade und präzise Bohrungen, auch bei großen Tiefen.
- Gerades und verstärktes Schneidkantenprofil: zur Erzeugung kurzer Späne und zur Gewährleistung hoher Zuverlässigkeit
- Geometrie der Schneidkante mit speziellem Schliff zum Schutz von Schneidkante und Kanten
- Geometrie des Körpers mit konischem hinteren Bereich zur Erleichterung des Schnitvorgangs
- Schlichtbearbeitung der Nuten: geläpft, um Probleme durch Verkleben zu reduzieren und um die Späneabführung zu erleichtern
- Kühlöffnungen mit abgeänderter Geometrie für einen verbesserten Kühlmittelzufluss
- Spezielles Trägermaterial und spezielle Beschichtung zur Gewährleistung von Standzeit und Zuverlässigkeit


**4HTA 8xD**

- Affûtage autocentré pour un perçage plus précis.
- Géométrie avec « 4 listels » : trous droits et précis, même en présence de trous profonds.
- Profil de l'arête droit et renforcé : il génère des copeaux courts et garantit une grande fiabilité
- Géométrie de l'arête avec affûtage spécifique pour protéger l'arête et les angles
- Géométrie du corps avec conicité arrière pour faciliter l'action de coupe
- Finition des goujures : polie pour réduire le problème du collage et faciliter l'évacuation des copeaux
- Trous de lubrification avec géométrie modifiée pour un apport de lubrifiant plus important
- Substrat et revêtement spécifiques pour garantir durée et fiabilité


**4HTA 8xD**

- Afilado autocentrante para agujeros precisos
- Geometría con «4 Márgenes»: agujeros rectilíneos y precisos, incluso en caso de profundidades elevadas.
- Perfil del filo recto y reforzado: genera virutas cortas y garantiza una gran fiabilidad
- Geometría del filo con afilado específico para proteger el filo y los ángulos
- Geometría del cuerpo con conicidad posterior para facilitar la acción de corte
- Acabado ranuras: lapeadas para reducir el problema del encolado y facilitar la evacuación de las virutas
- Agujeros de refrigeración con geometría modificada para una mayor aportación de refrigerante
- Sustrato y revestimiento específicos para garantizar duración y fiabilidad


**4HTA 8xD**

- Самоцентрирующаяся заточка для сверления отверстий высокой точности
- Геометрия с 4 режущими кромками: надежная обработка и высокая точность отверстия, даже при глубоком сверлении
- Прямые режущие кромки: легкий вывод короткой стружки и высокая эффективность
- Геометрия режущих кромок со специальной заточкой: высокая производительность и защита кромок
- Геометрия с обратным конусом: повышение производительности
- Отполированные стружечные канавки: уменьшают вероятность приваривания стружки и облегчают ее вывод
- Большие отверстия: увеличена эффективность подвода СОЖ
- Специальное покрытие для повышения стойкости инструмента

**CARBIDE DRILLS**

 PU-HPU  
**TA-4HTA**  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

**HSS DRILLS**

 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE END-MILLS**

 G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

**HSS END-MILLS**
**CARBIDE BURRS**

INFO

# 343TA-318N

general purpose, coated (343TA) and uncoated (318N)

3XD

DIN  
6539

TA

MG  
PV200

MG  
BR

140°

30°

343TA
318N



CARBIDE DRILLS

PU-HPU  
**TA-4HTA**  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

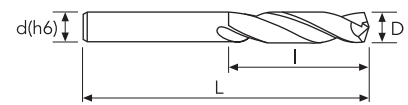
P	M	K	N	S	H	
★	☆	☆	☆			<b>343TA</b>
★	☆	☆	☆			<b>318N</b>

★ 1st choice ☆ suitable

< ø2 mm



≥ ø2 mm



D(h7)	D Tol.	d(h6)	l	l1	L	343TA		318N	
						EDP No.	Stock	EDP No.	Stock
1.00	0/-0.010	2	6		40	343TA0100	●	P318N0100	●
1.10	0/-0.010	2	7		40	343TA0110	●	P318N0110	●
1.20	0/-0.010	2	8		40	343TA0120	●	P318N0120	●
1.30	0/-0.010	2	8		40	343TA0130	●	P318N0130	●
1.40	0/-0.010	2	9		40	343TA0140	●	P318N0140	●
1.50	0/-0.010	2	9		40	343TA0150	●	P318N0150	●
1.60	0/-0.010	2	10		40	343TA0160	●	P318N0160	●
1.70	0/-0.010	2	10		40	343TA0170	●	P318N0170	●
1.80	0/-0.010	2	11		40	343TA0180	●	P318N0180	●
1.90	0/-0.010	2	11		40	343TA0190	●	P318N0190	●
2.00	0/-0.010	2	12		40	343TA0200	●	P318N0200	●
2.10	0/-0.010	2.1	12		40	343TA0210	●	P318N0210	●
2.20	0/-0.010	2.2	13		40	343TA0220	●	P318N0220	●
2.30	0/-0.010	2.3	13		46	343TA0230	●	P318N0230	●
2.40	0/-0.010	2.4	14		46	343TA0240	●	P318N0240	●
2.50	0/-0.010	2.5	14		46	343TA0250	●	P318N0250	●
2.60	0/-0.010	2.6	14		46	343TA0260	●	P318N0260	●
2.70	0/-0.010	2.7	16		46	343TA0270	●	P318N0270	●
2.80	0/-0.010	2.8	16		49	343TA0280	●	P318N0280	●
2.90	0/-0.010	2.9	16		49	343TA0290	●	P318N0290	●
3.00	0/-0.010	3	16		49	343TA0300	●	P318N0300	●
3.10	0/-0.012	3.1	18		49	343TA0310	●	P318N0310	●
3.20	0/-0.012	3.2	18		49	343TA0320	●	P318N0320	●
3.30	0/-0.012	3.3	18		52	343TA0330	●	P318N0330	●
3.40	0/-0.012	3.4	20		52	343TA0340	●	P318N0340	●
3.50	0/-0.012	3.5	20		52	343TA0350	●	P318N0350	●
3.60	0/-0.012	3.6	20		52	343TA0360	●	P318N0360	●
3.70	0/-0.012	3.7	20		52	343TA0370	●	P318N0370	●
3.80	0/-0.012	3.8	22		55	343TA0380	●	P318N0380	●
3.90	0/-0.012	3.9	22		55	343TA0390	●	P318N0390	●
4.00	0/-0.012	4	22		55	343TA0400	●	P318N0400	●
4.10	0/-0.012	4.1	22		55	343TA0410	●	P318N0410	●
4.20	0/-0.012	4.2	22		55	343TA0420	●	P318N0420	●
4.30	0/-0.012	4.3	24		58	343TA0430	●	P318N0430	●
4.40	0/-0.012	4.4	24		58	343TA0440	●	P318N0440	●
4.50	0/-0.012	4.5	24		58	343TA0450	●	P318N0450	●
4.60	0/-0.012	4.6	24		58	343TA0460	●	P318N0460	●
4.70	0/-0.012	4.7	24		58	343TA0470	●	P318N0470	●
4.80	0/-0.012	4.8	26		62	343TA0480	●	P318N0480	●

HSS DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS

G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



# 343TA-318N

general purpose, coated (343TA) and uncoated (318N)

3XD

DIN  
6539

TA

MG  
PV200

MG  
BR

140°

30°

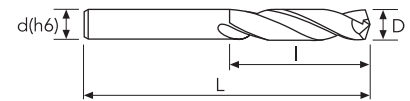
343TA
318N

INFO



P	M	K	N	S	H	
★	☆	☆	☆			<b>343TA</b>
★	☆	☆	☆			<b>318N</b>

★ 1st choice ☆ suitable



D(h7)	D Tol.	d(h6)	l	l1	L	343TA		318N	
						EDP No.	Stock	EDP No.	Stock
4.90	0/-0.012	4.9	26		62	343TA0490	●	P318N0490	●
5.00	0/-0.012	5	26		62	343TA0500	●	P318N0500	●
5.10	0/-0.012	5.1	26		62	343TA0510	●	P318N0510	●
5.20	0/-0.012	5.2	26		62	343TA0520	●	P318N0520	●
5.30	0/-0.012	5.3	26		66	343TA0530	●	P318N0530	●
5.40	0/-0.012	5.4	28		66	343TA0540	●	P318N0540	●
5.50	0/-0.012	5.5	28		66	343TA0550	●	P318N0550	●
5.60	0/-0.012	5.6	28		66	343TA0560	●	P318N0560	●
5.70	0/-0.012	5.7	28		66	343TA0570	●	P318N0570	●
5.80	0/-0.012	5.8	28		70	343TA0580	●	P318N0580	●
5.90	0/-0.012	5.9	28		70	343TA0590	●	P318N0590	●
6.00	0/-0.012	6	28		70	343TA0600	●	P318N0600	●
6.10	0/-0.015	6.1	31		70	343TA0610	●	P318N0610	●
6.20	0/-0.015	6.2	31		70	343TA0620	●	P318N0620	●
6.30	0/-0.015	6.3	31		70	343TA0630	●	P318N0630	●
6.40	0/-0.015	6.4	31		70	343TA0640	●	P318N0640	●
6.50	0/-0.015	6.5	31		70	343TA0650	●	P318N0650	●
6.60	0/-0.015	6.6	31		70	343TA0660	●	P318N0660	●
6.70	0/-0.015	6.7	31		70	343TA0670	●	P318N0670	●
6.80	0/-0.015	6.8	34		74	343TA0680	●	P318N0680	●
6.90	0/-0.015	6.9	34		74	343TA0690	●	P318N0690	●
7.00	0/-0.015	7	34		74	343TA0700	●	P318N0700	●
7.10	0/-0.015	7.1	34		74	343TA0710	●	P318N0710	●
7.20	0/-0.015	7.2	34		74	343TA0720	●	P318N0720	●
7.30	0/-0.015	7.3	34		79	343TA0730	●	P318N0730	●
7.40	0/-0.015	7.4	34		79	343TA0740	●	P318N0740	●
7.50	0/-0.015	7.5	34		79	343TA0750	●	P318N0750	●
7.60	0/-0.015	7.6	37		79	343TA0760	●	P318N0760	○
7.70	0/-0.015	7.7	37		79	343TA0770	●	P318N0770	○
7.80	0/-0.015	7.8	37		79	343TA0780	●	P318N0780	●
7.90	0/-0.015	7.9	37		79	343TA0790	●	P318N0790	○
8.00	0/-0.015	8	37		79	343TA0800	●	P318N0800	●
8.10	0/-0.015	8.1	37		79	343TA0810	●	P318N0810	●
8.20	0/-0.015	8.2	37		79	343TA0820	●	P318N0820	●
8.30	0/-0.015	8.3	37		84	343TA0830	●	P318N0830	●
8.40	0/-0.015	8.4	37		84	343TA0840	●	P318N0840	○
8.50	0/-0.015	8.5	37		84	343TA0850	●	P318N0850	●
8.60	0/-0.015	8.6	40		84	343TA0860	●	P318N0860	●
8.70	0/-0.015	8.7	40		84	343TA0870	●	P318N0870	●

CARBIDE DRILLS

- PU-HPU
- TA-4HTA**
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



CUTTING PARAMETERS

INFO

### 343TA

Material Group ISO 513	P1 P2 P3	P7	M1	K1	N1 N2		
	Hardness/Rm	<800 N/mm <sup>2</sup>	<700 N/mm <sup>2</sup>	<750 N/mm <sup>2</sup>	150÷250 HB		
Vc (m/min)	<b>80÷100</b>	<b>35÷45</b>	<b>35÷45</b>	<b>80÷100</b>	<b>140÷180</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
1	0.050	0.035	0.035	0.050	0.065		
2	0.070	0.049	0.049	0.070	0.091		
3	0.086	0.060	0.060	0.086	0.112		
4	0.126	0.088	0.088	0.126	0.164		
5	0.131	0.092	0.092	0.131	0.170		
6	0.145	0.102	0.102	0.145	0.189		
7	0.165	0.116	0.116	0.165	0.215		
8	0.185	0.130	0.130	0.185	0.241		
9	0.205	0.144	0.144	0.205	0.267		
10	0.224	0.157	0.157	0.224	0.291		
11	0.244	0.171	0.171	0.244	0.317		
12	0.263	0.184	0.184	0.263	0.342		
13	0.282	0.197	0.197	0.282	0.367		
14	0.302	0.211	0.211	0.302	0.393		
15	0.315	0.221	0.221	0.315	0.410		
16	0.336	0.235	0.235	0.336	0.437		



CARBIDE  
DRILLS

PU-HPU  
**TA-4HTA**  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

### 318N

Material Group ISO 513	P1 P2 P3	P7	M1	K1	N1 N2		
	Hardness/Rm	<800 N/mm <sup>2</sup>	<700 N/mm <sup>2</sup>	<750 N/mm <sup>2</sup>	150÷250 HB		
Vc (m/min)	<b>60÷80</b>	<b>20÷30</b>	<b>20÷30</b>	<b>50÷70</b>	<b>100÷140</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
1	0.035	0.025	0.025	0.032	0.046		
2	0.050	0.035	0.035	0.045	0.065		
3	0.065	0.046	0.046	0.059	0.085		
4	0.080	0.056	0.056	0.072	0.104		
5	0.095	0.067	0.067	0.086	0.124		
6	0.110	0.077	0.077	0.099	0.143		
7	0.125	0.088	0.088	0.113	0.163		
8	0.140	0.098	0.098	0.126	0.182		
9	0.155	0.109	0.109	0.140	0.202		
10	0.170	0.119	0.119	0.153	0.221		
11	0.185	0.130	0.130	0.167	0.241		
12	0.200	0.140	0.140	0.180	0.260		
13	0.215	0.151	0.151	0.194	0.280		



HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

# 3584HTA

4-margin lands, long (8xD)

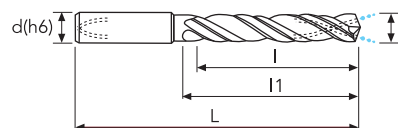


CARBIDE DRILLS

- PU-HPU
- TA-4HTA**
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	★	☆	☆	

★ 1st choice ☆ suitable



D(m7)	D Tol.	d(h6)	l	l1	L	EDP No.	Stock
3.00	+0.012/+0.002	6	32	40	85	358HTA0300	●
3.10	+0.016/+0.004	6	32	40	85	358HTA0310	●
3.20	+0.016/+0.004	6	32	40	85	358HTA0320	●
3.30	+0.016/+0.004	6	32	40	85	358HTA0330	●
3.40	+0.016/+0.004	6	32	40	85	358HTA0340	●
3.50	+0.016/+0.004	6	32	40	85	358HTA0350	●
3.60	+0.016/+0.004	6	36	40	85	358HTA0360	●
3.70	+0.016/+0.004	6	36	40	85	358HTA0370	●
3.80	+0.016/+0.004	6	36	40	85	358HTA0380	●
3.90	+0.016/+0.004	6	36	40	85	358HTA0390	○
4.00	+0.016/+0.004	6	38	46	85	358HTA0400	●
4.10	+0.016/+0.004	6	38	46	85	358HTA0410	●
4.20	+0.016/+0.004	6	38	46	85	358HTA0420	●
4.30	+0.016/+0.004	6	40	46	97	358HTA0430	●
4.40	+0.016/+0.004	6	40	46	97	358HTA0440	○
4.50	+0.016/+0.004	6	44	46	97	358HTA0450	●
4.60	+0.016/+0.004	6	44	46	97	358HTA0460	●
4.70	+0.016/+0.004	6	44	46	97	358HTA0470	●
4.80	+0.016/+0.004	6	44	46	97	358HTA0480	●
4.90	+0.016/+0.004	6	44	46	97	358HTA0490	○
5.00	+0.016/+0.004	6	48	57	97	358HTA0500	●
5.10	+0.016/+0.004	6	48	57	97	358HTA0510	●
5.20	+0.016/+0.004	6	48	57	97	358HTA0520	●
5.30	+0.016/+0.004	6	48	57	97	358HTA0530	●
5.40	+0.016/+0.004	6	48	57	97	358HTA0540	○
5.50	+0.016/+0.004	6	48	57	97	358HTA0550	●
5.60	+0.016/+0.004	6	48	57	97	358HTA0560	●
5.70	+0.016/+0.004	6	48	57	97	358HTA0570	○
5.80	+0.016/+0.004	6	48	57	97	358HTA0580	●
5.90	+0.016/+0.004	6	48	57	97	358HTA0590	●
6.00	+0.016/+0.004	6	48	57	97	358HTA0600	●
6.10	+0.021/+0.006	8	64	76	116	358HTA0610	●
6.20	+0.021/+0.006	8	64	76	116	358HTA0620	●
6.30	+0.021/+0.006	8	64	76	116	358HTA0630	●
6.40	+0.021/+0.006	8	64	76	116	358HTA0640	○
6.50	+0.021/+0.006	8	64	76	116	358HTA0650	●
6.60	+0.021/+0.006	8	64	76	116	358HTA0660	○
6.70	+0.021/+0.006	8	64	76	116	358HTA0670	●
6.80	+0.021/+0.006	8	64	76	116	358HTA0680	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

# 3584HTA

4-margin lands, long (8xD)



8XD

OSAWA  
NORM

4HTA

MG  
PV300

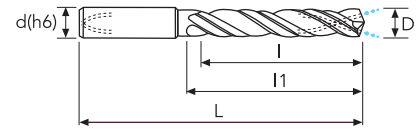
140°

30°

INFO

P	M	K	N	S	H
★	★	★	☆	☆	

★ 1st choice ☆ suitable



**CARBIDE DRILLS**

- PU-HPU
- TA-4HTA**
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D(m7)	D Tol.	d(h6)	l	l1	L	EDP No.	Stock
6.90	+0.021/+0.006	8	64	76	116	358HTA0690	●
7.00	+0.021/+0.006	8	64	76	116	358HTA0700	●
7.10	+0.021/+0.006	8	64	76	116	358HTA0710	●
7.20	+0.021/+0.006	8	64	76	116	358HTA0720	●
7.30	+0.021/+0.006	8	64	76	116	358HTA0730	●
7.40	+0.021/+0.006	8	64	76	116	358HTA0740	●
7.50	+0.021/+0.006	8	64	76	116	358HTA0750	●
7.60	+0.021/+0.006	8	64	76	116	358HTA0760	●
7.70	+0.021/+0.006	8	64	76	116	358HTA0770	○
7.80	+0.021/+0.006	8	64	76	116	358HTA0780	●
7.90	+0.021/+0.006	8	64	76	116	358HTA0790	○
8.00	+0.021/+0.006	8	64	76	116	358HTA0800	●
8.10	+0.021/+0.006	10	80	95	142	358HTA0810	●
8.20	+0.021/+0.006	10	80	95	142	358HTA0820	●
8.30	+0.021/+0.006	10	80	95	142	358HTA0830	●
8.40	+0.021/+0.006	10	80	95	142	358HTA0840	○
8.50	+0.021/+0.006	10	80	95	142	358HTA0850	●
8.60	+0.021/+0.006	10	80	95	142	358HTA0860	●
8.70	+0.021/+0.006	10	80	95	142	358HTA0870	●
8.80	+0.021/+0.006	10	80	95	142	358HTA0880	●
8.90	+0.021/+0.006	10	80	95	142	358HTA0890	○
9.00	+0.021/+0.006	10	80	95	142	358HTA0900	●
9.10	+0.021/+0.006	10	80	95	142	358HTA0910	●
9.20	+0.021/+0.006	10	80	95	142	358HTA0920	●
9.30	+0.021/+0.006	10	80	95	142	358HTA0930	●
9.40	+0.021/+0.006	10	80	95	142	358HTA0940	○
9.50	+0.021/+0.006	10	80	95	142	358HTA0950	●
9.60	+0.021/+0.006	10	80	95	142	358HTA0960	○
9.70	+0.021/+0.006	10	80	95	142	358HTA0970	○
9.80	+0.021/+0.006	10	80	95	142	358HTA0980	●
9.90	+0.021/+0.006	10	80	95	142	358HTA0990	○
10.00	+0.021/+0.006	10	80	95	142	358HTA1000	●
10.20	+0.025/+0.007	12	96	114	163	358HTA1020	●
10.50	+0.025/+0.007	12	96	114	163	358HTA1050	●
10.80	+0.025/+0.007	12	96	114	163	358HTA1080	●
11.00	+0.025/+0.007	12	96	114	163	358HTA1100	●
11.20	+0.025/+0.007	12	96	114	163	358HTA1120	●
11.30	+0.025/+0.007	12	96	114	163	358HTA1130	○
11.50	+0.025/+0.007	12	96	114	163	358HTA1150	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



CUTTING PARAMETERS

### 3584HTA

Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
Vc (m/min)	<b>100÷120</b>	<b>80÷100</b>	<b>50÷70</b>	<b>40÷60</b>	<b>40÷50</b>	<b>15÷25</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
3	0.072	0.065	0.058	0.050	0.070	0.042
4	0.089	0.080	0.071	0.062	0.090	0.054
5	0.106	0.095	0.085	0.074	0.100	0.060
6	0.122	0.110	0.098	0.085	0.110	0.066
7	0.139	0.125	0.111	0.097	0.130	0.078
8	0.155	0.140	0.124	0.109	0.150	0.090
9	0.172	0.155	0.138	0.120	0.160	0.096
10	0.188	0.169	0.150	0.132	0.175	0.105
11	0.205	0.185	0.164	0.144	0.180	0.108
12	0.221	0.199	0.177	0.155	0.200	0.120
13	0.238	0.214	0.190	0.167	0.215	0.129
14	0.254	0.229	0.203	0.178	0.230	0.138
15	0.270	0.243	0.216	0.189	0.245	0.147
16	0.286	0.257	0.229	0.200	0.260	0.156

Material Group ISO 513	M1	M2	M3			
Hardness/Rm						
Vc (m/min)	<b>40÷50</b>	<b>30÷40</b>	<b>20÷30</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
3	0.070	0.056	0.049			
4	0.090	0.072	0.063			
5	0.100	0.080	0.070			
6	0.110	0.088	0.077			
7	0.130	0.104	0.091			
8	0.150	0.120	0.105			
9	0.160	0.128	0.112			
10	0.175	0.140	0.123			
11	0.180	0.144	0.126			
12	0.200	0.160	0.140			
13	0.215	0.172	0.151			
14	0.230	0.184	0.161			
15	0.245	0.196	0.172			
16	0.260	0.208	0.182			

INFO

CARBIDE DRILLS

PU-HPU  
**TA-4HTA**  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

HSS DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS

G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

### 3584HTA

CARBIDE DRILLS

PU-HPU  
**TA-4HTA**  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

Material Group ISO 513	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>K4</b>		
Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
Vc (m/min)	<b>100÷120</b>	<b>80÷100</b>	<b>50÷70</b>	<b>40÷60</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
<b>3</b>	0.072	0.065	0.058	0.050		
<b>4</b>	0.089	0.080	0.071	0.062		
<b>5</b>	0.106	0.095	0.085	0.074		
<b>6</b>	0.122	0.110	0.098	0.085		
<b>7</b>	0.139	0.125	0.111	0.097		
<b>8</b>	0.155	0.140	0.124	0.109		
<b>9</b>	0.172	0.155	0.138	0.120		
<b>10</b>	0.188	0.169	0.150	0.132		
<b>11</b>	0.205	0.185	0.164	0.144		
<b>12</b>	0.221	0.199	0.177	0.155		
<b>13</b>	0.238	0.214	0.190	0.167		
<b>14</b>	0.254	0.229	0.203	0.178		
<b>15</b>	0.270	0.243	0.216	0.189		
<b>16</b>	0.286	0.257	0.229	0.200		

HSS DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

Material Group ISO 513	<b>N1</b> <b>N2</b>	<b>N3</b>	<b>N4</b>			
Hardness/Rm	>5% Si					
Vc (m/min)	<b>160÷200</b>	<b>140÷180</b>	<b>130÷170</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
<b>3</b>	0.086	0.078	0.078			
<b>4</b>	0.107	0.096	0.096			
<b>5</b>	0.127	0.114	0.114			
<b>6</b>	0.146	0.132	0.132			
<b>7</b>	0.167	0.150	0.150			
<b>8</b>	0.186	0.167	0.167			
<b>9</b>	0.206	0.186	0.186			
<b>10</b>	0.226	0.203	0.203			
<b>11</b>	0.246	0.221	0.221			
<b>12</b>	0.265	0.239	0.239			
<b>13</b>	0.286	0.257	0.257			
<b>14</b>	0.305	0.274	0.274			
<b>15</b>	0.324	0.292	0.292			
<b>16</b>	0.343	0.309	0.309			

CARBIDE END-MILLS

G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS





CUTTING PARAMETERS

### 3584HTA

	Material Group ISO 513	S1	S2	S3	S4	S5		
	Hardness/Rm	<35 HRC		35÷45 HRC				
Vc (m/min)	<b>25÷35</b>	<b>15÷25</b>		<b>35÷45</b>		<b>25÷35</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)		fn (mm/rev)		fn (mm/rev)		
<b>3</b>	0.046	0.032		0.044		0.037		
<b>4</b>	0.055	0.039		0.052		0.044		
<b>5</b>	0.063	0.044		0.060		0.050		
<b>6</b>	0.073	0.051		0.069		0.058		
<b>7</b>	0.080	0.056		0.076		0.064		
<b>8</b>	0.090	0.063		0.086		0.072		
<b>9</b>	0.100	0.070		0.095		0.080		
<b>10</b>	0.110	0.077		0.105		0.088		
<b>11</b>	0.120	0.084		0.114		0.096		
<b>12</b>	0.130	0.091		0.124		0.104		
<b>13</b>	0.137	0.096		0.130		0.110		
<b>14</b>	0.145	0.102		0.138		0.116		
<b>15</b>	0.153	0.107		0.145		0.122		
<b>16</b>	0.160	0.112		0.152		0.128		

INFO

CARBIDE  
DRILLS

PU-HPU  
**TA-4HTA**  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS





INFO

#### CARBIDE DRILLS

PU-HPU  
TA-4HTA  
**SUH**  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

#### HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

#### CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

## TYPHOON SUH

HIGH PERFORMANCE - STAINLESS STEEL

🇬🇧 High performance tools for stainless steel (ISO M), steel (ISO P), cast iron (ISO K) and HRSA super alloys (ISO S) below 45 HRC.

🇮🇹 Punte ad alto rendimento per la foratura di acciaio inossidabile (ISO M), acciaio (ISO P), ghisa (ISO K) e super leghe (ISO S) sino a 45 HRC.

🇩🇪 Hochleistungsbohrer für das Bohren von rostfreiem Stahl (ISO M), Stahl (ISO P), Gusseisen (ISO K) und Superlegierungen (ISO S) bis 45 HRC.

🇫🇷 Forets haute performance pour le perçage de l'acier inoxydable (ISO M), de l'acier (ISO P), de la fonte (ISO K) et des super alliages (ISO S) jusqu'à 45 HRC.

🇪🇸 Puntas de alto rendimiento para el taladro de acero inoxidable (ISO M), acero (ISO P), hierro fundido (ISO K) e súper aleaciones (ISO S) hasta 45 HRC.

🇷🇺 Высокопроизводительный инструмент для обработки нержавеющей стали (ISO M), стали (ISO P), чугуна (ISO K) и жаропрочных сплавов (ISO S) с твёрдостью до 45 HRC.

#### HSS END-MILLS

#### CARBIDE BURRS

**TYPHOON SUH**
**HIGH PERFORMANCE - STAINLESS STEEL**

INFO

**CARBIDE DRILLS**

 PU-HPU  
 TA-4HTA  
**SUH**  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

**HSS DRILLS**

 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE END-MILLS**

 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

**HSS END-MILLS**
**CARBIDE BURRS**


- Self-centering geometry: highly accurate holes
- Straight cutting edge: short chips for easy evacuation and high reliability
- Special edge design: high performance and edge protection
- Back taper geometry: improves the cutting efficiency
- Chip pocket finishing: highly polished to reduce welding and improve chip ejection
- Large oil holes: improves coolant feed
- Substrate and coating: specifically selected for high wear resistance, long and reliable life



- Affûtage autocentré pour l'exécution de trous précis
- Profil de l'arête droit et renforcé : il génère des copeaux courts et garantit une grande fiabilité
- Géométrie de l'arête avec affûtage spécifique pour protéger l'arête et les angles
- Géométrie du corps avec conicité arrière pour faciliter l'action de coupe
- Finition des goujures : polie pour réduire le problème du collage et facilitent l'évacuation des copeaux
- Trous de lubrification avec géométrie modifiée pour un apport de lubrifiant plus important
- Substrat et revêtement spécifiques pour garantir durée et fiabilité



- Affilatura autocentrante per l'esecuzione di fori precisi
- Profilo del tagliente diritto e rinforzato: genera trucioli corti e garantisce grande affidabilità
- Geometria del tagliente con affilatura specifica a protezione del tagliente e degli spigoli
- Geometria del corpo con conicità posteriore per agevolare l'azione di taglio
- Finitura gole: lappate per ridurre il problema dell'incollaggio e facilitare l'evacuazione dei trucioli
- Fori di refrigerazione con geometria modificata per un maggior apporto di refrigerante
- Substrato e rivestimento specifici per garantire durata e affidabilità



- Afilado autocentrante para la ejecución de agujeros precisos
- Perfil del filo recto y reforzado: genera virutas cortas y garantiza una gran fiabilidad
- Geometría del filo con afilado específico para proteger el filo y los ángulos
- Geometría del cuerpo con conicidad posterior para facilitar la acción de corte
- Acabado ranuras: lapeadas para reducir el problema del encolado y facilitar la evacuación de las virutas
- Agujeros de refrigeración con geometría modificada para una mayor aportación de refrigerante
- Sustrato y revestimiento específicos para garantizar duración y fiabilidad



- Selbstzentrierender Schliff für die Herstellung von präzisen Bohrungen
- Gerades und verstärktes Schneidkantenprofil: zur Erzeugung kurzer Späne und zur Gewährleistung hoher Zuverlässigkeit
- Geometrie der Schneidkante mit speziellem Schliff zum Schutz von Schneidkante und Kanten
- Geometrie des Körpers mit konischem hinteren Bereich zur Erleichterung des Schnittvorgangs
- Schlichtbearbeitung der Nuten: geläpft, um Probleme durch Verkleben zu reduzieren und um die Späneabführung zu erleichtern
- Kühlöffnungen mit abgeänderter Geometrie für einen verbesserten Kühlmittelzufluss
- Spezielles Trägermaterial und spezielle Beschichtung zur Gewährleistung von Standzeit und Zuverlässigkeit



- Самоцентрирующаяся геометрия: высокая точность отверстий
- Прямые режущие кромки: формирование короткой стружки и высокая надежность
- Геометрия режущей кромки со специальной заточкой: высокая производительность и защита кромок
- Геометрия с обратным конусом: увеличивает эффективность обработки
- Отполированные стружечные канавки: уменьшают вероятность приваривания стружки и облегчают ее вывод
- Широкие каналы для СОЖ: увеличена эффективность подвода СОЖ
- Специальное покрытие для повышения стойкости инструмента

# 353SUH

stainless steel, polished flutes



3XD

DIN  
6537K

SUH

MG  
PV300

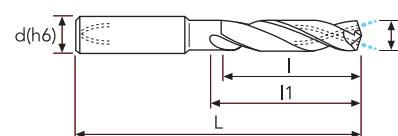
140°

30°

INFO

P	M	K	N	S	H
☆	★	☆	☆	☆	

★ 1st choice ☆ suitable



CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH**
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D(m7)	D Tol.	d(h6)	l	l1	L	EDP No.	Stock
3.00	+0.012/+0.002	6	14	20	62	353SUH0300	●
3.10	+0.016/+0.004	6	14	20	62	353SUH0310	●
3.20	+0.016/+0.004	6	14	20	62	353SUH0320	●
3.30	+0.016/+0.004	6	14	20	62	353SUH0330	●
3.40	+0.016/+0.004	6	14	20	62	353SUH0340	●
3.50	+0.016/+0.004	6	14	20	62	353SUH0350	●
3.60	+0.016/+0.004	6	14	20	62	353SUH0360	●
3.70	+0.016/+0.004	6	14	20	62	353SUH0370	●
3.80	+0.016/+0.004	6	17	24	66	353SUH0380	●
3.90	+0.016/+0.004	6	17	24	66	353SUH0390	●
4.00	+0.016/+0.004	6	17	24	66	353SUH0400	●
4.10	+0.016/+0.004	6	17	24	66	353SUH0410	●
4.20	+0.016/+0.004	6	17	24	66	353SUH0420	●
4.30	+0.016/+0.004	6	17	24	66	353SUH0430	●
4.40	+0.016/+0.004	6	17	24	66	353SUH0440	●
4.50	+0.016/+0.004	6	17	24	66	353SUH0450	●
4.60	+0.016/+0.004	6	17	24	66	353SUH0460	●
4.70	+0.016/+0.004	6	17	24	66	353SUH0470	●
4.80	+0.016/+0.004	6	20	28	66	353SUH0480	●
4.90	+0.016/+0.004	6	20	28	66	353SUH0490	●
5.00	+0.016/+0.004	6	20	28	66	353SUH0500	●
5.10	+0.016/+0.004	6	20	28	66	353SUH0510	●
5.20	+0.016/+0.004	6	20	28	66	353SUH0520	●
5.30	+0.016/+0.004	6	20	28	66	353SUH0530	●
5.40	+0.016/+0.004	6	20	28	66	353SUH0540	●
5.50	+0.016/+0.004	6	20	28	66	353SUH0550	●
5.60	+0.016/+0.004	6	20	28	66	353SUH0560	●
5.70	+0.016/+0.004	6	20	28	66	353SUH0570	●
5.80	+0.016/+0.004	6	20	28	66	353SUH0580	●
5.90	+0.016/+0.004	6	20	28	66	353SUH0590	●
6.00	+0.016/+0.004	6	20	28	66	353SUH0600	●
6.10	+0.021/+0.006	8	24	34	79	353SUH0610	●
6.20	+0.021/+0.006	8	24	34	79	353SUH0620	●
6.30	+0.021/+0.006	8	24	34	79	353SUH0630	●
6.40	+0.021/+0.006	8	24	34	79	353SUH0640	●
6.50	+0.021/+0.006	8	24	34	79	353SUH0650	●
6.60	+0.021/+0.006	8	24	34	79	353SUH0660	●
6.70	+0.021/+0.006	8	24	34	79	353SUH0670	●
6.80	+0.021/+0.006	8	24	34	79	353SUH0680	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 353SUH

stainless steel, polished flutes



CARBIDE DRILLS

PU-HPU  
TA-4HTA

**SUH**

ALH

HRC

SUH MINI

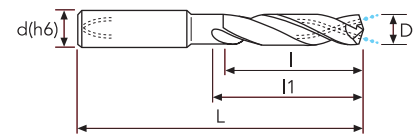
HL

HSD

C-SD-TA

P	M	K	N	S	H
☆	★	☆	☆	☆	

★ 1st choice ☆ suitable



D(m7)	D Tol.	d(h6)	l	l1	L	EDP No.	Stock
6.90	+0.021/+0.006	8	24	34	79	353SUH0690	●
7.00	+0.021/+0.006	8	24	34	79	353SUH0700	●
7.10	+0.021/+0.006	8	29	41	79	353SUH0710	●
7.20	+0.021/+0.006	8	29	41	79	353SUH0720	●
7.30	+0.021/+0.006	8	29	41	79	353SUH0730	●
7.40	+0.021/+0.006	8	29	41	79	353SUH0740	●
7.50	+0.021/+0.006	8	29	41	79	353SUH0750	●
7.60	+0.021/+0.006	8	29	41	79	353SUH0760	●
7.70	+0.021/+0.006	8	29	41	79	353SUH0770	●
7.80	+0.021/+0.006	8	29	41	79	353SUH0780	●
7.90	+0.021/+0.006	8	29	41	79	353SUH0790	●
8.00	+0.021/+0.006	8	29	41	79	353SUH0800	●
8.10	+0.021/+0.006	10	35	47	89	353SUH0810	●
8.20	+0.021/+0.006	10	35	47	89	353SUH0820	●
8.30	+0.021/+0.006	10	35	47	89	353SUH0830	●
8.40	+0.021/+0.006	10	35	47	89	353SUH0840	●
8.50	+0.021/+0.006	10	35	47	89	353SUH0850	●
8.60	+0.021/+0.006	10	35	47	89	353SUH0860	●
8.70	+0.021/+0.006	10	35	47	89	353SUH0870	●
8.80	+0.021/+0.006	10	35	47	89	353SUH0880	●
8.90	+0.021/+0.006	10	35	47	89	353SUH0890	●
9.00	+0.021/+0.006	10	35	47	89	353SUH0900	●
9.10	+0.021/+0.006	10	35	47	89	353SUH0910	●
9.20	+0.021/+0.006	10	35	47	89	353SUH0920	●
9.30	+0.021/+0.006	10	35	47	89	353SUH0930	●
9.40	+0.021/+0.006	10	35	47	89	353SUH0940	●
9.50	+0.021/+0.006	10	35	47	89	353SUH0950	●
9.60	+0.021/+0.006	10	35	47	89	353SUH0960	●
9.70	+0.021/+0.006	10	35	47	89	353SUH0970	●
9.80	+0.021/+0.006	10	35	47	89	353SUH0980	●
9.90	+0.021/+0.006	10	35	47	89	353SUH0990	●
10.00	+0.021/+0.006	10	35	47	89	353SUH1000	●
10.20	+0.025/+0.007	12	40	55	102	353SUH1020	●
10.50	+0.025/+0.007	12	40	55	102	353SUH1050	●
10.80	+0.025/+0.007	12	40	55	102	353SUH1080	●
11.00	+0.025/+0.007	12	40	55	102	353SUH1100	●
11.20	+0.025/+0.007	12	40	55	102	353SUH1120	○
11.30	+0.025/+0.007	12	40	55	102	353SUH1130	○
11.50	+0.025/+0.007	12	40	55	102	353SUH1150	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



INFO

### 353SUH

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH**
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
Vc (m/min)	<b>130÷150</b>	<b>100÷140</b>	<b>80÷100</b>	<b>55÷75</b>	<b>50÷70</b>	<b>20÷30</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
3	0.118	0.106	0.095	0.083	0.077	0.046
4	0.140	0.126	0.112	0.098	0.091	0.055
5	0.161	0.145	0.129	0.113	0.105	0.063
6	0.183	0.164	0.146	0.128	0.119	0.071
7	0.204	0.184	0.163	0.143	0.133	0.080
8	0.226	0.203	0.181	0.158	0.147	0.088
9	0.247	0.223	0.198	0.173	0.161	0.096
10	0.269	0.242	0.215	0.188	0.175	0.105
11	0.280	0.252	0.224	0.196	0.182	0.109
12	0.301	0.271	0.241	0.211	0.196	0.117
13	0.323	0.290	0.258	0.226	0.210	0.126
14	0.344	0.310	0.275	0.241	0.224	0.134
15	0.366	0.329	0.292	0.256	0.238	0.143
16	0.387	0.348	0.310	0.271	0.252	0.151
17	0.398	0.358	0.318	0.278	0.259	0.155
18	0.409	0.368	0.327	0.286	0.266	0.159
19	0.419	0.377	0.335	0.293	0.273	0.164
20	0.430	0.387	0.344	0.301	0.280	0.168

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	M1	M2	M3			
Hardness/Rm						
Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
3	0.077	0.061	0.054			
4	0.091	0.073	0.064			
5	0.105	0.084	0.073			
6	0.119	0.095	0.083			
7	0.133	0.106	0.093			
8	0.147	0.117	0.103			
9	0.161	0.129	0.112			
10	0.175	0.140	0.122			
11	0.182	0.145	0.127			
12	0.196	0.157	0.137			
13	0.210	0.168	0.147			
14	0.224	0.179	0.157			
15	0.238	0.190	0.166			
16	0.252	0.201	0.176			
17	0.259	0.207	0.181			
18	0.266	0.212	0.186			
19	0.273	0.218	0.191			
20	0.280	0.224	0.196			

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS



### 353SUH

	Material Group ISO 513	K1	K2	K3	K4		
	Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
	Vc (m/min)	<b>110÷130</b>	<b>90÷110</b>	<b>70÷90</b>	<b>55÷75</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3	0.118	0.106	0.095	0.083			
4	0.140	0.126	0.112	0.098			
5	0.161	0.145	0.129	0.113			
6	0.183	0.164	0.146	0.128			
7	0.204	0.184	0.163	0.143			
8	0.226	0.203	0.181	0.158			
9	0.247	0.223	0.198	0.173			
10	0.269	0.242	0.215	0.188			
11	0.280	0.252	0.224	0.196			
12	0.301	0.271	0.241	0.211			
13	0.323	0.290	0.258	0.226			
14	0.344	0.310	0.275	0.241			
15	0.366	0.329	0.292	0.256			
16	0.387	0.348	0.310	0.271			
17	0.398	0.358	0.318	0.278			
18	0.409	0.368	0.327	0.286			
19	0.419	0.377	0.335	0.293			
20	0.430	0.387	0.344	0.301			

	Material Group ISO 513	N2	N4				
	Hardness/Rm						
	Vc (m/min)	<b>180÷220</b>	<b>160÷200</b>				
	D (mm)	fn (mm/rev)	fn (mm/rev)				
3	0.128	0.128					
4	0.151	0.151					
5	0.174	0.174					
6	0.197	0.197					
7	0.221	0.221					
8	0.244	0.244					
9	0.267	0.267					
10	0.290	0.290					
11	0.302	0.302					
12	0.325	0.325					
13	0.348	0.348					
14	0.372	0.372					
15	0.395	0.395					
16	0.418	0.418					
17	0.430	0.430					
18	0.441	0.441					
19	0.453	0.453					
20	0.464	0.464					

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
**SUH**  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

### 353SUH

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
**SUH**  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	S1 S2	S3	S4	S5		
Hardness/Rm	<35 HRC	35÷45 HRC				
Vc (m/min)	<b>30+50</b>	<b>20+40</b>	<b>45+65</b>	<b>35+55</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
<b>3</b>	0.053	0.037	0.051	0.043		
<b>4</b>	0.063	0.044	0.060	0.050		
<b>5</b>	0.073	0.051	0.069	0.058		
<b>6</b>	0.082	0.058	0.078	0.066		
<b>7</b>	0.092	0.064	0.087	0.074		
<b>8</b>	0.102	0.071	0.097	0.081		
<b>9</b>	0.111	0.078	0.106	0.089		
<b>10</b>	0.121	0.085	0.115	0.097		
<b>11</b>	0.126	0.088	0.119	0.101		
<b>12</b>	0.135	0.095	0.129	0.108		
<b>13</b>	0.145	0.102	0.138	0.116		
<b>14</b>	0.155	0.108	0.147	0.124		
<b>15</b>	0.164	0.115	0.156	0.132		
<b>16</b>	0.174	0.122	0.165	0.139		
<b>17</b>	0.179	0.125	0.170	0.143		
<b>18</b>	0.184	0.129	0.175	0.147		
<b>19</b>	0.189	0.132	0.179	0.151		
<b>20</b>	0.194	0.135	0.155	0.155		

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# 355SUH

stainless steel, polished flutes



5XD

DIN  
6537L

SUH

MG  
PV300

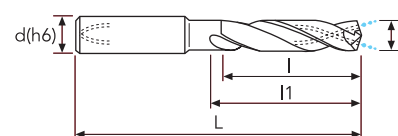
140°

30°

INFO

P	M	K	N	S	H
☆	★	☆	☆	☆	

★ 1st choice ☆ suitable



D(m7)	D Tol.	d(h6)	l	l1	L	EDP No.	Stock
3.00	+0.012/+0.002	6	23	28	66	355SUH0300	●
3.10	+0.016/+0.004	6	23	28	66	355SUH0310	●
3.20	+0.016/+0.004	6	23	28	66	355SUH0320	●
3.30	+0.016/+0.004	6	23	28	66	355SUH0330	●
3.40	+0.016/+0.004	6	23	28	66	355SUH0340	●
3.50	+0.016/+0.004	6	23	28	66	355SUH0350	●
3.60	+0.016/+0.004	6	23	28	66	355SUH0360	●
3.70	+0.016/+0.004	6	23	28	66	355SUH0370	●
3.80	+0.016/+0.004	6	29	36	74	355SUH0380	●
3.90	+0.016/+0.004	6	29	36	74	355SUH0390	●
4.00	+0.016/+0.004	6	29	36	74	355SUH0400	●
4.10	+0.016/+0.004	6	29	36	74	355SUH0410	●
4.20	+0.016/+0.004	6	29	36	74	355SUH0420	●
4.30	+0.016/+0.004	6	29	36	74	355SUH0430	●
4.40	+0.016/+0.004	6	29	36	74	355SUH0440	●
4.50	+0.016/+0.004	6	29	36	74	355SUH0450	●
4.60	+0.016/+0.004	6	29	36	74	355SUH0460	●
4.70	+0.016/+0.004	6	29	36	74	355SUH0470	●
4.80	+0.016/+0.004	6	35	44	82	355SUH0480	●
4.90	+0.016/+0.004	6	35	44	82	355SUH0490	●
5.00	+0.016/+0.004	6	35	44	82	355SUH0500	●
5.10	+0.016/+0.004	6	35	44	82	355SUH0510	●
5.20	+0.016/+0.004	6	35	44	82	355SUH0520	●
5.30	+0.016/+0.004	6	35	44	82	355SUH0530	●
5.40	+0.016/+0.004	6	35	44	82	355SUH0540	●
5.50	+0.016/+0.004	6	35	44	82	355SUH0550	●
5.60	+0.016/+0.004	6	35	44	82	355SUH0560	●
5.70	+0.016/+0.004	6	35	44	82	355SUH0570	●
5.80	+0.016/+0.004	6	35	44	82	355SUH0580	●
5.90	+0.016/+0.004	6	35	44	82	355SUH0590	●
6.00	+0.016/+0.004	6	35	44	82	355SUH0600	●
6.10	+0.021/+0.006	8	43	53	91	355SUH0610	●
6.20	+0.021/+0.006	8	43	53	91	355SUH0620	●
6.30	+0.021/+0.006	8	43	53	91	355SUH0630	●
6.40	+0.021/+0.006	8	43	53	91	355SUH0640	●
6.50	+0.021/+0.006	8	43	53	91	355SUH0650	●
6.60	+0.021/+0.006	8	43	53	91	355SUH0660	●
6.70	+0.021/+0.006	8	43	53	91	355SUH0670	●
6.80	+0.021/+0.006	8	43	53	91	355SUH0680	●

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH**
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 355SUH

stainless steel, polished flutes



CARBIDE DRILLS

PU-HPU  
TA-4HTA

**SUH**

ALH

HRC

SUH MINI

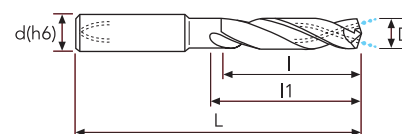
HL

HSD

C-SD-TA

P	M	K	N	S	H
☆	★	☆	☆	☆	

★ 1st choice ☆ suitable



D(m7)	D Tol.	d(h6)	l	l1	L	EDP No.	Stock
6.90	+0.021/+0.006	8	43	53	91	355SUH0690	●
7.00	+0.021/+0.006	8	43	53	91	355SUH0700	●
7.10	+0.021/+0.006	8	43	53	91	355SUH0710	●
7.20	+0.021/+0.006	8	43	53	91	355SUH0720	●
7.30	+0.021/+0.006	8	43	53	91	355SUH0730	●
7.40	+0.021/+0.006	8	43	53	91	355SUH0740	●
7.50	+0.021/+0.006	8	43	53	91	355SUH0750	●
7.60	+0.021/+0.006	8	43	53	91	355SUH0760	●
7.70	+0.021/+0.006	8	43	53	91	355SUH0770	●
7.80	+0.021/+0.006	8	43	53	91	355SUH0780	●
7.90	+0.021/+0.006	8	43	53	91	355SUH0790	●
8.00	+0.021/+0.006	8	43	53	91	355SUH0800	●
8.10	+0.021/+0.006	10	49	61	103	355SUH0810	●
8.20	+0.021/+0.006	10	49	61	103	355SUH0820	●
8.30	+0.021/+0.006	10	49	61	103	355SUH0830	●
8.40	+0.021/+0.006	10	49	61	103	355SUH0840	●
8.50	+0.021/+0.006	10	49	61	103	355SUH0850	●
8.60	+0.021/+0.006	10	49	61	103	355SUH0860	●
8.70	+0.021/+0.006	10	49	61	103	355SUH0870	●
8.80	+0.021/+0.006	10	49	61	103	355SUH0880	●
8.90	+0.021/+0.006	10	49	61	103	355SUH0890	●
9.00	+0.021/+0.006	10	49	61	103	355SUH0900	●
9.10	+0.021/+0.006	10	49	61	103	355SUH0910	●
9.20	+0.021/+0.006	10	49	61	103	355SUH0920	●
9.30	+0.021/+0.006	10	49	61	103	355SUH0930	●
9.40	+0.021/+0.006	10	49	61	103	355SUH0940	●
9.50	+0.021/+0.006	10	61	61	103	355SUH0950	●
9.60	+0.021/+0.006	10	61	61	103	355SUH0960	●
9.70	+0.021/+0.006	10	61	61	103	355SUH0970	●
9.80	+0.021/+0.006	10	61	61	103	355SUH0980	●
9.90	+0.021/+0.006	10	61	61	103	355SUH0990	●
10.00	+0.021/+0.006	10	61	61	103	355SUH1000	●
10.20	+0.025/+0.007	12	71	71	118	355SUH1020	●
10.30	+0.025/+0.007	12	71	71	118	355SUH1030	●
10.50	+0.025/+0.007	12	71	71	118	355SUH1050	●
10.80	+0.025/+0.007	12	71	71	118	355SUH1080	●
11.00	+0.025/+0.007	12	71	71	118	355SUH1100	●
11.20	+0.025/+0.007	12	71	71	118	355SUH1120	●
11.30	+0.025/+0.007	12	71	71	118	355SUH1130	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



INFO

### 355SUH

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH**
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
Vc (m/min)	<b>120÷140</b>	<b>100÷120</b>	<b>70÷90</b>	<b>45÷65</b>	<b>40÷60</b>	<b>15÷25</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
3	0.101	0.075	0.060	0.050	0.065	0.039
4	0.119	0.089	0.071	0.059	0.077	0.046
5	0.137	0.103	0.082	0.069	0.089	0.053
6	0.155	0.117	0.093	0.078	0.101	0.061
7	0.174	0.130	0.104	0.087	0.113	0.068
8	0.192	0.144	0.115	0.096	0.125	0.075
9	0.210	0.158	0.126	0.105	0.137	0.082
10	0.228	0.171	0.137	0.114	0.148	0.089
11	0.238	0.178	0.143	0.119	0.154	0.093
12	0.256	0.192	0.154	0.128	0.166	0.100
13	0.274	0.206	0.164	0.137	0.178	0.107
14	0.292	0.219	0.175	0.146	0.190	0.114
15	0.311	0.233	0.186	0.155	0.202	0.121
16	0.329	0.247	0.197	0.164	0.214	0.128
17	0.338	0.254	0.203	0.169	0.220	0.132
18	0.347	0.260	0.208	0.174	0.226	0.135
19	0.356	0.267	0.214	0.178	0.232	0.139
20	0.366	0.274	0.219	0.183	0.238	0.143

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	M1	M2	M3			
Hardness/Rm						
Vc (m/min)	<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
3	0.065	0.052	0.046			
4	0.077	0.062	0.054			
5	0.089	0.071	0.062			
6	0.101	0.081	0.071			
7	0.113	0.090	0.079			
8	0.125	0.100	0.087			
9	0.137	0.109	0.096			
10	0.148	0.119	0.104			
11	0.154	0.124	0.108			
12	0.166	0.133	0.116			
13	0.178	0.143	0.125			
14	0.190	0.152	0.133			
15	0.202	0.162	0.141			
16	0.214	0.171	0.150			
17	0.220	0.176	0.154			
18	0.226	0.181	0.158			
19	0.232	0.185	0.162			
20	0.238	0.190	0.166			

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

### 355SUH

	Material Group ISO 513	K1	K2	K3	K4		
	Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
	Vc (m/min)	<b>100÷120</b>	<b>80÷100</b>	<b>55÷75</b>	<b>40÷60</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
	3	0.101	0.090	0.080	0.070		
4	0.119	0.107	0.095	0.083			
5	0.137	0.123	0.110	0.096			
6	0.155	0.140	0.124	0.109			
7	0.174	0.156	0.139	0.122			
8	0.192	0.173	0.154	0.134			
9	0.210	0.189	0.168	0.147			
10	0.228	0.206	0.183	0.160			
11	0.238	0.214	0.190	0.166			
12	0.256	0.230	0.205	0.179			
13	0.274	0.247	0.219	0.192			
14	0.292	0.263	0.234	0.205			
15	0.311	0.280	0.249	0.217			
16	0.329	0.296	0.263	0.230			
17	0.338	0.304	0.270	0.237			
18	0.347	0.313	0.278	0.243			
19	0.356	0.321	0.285	0.249			
20	0.366	0.329	0.292	0.256			

	Material Group ISO 513	N2	N4				
	Hardness/Rm						
	Vc (m/min)	<b>180÷220</b>	<b>160÷200</b>				
	D (mm)	fn (mm/rev)	fn (mm/rev)				
	3	0.109	0.096				
4	0.128	0.114					
5	0.148	0.132					
6	0.168	0.149					
7	0.188	0.167					
8	0.207	0.184					
9	0.227	0.202					
10	0.247	0.219					
11	0.257	0.228					
12	0.276	0.246					
13	0.296	0.263					
14	0.316	0.281					
15	0.336	0.298					
16	0.355	0.316					
17	0.365	0.325					
18	0.375	0.333					
19	0.385	0.342					
20	0.395	0.351					

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
**SUH**  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

### 355SUH

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
**SUH**  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	S1	S2	S3	S4	S5			
	Hardness/Rm	<35 HRC		35÷45 HRC				
Vc (m/min)	<b>25÷45</b>		<b>15÷35</b>		<b>40÷60</b>		<b>30÷50</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
<b>3</b>	0.045	0.032	0.043	0.036				
<b>4</b>	0.053	0.037	0.051	0.043				
<b>5</b>	0.062	0.043	0.059	0.049				
<b>6</b>	0.070	0.049	0.066	0.056				
<b>7</b>	0.078	0.055	0.074	0.063				
<b>8</b>	0.086	0.060	0.082	0.069				
<b>9</b>	0.095	0.066	0.090	0.076				
<b>10</b>	0.103	0.072	0.098	0.082				
<b>11</b>	0.107	0.075	0.102	0.086				
<b>12</b>	0.115	0.081	0.109	0.092				
<b>13</b>	0.123	0.086	0.117	0.099				
<b>14</b>	0.132	0.092	0.125	0.105				
<b>15</b>	0.140	0.098	0.133	0.112				
<b>16</b>	0.148	0.104	0.141	0.118				
<b>17</b>	0.152	0.106	0.145	0.122				
<b>18</b>	0.156	0.109	0.148	0.125				
<b>19</b>	0.160	0.112	0.152	0.128				
<b>20</b>	0.164	0.115	0.156	0.132				

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS





INFO

#### CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
**ALH**  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

#### HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

#### CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

#### HSS END-MILLS

#### CARBIDE BURRS

## TYPHOON ALH

HIGH PERFORMANCE - NON-FERROUS MATERIALS

🇬🇧 Drills specifically designed for non-ferrous materials (ISO N).

🇮🇹 Punte progettate appositamente per la foratura di materiali non ferrosi (ISO N).

🇩🇪 Eigens für das Bohren von nicht eisenhaltigen Materialien (ISO N) entwickelte Bohrer.

🇫🇷 Forets conçus spécialement pour le perçage de matériaux non ferreux (ISO N).

🇪🇸 Puntas proyectadas específicamente para el taladro de materiales no ferrosos (ISO N).

🇷🇺 Свёрла, разработанные специально для сверления отверстий в цветных металлах (ISO N).

INFO

**CARBIDE DRILLS**

 PU-HPU  
 TA-4HTA  
 SUH  
**ALH**  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA


- Self-centering geometry: highly accurate holes
- Straight cutting edge and highly positive geometry: low cutting forces to prevent welding
- Chip pocket: wide and curved to improve the chip ejection
- Back taper geometry: improves the cutting efficiency
- Chip pocket finishing: highly polished to reduce welding and improve chip ejection
- Modified oil holes: improves coolant feed
- Substrate: specifically selected for high wear resistance, long and reliable life



- Affûtage autocentré pour l'exécution de trous précis
- Profil de l'arête droit avec affûtage spécifique pour réduire l'effort de coupe
- Géométrie des goujures : arquées et larges pour faciliter l'évacuation des copeaux
- Géométrie du corps avec conicité arrière pour faciliter l'action de coupe
- Finition des goujures : polie pour réduire le problème du collage et faciliter l'évacuation des copeaux
- Trous de lubrification avec géométrie modifiée pour un apport de lubrifiant plus important
- Substrat spécifique pour garantir durée et fiabilité



- Affilatura autocentrante per l'esecuzione di fori precisi
- Profilo del tagliente diritto con affilatura specifica per ridurre lo sforzo di taglio
- Geometria delle gole: arcuate e ampie per agevolare l'evacuazione dei trucioli
- Geometria del corpo con conicità posteriore per agevolare l'azione di taglio
- Finitura gole: lappate per ridurre il problema dell'incollaggio e facilitare l'evacuazione dei trucioli
- Fori di refrigerazione con geometria modificata per un maggior apporto di refrigerante
- Substrato specifico per garantire durata e affidabilità



- Afilado autocentrante para la ejecución de agujeros precisos
- Perfil del borde recto con afilado específico para reducir el esfuerzo de corte
- Geometría de las ranuras: arqueadas y amplias para facilitar la evacuación de las virutas
- Geometría del cuerpo con conicidad posterior para facilitar la acción de corte
- Acabado ranuras: lapeadas para reducir el problema del encolado y facilitar la evacuación de las virutas
- Agujeros de refrigeración con geometría modificada para una mayor aportación de refrigerante
- Substrato específico para garantizar duración y fiabilidad



- Selbstzentrierender Schliff für die Herstellung von präzisen Bohrungen
- Gerades Schneidkantenprofil mit Spezialschliff zur Reduzierung des Schneiddrucks
- Geometrie der Nuten: gebogen und breit zur Vereinfachung der Späneabführung
- Geometrie des Körpers mit konischem hinteren Bereich zur Erleichterung des Schnitvorgangs
- Schlichtbearbeitung der Nuten: geläpft, um Probleme durch Verkleben zu reduzieren und um die Späneabführung zu erleichtern
- Kühlöffnungen mit abgeänderter Geometrie für einen verbesserten Kühlmittelzufluss
- Spezielles Trägermaterial zur Gewährleistung von Lebensdauer und Zuverlässigkeit



- Самоцентрирующаяся геометрия: высокая точность отверстий
- Прямые режущие кромки и большой передний угол: низкие силы резания
- Стружечные канавки: широкие с большим наклоном для надежной эвакуации стружки
- Геометрия с обратным конусом: увеличивает эффективность обработки
- Отполированные стружечные канавки: уменьшают вероятность приваривания стружки и облегчают ее вывод
- Большие отверстия: увеличена эффективность подвода СОЖ
- Специальное покрытие для повышения стойкости инструмента

**HSS DRILLS**

 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE END-MILLS**

 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

**HSS END-MILLS**
**CARBIDE BURRS**

# 353ALH

aluminium, polished flutes



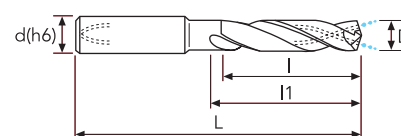
INFO



★ 1st choice ☆ suitable

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH**
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



D(m7)	D Tol.	d(h6)	l	l1	L	EDP No.	Stock
3.00	+0.012/+0.002	6	14	20	62	353ALH0300	●
3.10	+0.016/+0.004	6	14	20	62	353ALH0310	●
3.20	+0.016/+0.004	6	14	20	62	353ALH0320	●
3.30	+0.016/+0.004	6	14	20	62	353ALH0330	●
3.40	+0.016/+0.004	6	14	20	62	353ALH0340	●
3.50	+0.016/+0.004	6	14	20	62	353ALH0350	●
3.60	+0.016/+0.004	6	14	20	62	353ALH0360	●
3.70	+0.016/+0.004	6	14	20	62	353ALH0370	●
3.80	+0.016/+0.004	6	17	24	66	353ALH0380	●
3.90	+0.016/+0.004	6	17	24	66	353ALH0390	●
4.00	+0.016/+0.004	6	17	24	66	353ALH0400	●
4.10	+0.016/+0.004	6	17	24	66	353ALH0410	●
4.20	+0.016/+0.004	6	17	24	66	353ALH0420	●
4.30	+0.016/+0.004	6	17	24	66	353ALH0430	●
4.40	+0.016/+0.004	6	17	24	66	353ALH0440	○
4.50	+0.016/+0.004	6	17	24	66	353ALH0450	●
4.60	+0.016/+0.004	6	17	24	66	353ALH0460	●
4.70	+0.016/+0.004	6	17	24	66	353ALH0470	●
4.80	+0.016/+0.004	6	20	28	66	353ALH0480	●
4.90	+0.016/+0.004	6	20	28	66	353ALH0490	○
5.00	+0.016/+0.004	6	20	28	66	353ALH0500	●
5.10	+0.016/+0.004	6	20	28	66	353ALH0510	●
5.20	+0.016/+0.004	6	20	28	66	353ALH0520	●
5.30	+0.016/+0.004	6	20	28	66	353ALH0530	●
5.40	+0.016/+0.004	6	20	28	66	353ALH0540	○
5.50	+0.016/+0.004	6	20	28	66	353ALH0550	●
5.60	+0.016/+0.004	6	20	28	66	353ALH0560	●
5.70	+0.016/+0.004	6	20	28	66	353ALH0570	●
5.80	+0.016/+0.004	6	20	28	66	353ALH0580	●
5.90	+0.016/+0.004	6	20	28	66	353ALH0590	○
6.00	+0.016/+0.004	6	20	28	66	353ALH0600	●
6.10	+0.021/+0.006	8	24	34	79	353ALH0610	●
6.20	+0.021/+0.006	8	24	34	79	353ALH0620	●
6.30	+0.021/+0.006	8	24	34	79	353ALH0630	●
6.40	+0.021/+0.006	8	24	34	79	353ALH0640	○
6.50	+0.021/+0.006	8	24	34	79	353ALH0650	●
6.60	+0.021/+0.006	8	24	34	79	353ALH0660	○
6.70	+0.021/+0.006	8	24	34	79	353ALH0670	●
6.80	+0.021/+0.006	8	24	34	79	353ALH0680	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 353ALH

aluminium, polished flutes

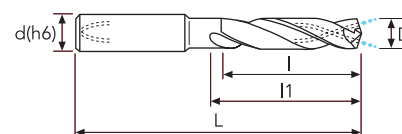


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH**
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



★ 1st choice ☆ suitable



D(m7)	D Tol.	d(h6)	l	l1	L	EDP No.	Stock
6.90	+0.021/+0.006	8	24	34	79	353ALH0690	○
7.00	+0.021/+0.006	8	24	34	79	353ALH0700	●
7.10	+0.021/+0.006	8	29	41	79	353ALH0710	○
7.20	+0.021/+0.006	8	29	41	79	353ALH0720	●
7.30	+0.021/+0.006	8	29	41	79	353ALH0730	○
7.40	+0.021/+0.006	8	29	41	79	353ALH0740	○
7.50	+0.021/+0.006	8	29	41	79	353ALH0750	●
7.60	+0.021/+0.006	8	29	41	79	353ALH0760	○
7.70	+0.021/+0.006	8	29	41	79	353ALH0770	○
7.80	+0.021/+0.006	8	29	41	79	353ALH0780	●
7.90	+0.021/+0.006	8	29	41	79	353ALH0790	○
8.00	+0.021/+0.006	8	29	41	79	353ALH0800	●
8.10	+0.021/+0.006	10	35	47	89	353ALH0810	○
8.20	+0.021/+0.006	10	35	47	89	353ALH0820	●
8.30	+0.021/+0.006	10	35	47	89	353ALH0830	●
8.40	+0.021/+0.006	10	35	47	89	353ALH0840	○
8.50	+0.021/+0.006	10	35	47	89	353ALH0850	●
8.60	+0.021/+0.006	10	35	47	89	353ALH0860	●
8.70	+0.021/+0.006	10	35	47	89	353ALH0870	○
8.80	+0.021/+0.006	10	35	47	89	353ALH0880	●
8.90	+0.021/+0.006	10	35	47	89	353ALH0890	○
9.00	+0.021/+0.006	10	35	47	89	353ALH0900	●
9.10	+0.021/+0.006	10	35	47	89	353ALH0910	○
9.20	+0.021/+0.006	10	35	47	89	353ALH0920	○
9.30	+0.021/+0.006	10	35	47	89	353ALH0930	○
9.40	+0.021/+0.006	10	35	47	89	353ALH0940	○
9.50	+0.021/+0.006	10	35	47	89	353ALH0950	●
9.60	+0.021/+0.006	10	35	47	89	353ALH0960	○
9.70	+0.021/+0.006	10	35	47	89	353ALH0970	○
9.80	+0.021/+0.006	10	35	47	89	353ALH0980	○
9.90	+0.021/+0.006	10	35	47	89	353ALH0990	○
10.00	+0.021/+0.006	10	35	47	89	353ALH1000	●
10.20	+0.025/+0.007	12	40	55	102	353ALH1020	●
10.30	+0.025/+0.007	12	40	55	102	353ALH1030	●
10.50	+0.025/+0.007	12	40	55	102	353ALH1050	●
10.80	+0.025/+0.007	12	40	55	102	353ALH1080	○
11.00	+0.025/+0.007	12	40	55	102	353ALH1100	●
11.20	+0.025/+0.007	12	40	55	102	353ALH1120	○
11.30	+0.025/+0.007	12	40	55	102	353ALH1130	○

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



INFO

### 353ALH

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
**ALH**  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	N1	N2	N3 N4	N5		
Hardness/Rm						
Vc (m/min)	<b>260±300</b>	<b>230±270</b>	<b>200±240</b>	<b>280±320</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
<b>3</b>	0.160	0.152	0.136	0.176		
<b>4</b>	0.190	0.181	0.162	0.209		
<b>5</b>	0.220	0.209	0.187	0.242		
<b>6</b>	0.250	0.238	0.213	0.275		
<b>7</b>	0.280	0.266	0.238	0.308		
<b>8</b>	0.310	0.295	0.264	0.341		
<b>9</b>	0.340	0.323	0.289	0.374		
<b>10</b>	0.370	0.352	0.315	0.407		
<b>11</b>	0.400	0.380	0.340	0.440		
<b>12</b>	0.430	0.409	0.366	0.473		
<b>13</b>	0.460	0.437	0.391	0.506		
<b>14</b>	0.490	0.466	0.417	0.539		
<b>15</b>	0.520	0.494	0.442	0.572		
<b>16</b>	0.550	0.523	0.468	0.605		
<b>17</b>	0.580	0.551	0.493	0.638		
<b>18</b>	0.610	0.580	0.519	0.671		
<b>19</b>	0.640	0.608	0.544	0.704		
<b>20</b>	0.670	0.637	0.570	0.737		

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# 355ALH

aluminium, polished flutes



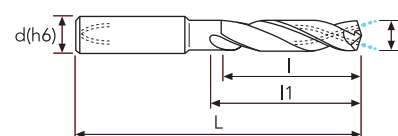
INFO



★ 1st choice ☆ suitable

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH**
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



D(m7)	D Tol.	d(h6)	l	l1	L	EDP No.	Stock
3.00	+0.012/+0.002	6	23	28	66	355ALH0300	●
3.10	+0.016/+0.004	6	23	28	66	355ALH0310	○
3.20	+0.016/+0.004	6	23	28	66	355ALH0320	●
3.30	+0.016/+0.004	6	23	28	66	355ALH0330	●
3.40	+0.016/+0.004	6	23	28	66	355ALH0340	●
3.50	+0.016/+0.004	6	23	28	66	355ALH0350	●
3.60	+0.016/+0.004	6	23	28	66	355ALH0360	●
3.70	+0.016/+0.004	6	23	28	66	355ALH0370	●
3.80	+0.016/+0.004	6	29	36	74	355ALH0380	●
3.90	+0.016/+0.004	6	29	36	74	355ALH0390	○
4.00	+0.016/+0.004	6	29	36	74	355ALH0400	●
4.10	+0.016/+0.004	6	29	36	74	355ALH0410	○
4.20	+0.016/+0.004	6	29	36	74	355ALH0420	●
4.30	+0.016/+0.004	6	29	36	74	355ALH0430	●
4.40	+0.016/+0.004	6	29	36	74	355ALH0440	○
4.50	+0.016/+0.004	6	29	36	74	355ALH0450	●
4.60	+0.016/+0.004	6	29	36	74	355ALH0460	○
4.70	+0.016/+0.004	6	29	36	74	355ALH0470	○
4.80	+0.016/+0.004	6	35	44	82	355ALH0480	●
4.90	+0.016/+0.004	6	35	44	82	355ALH0490	○
5.00	+0.016/+0.004	6	35	44	82	355ALH0500	●
5.10	+0.016/+0.004	6	35	44	82	355ALH0510	●
5.20	+0.016/+0.004	6	35	44	82	355ALH0520	●
5.30	+0.016/+0.004	6	35	44	82	355ALH0530	○
5.40	+0.016/+0.004	6	35	44	82	355ALH0540	○
5.50	+0.016/+0.004	6	35	44	82	355ALH0550	●
5.60	+0.016/+0.004	6	35	44	82	355ALH0560	●
5.70	+0.016/+0.004	6	35	44	82	355ALH0570	○
5.80	+0.016/+0.004	6	35	44	82	355ALH0580	●
5.90	+0.016/+0.004	6	35	44	82	355ALH0590	○
6.00	+0.016/+0.004	6	35	44	82	355ALH0600	●
6.10	+0.021/+0.006	8	43	53	91	355ALH0610	○
6.20	+0.021/+0.006	8	43	53	91	355ALH0620	●
6.30	+0.021/+0.006	8	43	53	91	355ALH0630	○
6.40	+0.021/+0.006	8	43	53	91	355ALH0640	○
6.50	+0.021/+0.006	8	43	53	91	355ALH0650	●
6.60	+0.021/+0.006	8	43	53	91	355ALH0660	○
6.70	+0.021/+0.006	8	43	53	91	355ALH0670	●
6.80	+0.021/+0.006	8	43	53	91	355ALH0680	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



INFO

# 355ALH

aluminium, polished flutes

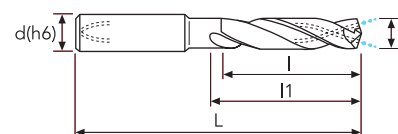


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH**
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



★ 1st choice ☆ suitable



D(m7)	D Tol.	d(h6)	l	l1	L	EDP No.	Stock
6.90	+0.021/+0.006	8	43	53	91	355ALH0690	●
7.00	+0.021/+0.006	8	43	53	91	355ALH0700	●
7.10	+0.021/+0.006	8	43	53	91	355ALH0710	○
7.20	+0.021/+0.006	8	43	53	91	355ALH0720	●
7.30	+0.021/+0.006	8	43	53	91	355ALH0730	○
7.40	+0.021/+0.006	8	43	53	91	355ALH0740	○
7.50	+0.021/+0.006	8	43	53	91	355ALH0750	●
7.60	+0.021/+0.006	8	43	53	91	355ALH0760	○
7.70	+0.021/+0.006	8	43	53	91	355ALH0770	○
7.80	+0.021/+0.006	8	43	53	91	355ALH0780	●
7.90	+0.021/+0.006	8	43	53	91	355ALH0790	○
8.00	+0.021/+0.006	8	43	53	91	355ALH0800	●
8.10	+0.021/+0.006	10	49	61	103	355ALH0810	○
8.20	+0.021/+0.006	10	49	61	103	355ALH0820	●
8.30	+0.021/+0.006	10	49	61	103	355ALH0830	○
8.40	+0.021/+0.006	10	49	61	103	355ALH0840	○
8.50	+0.021/+0.006	10	49	61	103	355ALH0850	●
8.60	+0.021/+0.006	10	49	61	103	355ALH0860	○
8.70	+0.021/+0.006	10	49	61	103	355ALH0870	○
8.80	+0.021/+0.006	10	49	61	103	355ALH0880	●
8.90	+0.021/+0.006	10	49	61	103	355ALH0890	○
9.00	+0.021/+0.006	10	49	61	103	355ALH0900	●
9.10	+0.021/+0.006	10	49	61	103	355ALH0910	○
9.20	+0.021/+0.006	10	49	61	103	355ALH0920	○
9.30	+0.021/+0.006	10	49	61	103	355ALH0930	○
9.40	+0.021/+0.006	10	49	61	103	355ALH0940	○
9.50	+0.021/+0.006	10	61	61	103	355ALH0950	●
9.60	+0.021/+0.006	10	61	61	103	355ALH0960	○
9.70	+0.021/+0.006	10	61	61	103	355ALH0970	○
9.80	+0.021/+0.006	10	61	61	103	355ALH0980	○
9.90	+0.021/+0.006	10	61	61	103	355ALH0990	○
10.00	+0.021/+0.006	10	61	61	103	355ALH1000	●
10.20	+0.025/+0.007	12	71	71	118	355ALH1020	●
10.50	+0.025/+0.007	12	71	71	118	355ALH1050	●
10.80	+0.025/+0.007	12	71	71	118	355ALH1080	○
11.00	+0.025/+0.007	12	71	71	118	355ALH1100	●
11.20	+0.025/+0.007	12	71	71	118	355ALH1120	○
11.30	+0.025/+0.007	12	71	71	118	355ALH1130	○
11.50	+0.025/+0.007	12	71	71	118	355ALH1150	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion





INFO

### 355ALH

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH**
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	N1	N2	N3 N4	N5		
Hardness/Rm						
Vc (m/min)	<b>240÷280</b>	<b>200÷240</b>	<b>180÷200</b>	<b>260÷300</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
<b>3</b>	0.136	0.129	0.116	0.150		
<b>4</b>	0.162	0.153	0.137	0.178		
<b>5</b>	0.187	0.178	0.159	0.206		
<b>6</b>	0.213	0.202	0.181	0.234		
<b>7</b>	0.238	0.226	0.202	0.262		
<b>8</b>	0.264	0.250	0.224	0.290		
<b>9</b>	0.289	0.275	0.246	0.318		
<b>10</b>	0.315	0.299	0.267	0.346		
<b>11</b>	0.340	0.323	0.289	0.374		
<b>12</b>	0.366	0.347	0.311	0.402		
<b>13</b>	0.391	0.371	0.332	0.430		
<b>14</b>	0.417	0.396	0.354	0.458		
<b>15</b>	0.442	0.420	0.376	0.486		
<b>16</b>	0.468	0.444	0.397	0.514		
<b>17</b>	0.493	0.468	0.419	0.542		
<b>18</b>	0.519	0.493	0.441	0.570		
<b>19</b>	0.544	0.517	0.462	0.598		
<b>20</b>	0.570	0.541	0.484	0.626		

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

#### CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
**HRC**  
SUH MINI  
HL  
HSD  
C-SD-TA

#### HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

#### CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

#### HSS END-MILLS

#### CARBIDE BURRS

## TYPHOON HRC

HIGH PERFORMANCE - HARDENED STEEL 45÷62 HRC

✚ Reliable high precision drills for hardened steel 45÷62 HRC.

🇮🇹 Punte ad alta precisione per la foratura di acciai temprati 45÷62 HRC.

🇩🇪 Hohe Präzision und zuverlässige Bohrungen für gehärteten Stahl 45÷62 HRC.

🇫🇷 Forets haute précision et fiables pour acier trempé 45÷62 HRC.

🇪🇸 Brocas de alta precisión para aceros templados 45÷62 HRC.

🇷🇺 Высокоточные и высокопроизводительные сверла для обработки сталей с твердостью 45÷62 HRC.

**TYPHOON HRC**

HIGH PERFORMANCE - HARDENED STEEL 45÷62 HRC

INFO

**CARBIDE DRILLS**

 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
**HRC**  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA


- Drills for hardened steel 45÷62 HRC
- Self-centering geometry: high accurate holes
- Straight and reinforced edge: high stability and chipping resistance
- 45° chamfer: edge corners protection
- Thicker web: high rigidity and stability
- 15° helix angle: low helix for higher rigidity
- Substrate and coating: specifically selected for high wear resistance, long and reliable life



- Forets pour aciers trempés 45÷62 HRC
- Affûtage autocentré pour l'exécution de trous précis
- Profil de l'arête droit et renforcé
- Géométrie des angles : protection avec biseau à 45°
- Cœur très épais pour garantir rigidité et stabilité
- Angle de l'hélice à 15° : angle peu accentué pour une solidité maximale
- Substrat et revêtement spécifiques pour garantir durée et fiabilité



- Punta per acciai temprati 45÷62 HRC
- Affilatura autocentrante per l'esecuzione di fori precisi
- Profilo del tagliente diritto e rinforzato
- Geometria degli spigoli: protezione con smusso a 45°
- Nocciolo molto spesso per garantire rigidità e stabilità
- Angolo dell'elica a 15°: angolo poco accentuato per massima robustezza
- Substrato e rivestimento specifici per garantire durata e affidabilità



- Brocas para aceros templados 45÷62 HRC
- Geometría autocentrante para la realización de agujeros precisos
- Perfil del filo recto y reforzado
- Geometría de las bordes: protección con redondeo a 45°
- Núcleo muy grueso para garantizar rigidez y estabilidad
- Ángulo de la hélice a 15°: ángulo poco acentuado para la máxima resistencia
- Substrato y revestimiento específicos para garantizar duración y fiabilidad



- Bohrer für gehärteten Stahl 45-62 HRC
- Selbstzentrierender Schliff für die Herstellung von präzisen Bohrungen
- Gerades und verstärktes Schneidkantenprofil
- Geometrie der Kanten: Schutzfase mit 45°
- Sehr starker Kern zur Gewährleistung von Steifigkeit und Stabilität
- Anstellwinkel 15°: geringer Winkel für maximale Robustheit
- Spezielles Trägermaterial und spezielle Beschichtung zur Gewährleistung von Standzeit und Zuverlässigkeit



- Свёрла для закалённой стали 45÷62 HRC
- Самоцентрирующаяся геометрия: высокая точность отверстий
- Прямые усиленные кромки: высокая стабильность резания и предотвращение пакетирования
- Фаска 45°: защита кромок
- Утолщенная сердцевина: высокая жесткость и стабильность
- Угол наклона винтовой канавки 15°: маленький угол для высокой жесткости
- Специальное покрытие для повышения стойкости инструмента

**HSS DRILLS**

 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE END-MILLS**

 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

**HSS END-MILLS**
**CARBIDE BURRS**

# 353HRC

hardened steel 45±62 HRC



3XD

DIN  
6537K

HRC

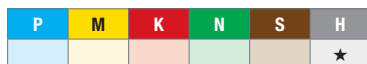
MG  
PV1000

45±62  
HRC

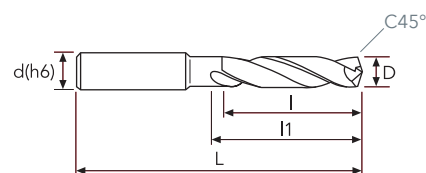
150°+C45°

15°

INFO



★ 1st choice ☆ suitable



**CARBIDE DRILLS**

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC**
- SUH MINI
- HL
- HSD
- C-SD-TA

D(h7)	D Tol.	d(h6)	l	l1	L	EDP No.	Stock
2.60	0/-0.010	6	14	20	62	353HRC0260	●
3.00	0/-0.010	6	14	20	62	353HRC0300	●
3.30	0/-0.012	6	14	20	62	353HRC0330	●
3.40	0/-0.012	6	14	20	62	353HRC0340	●
3.50	0/-0.012	6	14	20	62	353HRC0350	●
3.70	0/-0.012	6	14	20	62	353HRC0370	●
3.80	0/-0.012	6	17	24	66	353HRC0380	●
4.00	0/-0.012	6	17	24	66	353HRC0400	●
4.10	0/-0.012	6	17	24	66	353HRC0410	●
4.20	0/-0.012	6	17	24	66	353HRC0420	●
4.30	0/-0.012	6	17	24	66	353HRC0430	●
4.50	0/-0.012	6	17	24	66	353HRC0450	●
4.60	0/-0.012	6	17	24	66	353HRC0460	●
4.80	0/-0.012	6	20	28	66	353HRC0480	●
5.00	0/-0.012	6	20	28	66	353HRC0500	●
5.10	0/-0.012	6	20	28	66	353HRC0510	●
5.20	0/-0.012	6	20	28	66	353HRC0520	●
5.30	0/-0.012	6	20	28	66	353HRC0530	●
5.50	0/-0.012	6	20	28	66	353HRC0550	●
5.60	0/-0.012	6	20	28	66	353HRC0560	●
5.80	0/-0.012	6	20	28	66	353HRC0580	●
6.00	0/-0.012	6	20	28	66	353HRC0600	●
6.10	0/-0.015	8	29	41	79	353HRC0610	●
6.20	0/-0.015	8	29	41	79	353HRC0620	●
6.50	0/-0.015	8	29	41	79	353HRC0650	●
6.80	0/-0.015	8	29	41	79	353HRC0680	●
6.90	0/-0.015	8	29	41	79	353HRC0690	●
7.00	0/-0.015	8	29	41	79	353HRC0700	●
7.40	0/-0.015	8	29	41	79	353HRC0740	●
7.50	0/-0.015	8	29	41	79	353HRC0750	●
7.80	0/-0.015	8	29	41	79	353HRC0780	●
8.00	0/-0.015	8	29	41	79	353HRC0800	●
8.10	0/-0.015	10	35	47	89	353HRC0810	●
8.20	0/-0.015	10	35	47	89	353HRC0820	●
8.50	0/-0.015	10	35	47	89	353HRC0850	●
8.60	0/-0.015	10	35	47	89	353HRC0860	●
8.70	0/-0.015	10	35	47	89	353HRC0870	●
8.80	0/-0.015	10	35	47	89	353HRC0880	●
9.00	0/-0.015	10	35	47	89	353HRC0900	●

**HSS DRILLS**

- LFTA
- SUTA
- HSS-HSS/CO

**CARBIDE END-MILLS**

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

**HSS END-MILLS**

**CARBIDE BURRS**

● stock standard ○ non-standard stock ▽ stock exhaustion



CUTTING PARAMETERS

### 353HRC

Material Group ISO 513	H1 H4	H2	H3	H5		
	Hardness/Rm	50÷65 HRC	54÷62 HRC	60÷65 HRC	48÷65 HRC	
Vc (m/min)	<b>15÷25</b>	<b>12÷18</b>	<b>8÷12</b>	<b>20÷30</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
<b>3</b>	0,020	0,017	0,013	0,020		
<b>4</b>	0,030	0,026	0,020	0,030		
<b>5</b>	0,040	0,034	0,026	0,040		
<b>6</b>	0,050	0,043	0,033	0,050		
<b>7</b>	0,060	0,051	0,039	0,060		
<b>8</b>	0,070	0,060	0,046	0,070		
<b>9</b>	0,080	0,068	0,052	0,080		
<b>10</b>	0,090	0,077	0,059	0,090		
<b>11</b>	0,100	0,085	0,065	0,100		
<b>12</b>	0,110	0,094	0,072	0,110		
<b>13</b>	0,120	0,102	0,078	0,120		
<b>14</b>	0,130	0,111	0,085	0,130		
<b>15</b>	0,140	0,119	0,091	0,140		
<b>16</b>	0,150	0,128	0,098	0,150		



INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
**HRC**  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS







INFO

#### CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

#### HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

#### CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

## TYPHOON SUH MINI

HIGH PERFORMANCE - MINIATURE SHORT, LONG AND EXTRA LONG

✚ Miniature drills, from short (5xD) to extra-long (30xD) type, suitable for ISO P, M, K, N, S materials.

🇮🇹 Mini punte corte (5xD), lunghe ed extra-lunghe (30xD), adatte alla foratura di materiali ISO P, M, K, N, S.

🇩🇪 Kurze (5xD), lange und extra-lange (30xD) Kleinstbohrer für das Bohren der Materialien ISO P, M, K, N, S.

🇫🇷 Mini forets courts (5xD), longs et extra-longs (30xD), appropriés au perçage de matériaux ISO P, M, K, N, S.

🇪🇸 Mini brocas cortas (5xD), largas y extra largas (30xD), adecuadas para el taladro de materiales ISO P, M, K, N, S.

🇷🇺 Мини-свёрла от коротких (5xD) до супердлинных (30xD). Пригодны для обработки отверстий в материалах по ISO P, M, K, N, S.

#### HSS END-MILLS

#### CARBIDE BURRS

INFO



- Miniature drills are manufactured with unified 3 mm shank
- Oil holes for internal coolant feed
- Self-centering geometry: highly accurate holes
- Straight and reinforced edge: high stability and chipping resistance
- Edge geometry: special design for edge and corners protection
- Chip pocket: highly polished to prevent welding and to improve the chip ejection
- Substrate and coating: specifically selected for high wear resistance, long and reliable life
- Available from Ø1 mm to Ø3 mm
- Different cutting length types from short (5xD) to extra-long (30xD)



- Mini forets fabriqués avec une tige unifiée ayant un diamètre de 3 mm
- Trous de lubrification
- Affûtage autocentré pour l'exécution de trous précis et peu d'efforts de coupe
- Profil de l'arête droit et renforcé : il génère des copeaux courts et garantit une grande fiabilité
- Géométrie de l'arête avec affûtage spécifique pour protéger l'arête et les angles
- Finition des goujures : polie pour réduire le problème du collage et faciliter l'évacuation des copeaux
- Substrat et revêtement : spécifiques pour garantir durée et fiabilité
- Disponibles du Ø1 mm au Ø3 mm
- Différents types de longueur, de la plus courte (5xD) aux extra-longues (30xD)



- Mini-punte costruite con gambo unificato Ø3 mm
- Fori di refrigerazione
- Affilatura autocentrante per l'esecuzione di fori precisi e bassi sforzi di taglio
- Profilo del tagliente diritto e rinforzato: genera trucioli corti e garantisce grande affidabilità
- Geometria del tagliente con affilatura specifica a protezione del tagliente e degli spigoli
- Finitura gole: lappate per ridurre il problema dell'incollaggio e facilitare l'evacuazione dei trucioli
- Substrato e rivestimento: specifici per garantire durata e affidabilità
- Disponibili da Ø1 mm a Ø3 mm
- Differenti tipi di lunghezza, dalle corte (5XD) alle extra-lunghe (30XD)



- Mini-brocas fabricadas con mango unificado con diámetro de 3 mm
- Agujeros de refrigeración
- Afilado autocentrante para la realización de agujeros precisos y bajos esfuerzos de corte
- Perfil del filo recto y reforzado: genera virutas cortas y garantiza una gran fiabilidad
- Geometría del filo con afilado específico para proteger el filo y los ángulos
- Acabado ranuras: lapeadas para reducir el problema del encolado y facilitar la evacuación de las virutas
- Sustrato y revestimiento: específicos para garantizar duración y fiabilidad
- Disponibles de Ø1 mm a Ø3mm
- Diferentes tipos de longitud, desde las cortas (5XD) hasta las extra-largas (30XD)



- Kleinbohrer mit genormtem Schaft und einem Durchmesser von 3 mm
- Kühlöffnungen
- Selbstzentrierender Schliff für präzise Bohrungen und geringen Schneiddruck
- Gerades und verstärktes Schneidkantenprofil: zur Erzeugung kurzer Späne und zur Gewährleistung hoher Zuverlässigkeit
- Geometrie der Schneidkante mit speziellem Schliff zum Schutz von Schneidkante und Kanten
- Schlichtbearbeitung der Nuten: geläpft, um Probleme durch Verkleben zu reduzieren und um die Späneabführung zu erleichtern
- Trägermaterial und Beschichtung: speziell zur Gewährleistung von Standzeit und Zuverlässigkeit
- Erhältlich von Ø1 mm bis Ø3 mm
- Verschiedene Längen, von kurz (5XD) bis extra-lang (30XD)



- Мини-свёрла с унифицированным 3х мм хвостовиком
- Отверстия для подвода СОЖ
- Самоцентрирующаяся геометрия: высокая точность отверстий
- Прямые усиленные кромки: высокая стабильность резания и предотвращение пакетирования
- Геометрия режущей кромки со специальной заточкой для защиты лезвия и кромок
- Отполированные стружечные канавки: уменьшают вероятность приваривания стружки и облегчают ее вывод
- Специальное покрытие для повышения стойкости инструмента
- Доступны диаметром от Ø1 мм до Ø3 мм
- Различные длины: от коротких (5XD) до супердлинных (30XD)

**CARBIDE DRILLS**

 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
**SUH MINI**  
 HL  
 HSD  
 C-SD-TA

**HSS DRILLS**

 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE END-MILLS**

 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

**HSS END-MILLS**
**CARBIDE BURRS**

**MACHINING OF DEEP HOLES  
PERPENDICULAR TO THE SURFACE**

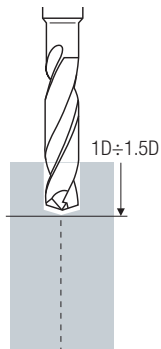
**ESECUZIONE FORI PROFONDI  
ORTOGONALI ALLA SUPERFICIE**

**HERSTELLUNG TIEFER RECHTWINKLIGER  
BOHRUNGEN**

**EXÉCUTION DE TROUS PROFONDS  
ORTHOGONAUX À LA SURFACE**

**MECANIZADO DE AGUJEROS PROFUNDOS  
PERPENDICULARES A LA SUPERFÍCIE**

**СВЕРЛЕНИЕ ГЛУБОКИХ ОТВЕРСТИЙ ПЕРПЕНДИКУЛЯРНО  
ОБРАБАТЫВАЕМОЙ ПОВЕРХНОСТИ**


**STEP 1**

As pilot drill (1xD,1.5xD), please use 343TA with head angle 140° (SUH MINI=135°) and m7 tolerance (SUH MINI=h7)

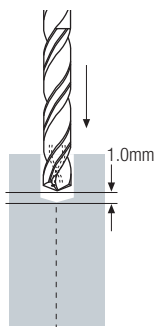
Utilizzare una punta 343TA con angolo in testa di 140° (SUH MINI=135°) e tolleranza m7 (SUH MINI=h7), per eseguire un foro pilota (1xD -1.5xD) molto preciso

Einen Bohrer 343TA mit einem Spitzenwinkel von 140° (SUH MINI=135°) und Toleranz m7 (SUH MINI=h7) für die Herstellung einer äußerst präzisen Richtbohrung (1xD - 1.5xD) verwenden.

Utiliser un foret 343TA avec un angle en bout de 140° (SUH MINI=135°) et une tolérance m7 (SUH MINI=h7), pour effectuer un trou pilote (1xD -1.5xD) très précis.

Utilice una broca 343TA con ángulo de punta de 140° (SUH MINI=135°) y tolerancia m7 (SUH MINI=h7), para realizar un agujero piloto (1xD -1,5xD) muy preciso

Для пилотного отверстия (1xD -1.5xD) используйте сверло 343TA с углом при вершине 140° (SUH MINI=135°) и допуском на диаметр m7 (SUH MINI=h7).


**STEP 2**

With coolant feed OFF, enter the pilot hole with SUH MINI drill at Vc=20 m/min and fn=0.3 mm/rev. Position the SUH MINI drill at 1 mm from the end of the pilot hole, then start supplying the coolant and start drilling.

Senza azionare il refrigerante interno, entrare con la punta lunga serie SUH MINI all'interno del foro. Vc=20 m/min, fn=0.3 mm/rev. Posizionare la punta SUH MINI sino a 1 mm dal fondo del foro pilota. Azionare il refrigerante interno ad alta pressione e cominciare la foratura.

Ohne Aktivierung der internen Kühlung, einen langen Bohrer der Serie SUH MINI in die Bohrung einführen. Vc=20 m/min, fn=0,3 mm/U. Den Bohrer SUH MINI bis 1 mm vom Ende der Richtbohrung ansetzen. Die interne Kühlung mit Hochdruck aktivieren und mit der Bohrung beginnen.

Sans actionner la lubrification interne, entrer avec le foret long série SUH MINI à l'intérieur du trou. Vc=20 m/min, fn=0.3 mm/rév. Placer le foret SUH MINI jusqu'à 1 mm du fond du trou pilote. Actionner la lubrification interne à haute pression et commencer le perçage.

Sin accionar el refrigerante interno, entre con la broca larga de la serie SUH MINI dentro del agujero. Vc=20m/min, fn=0.3mm/rev. Posicione la broca SUH MINI hasta 1 mm. del fondo del agujero piloto. Accione el refrigerante interno a alta presión y comience el taladro.

Без подачи СОЖ, введите длинное сверло серии SUH MINI внутрь пилотного отверстия с режимами Vc=20 м/мин и fn=0,3 мм/об. Спозиционируйте сверло SUH MINI на расстоянии 1 мм от дна отверстия. Включите подачу СОЖ и начните сверление.

**TYPHOON SUH MINI**

## HIGH PERFORMANCE - MINIATURE SHORT AND LONG

INFO

**CARBIDE DRILLS**

 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
**SUH MINI**  
 HL  
 HSD  
 C-SD-TA

**STEP 3**


Make continue drilling operation without steps for chip ejection. In case of through holes, reduce the feed by 30% before the hole exit (approx. 1 mm). Stop the coolant feed. Use the step drilling process whenever the chip ejection becomes poor.



Forare senza step per scarico trucioli. Nel caso di fori passanti, 1 mm prima di aver completato il foro, ridurre l'avanzamento del 30%. Fermare il refrigerante. Utilizzare il processo di foratura a step nel caso di evacuazione trucioli problematica.



Für die Späneabführung Stufenlos bohren. Bei Durchgangsbohrungen 1 mm vor Fertigstellung der Bohrung den Vorschub um 30% reduzieren. Die Kühlung deaktivieren. Man soll bei schlechter Spanabfuhr einen Step-Bohrvorgang machen.



Perçer sans step pour l'évacuation des copeaux. En présence de trous débouchants, 1 mm avant d'avoir terminé le trou, réduire l'avance de 30 %. Arrêter la lubrification. Man soll bei schlechter Spanabfuhr einen Step-Bohrvorgang machen.

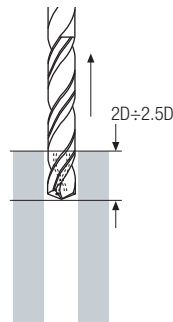


Taladre sin step para la descarga de virutas. En el caso de agujeros pasantes, 1 mm antes de haber completado el agujero, reduzca el avance un 30%. Pare el refrigerante. Aplicar taladrado a step (por pasos) en el caso de problemas de evacuación de viruta.



Сверлите без остановок и выводов инструмента. В случае обработки сквозного отверстия, снизьте подачу на 30%, за 1 мм до выхода. Отключите подачу СОЖ. Используйте пошаговый процесс сверления при недостаточном удалении стружки.

**HSS DRILLS**

 LFTA  
 SUTA  
 HSS-HSS/CO

**STEP 4**


Withdraw the drill using max rpm and double fn, until 2xD from the hole entrance.



Ritirare la punta utilizzando il massimo dei giri disponibili e il doppio dell'avanzamento consigliato sino ad una profondità 2xD.



Den Bohrer zurückziehen, dabei die maximal verfügbare Drehzahl und den doppelten Wert des empfohlenen Vorschubs bis zu einer Tiefe 2xD einsetzen.



Retirer le foret en utilisant le maximum de tours disponibles et le double de l'avancement conseillé jusqu'à une profondeur 2xD.



Retire la broca utilizando el máximo de rpm disponibles y el doble del avance aconsejado hasta una profundidad 2xD.



Выньте сверло до уровня 2xD, используя максимальную частоту вращения и двойную подачу.

**CARBIDE END-MILLS**

 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

**STEP 5**


Completing the exit from the hole by using slow and constant speed (200-300 rpm).



Completare l'ultimo tratto di arretramento con velocità ridotta e costante (200-300 rpm).



Den letzten Abschnitt beim Zurückziehen mit reduzierter und konstanter Geschwindigkeit fertigstellen (200-300 rpm).



Terminer la dernière partie du perçage avec une vitesse réduite et constante (200-300 rpm).



Complete el último tramo de retroceso con velocidad reducida y constante (200-300 rpm).



Полностью выньте сверло на заниженных режимах (200-300 rpm).

**HSS END-MILLS**
**CARBIDE BURRS**

**MACHINING OF DEEP HOLES ON  
SLANTED OR IRREGULAR SURFACES**
**ESECUZIONE FORI PROFONDI SU  
SUPERFICI IRREGOLARI O OBLIQUE**
**HERSTELLUNG TIEFER BOHRUNGEN AUF  
SCHRÄGEN ODER UNREGELMÄSSIGEN  
OBERFLÄCHEN**
**EXÉCUTION DE TROUS PROFONDS SUR DES  
SURFACES IRRÉGULIÈRES OU OBLIQUES**
**MECANIZADO DE AGUJEROS PROFUNDOS  
SOBRE SUPERFÍCIES IRREGULARES U  
OBLICUAS**
**ОБРАБОТКА ГЛУБОКИХ ОТВЕРСТИЙ  
НА НАКЛОННЫХ ИЛИ НЕРОВНЫХ  
ПЛОСКОСТЯХ**

**STEP 1**

Prepare a flat surface of the same size as the drilling diameter.

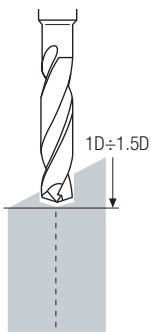
Realizzare una superficie piana utilizzando una fresa con tagliente frontale. Il piano realizzato deve avere le stesse dimensioni del diametro di foratura profonda.

Eine ebene Oberfläche, durch einen Fräser mit stirnseitiger Schneidkante, herstellen. Die hergestellte Oberfläche muss dieselben Abmessungen des Durchmessers der tiefen Bohrung aufweisen.

Réaliser une surface plane en utilisant une fraise avec une arête frontale. Le plan réalisé doit avoir les mêmes dimensions que le diamètre de perçage profond.

Realizar una superficie plana usando una fresa con filo frontal. El plano realizado tiene que tener las mismas dimensiones que el diámetro de taladro profundo.

Подготовьте ровную поверхность с помощью концевой фрезы. Эта поверхность должна быть того же размера, что и диаметр будущего глубокого отверстия.


**STEP 2**

As pilot drill (1xD, 1.5xD), please use 343TA with head angle 140° (SUH MINI=135°) and m7 tolerance (SUH MINI=h7).

Utilizzare una punta 343TA con angolo in testa di 140° (SUH MINI=135°) e tolleranza m7 (SUH MINI=h7), per eseguire un foro pilota (1xD -1.5xD) molto preciso.

Einen Bohrer 343TA mit einem Spitzenwinkel von 140° (SUH MINI=135°) und Toleranz m7 (SUH MINI=h7) für die Herstellung einer äußerst präzisen Richtbohrung (1xD - 1.5xD) verwenden.

Utiliser un foret 343TA avec un angle en bout de 140° (SUH MINI=135°) et une tolérance m7 (SUH MINI=h7), pour effectuer un trou pilote (1xD -1.5xD) très précis.

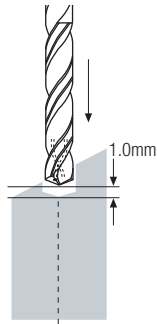
Utilice una broca 343TA con ángulo punta de 140° (SUH MINI=135°) y tolerancia m7 (SUH MINI=h7), para realizar un agujero piloto (1xD -1,5xD) muy preciso.

Для пилотного отверстия (1xD -1.5xD) используйте сверло 343TA с углом при вершине 140° (SUH MINI=135°) и допуском на диаметр m7 (SUH MINI=h7).

**TYPHOON SUH MINI**
**HIGH PERFORMANCE - MINIATURE SHORT AND LONG**

INFO

**CARBIDE DRILLS**

 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
**SUH MINI**  
 HL  
 HSD  
 C-SD-TA

**STEP 3**


With coolant feed OFF, enter the pilot hole with SUH MINI drill at  $V_c=20$  m/min and  $f_n=0.3$  mm/rev. Position the SUH MINI drill at 1 mm from the end of the pilot hole, then start supplying the coolant and start drilling.



Sans actionner la lubrification interne, entrer avec le foret long série SUH MINI à l'intérieur du trou.  $V_c=20$  m/min,  $f_n=0.3$  mm/rév. Placer le foret SUH MINI jusqu'à 1 mm du fond du trou pilote. Actionner la lubrification interne à haute pression et commencer le perçage.



Senza azionare il refrigerante interno, entrare con la punta lunga serie SUH MINI all'interno del foro.  $V_c=20$  m/min,  $f_n=0.3$  mm/rev. Posizionare la punta SUH MINI sino a 1 mm dal fondo del foro pilota. Azionare il refrigerante interno ad alta pressione e cominciare la foratura.



Sin accionar el refrigerante interno, entre con la broca larga de la serie SUH MINI dentro del agujero.  $V_c=20$  m/min,  $f_n=0.3$  mm/rev. Posicione la broca SUH MINI hasta 1 mm. del fondo del agujero piloto. Accione el refrigerante interno a alta presión y comience el taladro.



Ohne Aktivierung der internen Kühlung, einen langen Bohrer der Serie SUH MINI in die Bohrung einführen.  $V_c=20$  m/min,  $f_n=0,3$  mm/U. Den Bohrer SUH MINI bis 1 mm vom Ende der Richtbohrung ansetzen. Die interne Kühlung mit Hochdruck aktivieren und mit der Bohrung beginnen.



Без включения СОЖ, введите длинное сверло серии SUH MINI внутрь пилотного отверстия с режимами  $V_c=20$  м/мин и  $f_n=0.3$  мм/об. Спозиционируйте сверло SUH MINI на расстоянии 1 мм от дна отверстия. Включите подачу СОЖ и начните сверление.

**HSS DRILLS**

 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE END-MILLS**

 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

**STEP 4**


Make continue drilling operation without steps for chip ejection. In case of through holes, reduce the feed by 30% before the hole exit (approx. 1 mm). Stop the coolant feed.



Perçer sans step pour l'évacuation des copeaux. En présence de trous débouchants, 1 mm avant d'avoir terminé le trou, réduire l'avance de 30 %. Arrêter la lubrification.



Forare senza step per scarico trucioli. Nel caso di fori passanti, 1 mm prima di aver completato il foro, ridurre l'avanzamento del 30%. Fermare il refrigerante.



Taladre sin step para la descarga de virutas. En el caso de agujeros pasantes, 1 mm antes de haber completado el agujero, reduzca el avance un 30%. Pare el refrigerante.

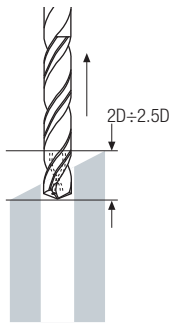


Für die Späneabführung Stufenlos bohren. Bei Durchgangsbohrungen 1 mm vor Fertigstellung der Bohrung den Vorschub um 30% reduzieren. Die Kühlung deaktivieren.



Сверлите без остановок и выводов инструмента. В случае обработки сквозного отверстия, снизьте подачу на 30%, за 1 мм до выхода. Отключите подачу СОЖ.

**HSS END-MILLS**
**CARBIDE BURRS**


**STEP 5**

Withdraw the drill using max rpm and double  $f_n$ , until  $2xD \div 2.5xD$  from the hole entrance.

Ritirare la punta utilizzando il massimo dei giri disponibili e il doppio dell'avanzamento consigliato sino ad una profondità  $2xD \div 2.5xD$ .

Den Bohrer zurückziehen, dabei die maximal verfügbare Drehzahl und den doppelten Wert des empfohlenen Vorschubs bis zu einer Tiefe  $2xD \div 2.5xD$  einsetzen.

Retirer le foret en utilisant le maximum de tours disponibles et le double de l'avancement conseillé jusqu'à une profondeur  $2xD \div 2.5xD$ .

Retire la broca utilizando el máximo de rpm disponibles y el doble del avance aconsejado hasta una profundidad de  $2xD \div 2.5xD$ .

Выньте сверло до уровня  $2xD$ , используя максимальную частоту вращения и двойную подачу.


**STEP 6**

Completing the exit from the hole by using slow and constant speed (200-300 rpm).

Completare l'ultimo tratto di arretramento con velocità ridotta e costante (200-300 rpm).

Den letzten Abschnitt beim Zurückziehen mit reduzierter und konstanter Geschwindigkeit fertigstellen (200-300 rpm).

Terminer la dernière partie du perçage avec une vitesse réduite et constante (200-300 rpm).

Complete el último tramo de retroceso con velocidad reducida y constante (200-300 rpm).

Полностью выньте сверло на заниженных режимах (200-300 rpm).

 CARBIDE  
DRILLS

 PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

 HSS  
DRILLS

 LFTA  
SUTA  
HSS-HSS/CO

 CARBIDE  
END-MILLS

 G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

 HSS  
END-MILLS

 CARBIDE  
BURRS







CUTTING PARAMETERS

### 355SUH MINI

Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8	
	Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
	Vc (m/min)	<b>85÷95*</b>	<b>75÷85*</b>	<b>65÷75*</b>	<b>60÷70*</b>	<b>55÷65*</b>	<b>38÷42*</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
1.0	0.025	0.025	0.026	0.026	0.012	0.012	
1.1	0.027	0.028	0.029	0.029	0.014	0.013	
1.2	0.030	0.030	0.032	0.031	0.015	0.014	
1.3	0.032	0.033	0.034	0.034	0.016	0.015	
1.4	0.035	0.035	0.037	0.037	0.017	0.017	
1.5	0.037	0.038	0.040	0.039	0.018	0.018	
1.6	0.041	0.041	0.044	0.043	0.021	0.020	
1.7	0.044	0.044	0.047	0.046	0.022	0.021	
1.8	0.047	0.047	0.049	0.049	0.024	0.023	
1.9	0.049	0.049	0.052	0.051	0.025	0.024	
2.0	0.052	0.052	0.055	0.054	0.026	0.025	
2.1	0.056	0.056	0.059	0.059	0.029	0.028	
2.2	0.059	0.059	0.062	0.062	0.031	0.029	
2.3	0.062	0.061	0.065	0.064	0.032	0.031	
2.4	0.064	0.064	0.068	0.067	0.033	0.032	
2.5	0.067	0.067	0.071	0.070	0.035	0.033	
2.6	0.073	0.071	0.076	0.075	0.038	0.037	
2.7	0.075	0.074	0.079	0.078	0.040	0.038	
2.8	0.078	0.077	0.082	0.081	0.041	0.040	
2.9	0.081	0.080	0.085	0.084	0.043	0.041	
3.0	0.084	0.082	0.088	0.087	0.044	0.042	



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

Material Group ISO 513	M1	M2	M3			
	Hardness/Rm					
	Vc (m/min)	<b>55÷65*</b>	<b>50÷60*</b>	<b>40÷50*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
1.0	0.012	0.013	0.013			
1.1	0.014	0.014	0.014			
1.2	0.015	0.015	0.015			
1.3	0.016	0.016	0.016			
1.4	0.017	0.018	0.018			
1.5	0.018	0.019	0.019			
1.6	0.021	0.021	0.021			
1.7	0.022	0.022	0.023			
1.8	0.024	0.024	0.024			
1.9	0.025	0.025	0.025			
2.0	0.026	0.026	0.027			
2.1	0.029	0.029	0.029			
2.2	0.031	0.030	0.031			
2.3	0.032	0.032	0.032			
2.4	0.033	0.033	0.034			
2.5	0.035	0.034	0.035			
2.6	0.038	0.037	0.038			
2.7	0.040	0.039	0.040			
2.8	0.041	0.040	0.041			
2.9	0.043	0.041	0.043			
3.0	0.044	0.043	0.044			



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

### 355SUH MINI

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI**
- HL
- HSD
- C-SD-TA



Material Group ISO 513	K1	K2	K3	K4		
Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
Vc (m/min)	<b>80÷90*</b>	<b>70÷80*</b>	<b>60÷70*</b>	<b>55÷65*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.016	0.015	0.014	0.012		
1.1	0.018	0.017	0.015	0.014		
1.2	0.019	0.018	0.017	0.015		
1.3	0.021	0.020	0.018	0.016		
1.4	0.023	0.021	0.019	0.017		
1.5	0.024	0.023	0.021	0.018		
1.6	0.027	0.025	0.023	0.021		
1.7	0.028	0.027	0.025	0.022		
1.8	0.030	0.028	0.026	0.024		
1.9	0.032	0.030	0.028	0.025		
2.0	0.033	0.031	0.029	0.026		
2.1	0.036	0.034	0.032	0.029		
2.2	0.038	0.036	0.034	0.031		
2.3	0.040	0.038	0.035	0.032		
2.4	0.041	0.039	0.037	0.033		
2.5	0.043	0.041	0.038	0.035		
2.6	0.046	0.044	0.041	0.038		
2.7	0.048	0.046	0.043	0.040		
2.8	0.050	0.047	0.045	0.041		
2.9	0.051	0.049	0.046	0.043		
3.0	0.053	0.051	0.048	0.044		

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

Material Group ISO 513	N1	N2	N3 N4	N5		
Hardness/Rm						
Vc (m/min)	<b>140÷150*</b>	<b>120÷130*</b>	<b>110÷120*</b>	<b>155÷165*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.016	0.016	0.015	0.016		
1.1	0.018	0.018	0.016	0.017		
1.2	0.019	0.019	0.018	0.019		
1.3	0.021	0.021	0.019	0.020		
1.4	0.022	0.023	0.021	0.022		
1.5	0.024	0.024	0.022	0.023		
1.6	0.026	0.027	0.024	0.026		
1.7	0.028	0.028	0.026	0.027		
1.8	0.030	0.030	0.028	0.029		
1.9	0.031	0.032	0.029	0.031		
2.0	0.033	0.033	0.031	0.032		
2.1	0.035	0.036	0.033	0.035		
2.2	0.037	0.038	0.035	0.037		
2.3	0.039	0.039	0.036	0.038		
2.4	0.041	0.041	0.038	0.040		
2.5	0.042	0.043	0.040	0.042		
2.6	0.045	0.046	0.043	0.045		
2.7	0.047	0.048	0.044	0.047		
2.8	0.049	0.049	0.046	0.048		
2.9	0.050	0.051	0.048	0.050		
3.0	0.052	0.053	0.049	0.052		

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



HSS END-MILLS

CARBIDE BURRS

### 355SUH MINI

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	<b>26÷30*</b>	<b>24÷26*</b>	<b>34÷36*</b>	<b>28÷32*</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.009	0.011	0.011	0.009			
1.1	0.010	0.012	0.012	0.010			
1.2	0.011	0.013	0.013	0.011			
1.3	0.012	0.014	0.014	0.012			
1.4	0.013	0.015	0.015	0.013			
1.5	0.013	0.016	0.016	0.014			
1.6	0.016	0.018	0.019	0.017			
1.7	0.017	0.019	0.020	0.018			
1.8	0.018	0.020	0.021	0.019			
1.9	0.019	0.021	0.022	0.020			
2.0	0.020	0.023	0.023	0.021			
2.1	0.024	0.025	0.026	0.024			
2.2	0.025	0.026	0.028	0.025			
2.3	0.026	0.027	0.029	0.027			
2.4	0.027	0.029	0.030	0.028			
2.5	0.028	0.030	0.031	0.029			
2.6	0.032	0.033	0.035	0.033			
2.7	0.033	0.034	0.036	0.034			
2.8	0.035	0.035	0.038	0.035			
2.9	0.036	0.036	0.039	0.036			
3.0	0.037	0.038	0.040	0.038			

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



CUTTING PARAMETERS

### 358SUH MINI

Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8							
	Hardness/Rm		500÷700 N/mm <sup>2</sup>		600÷1000 N/mm <sup>2</sup>		900÷1200 N/mm <sup>2</sup>		1200÷1400 N/mm <sup>2</sup>				
	Vc (m/min)		85÷95*		75÷85*		65÷75*		60÷70*		55÷65*		38÷42*
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
1.0	0.025	0.025	0.026	0.026	0.012	0.012							
1.1	0.027	0.028	0.029	0.029	0.014	0.013							
1.2	0.030	0.030	0.032	0.031	0.015	0.014							
1.3	0.032	0.033	0.034	0.034	0.016	0.015							
1.4	0.035	0.035	0.037	0.037	0.017	0.017							
1.5	0.037	0.038	0.040	0.039	0.018	0.018							
1.6	0.041	0.041	0.044	0.043	0.021	0.020							
1.7	0.044	0.044	0.047	0.046	0.022	0.021							
1.8	0.047	0.047	0.049	0.049	0.024	0.023							
1.9	0.049	0.049	0.052	0.051	0.025	0.024							
2.0	0.052	0.052	0.055	0.054	0.026	0.025							
2.1	0.056	0.056	0.059	0.059	0.029	0.028							
2.2	0.059	0.059	0.062	0.062	0.031	0.029							
2.3	0.062	0.061	0.065	0.064	0.032	0.031							
2.4	0.064	0.064	0.068	0.067	0.033	0.032							
2.5	0.067	0.067	0.071	0.070	0.035	0.033							
2.6	0.073	0.071	0.076	0.075	0.038	0.037							
2.7	0.075	0.074	0.079	0.078	0.040	0.038							
2.8	0.078	0.077	0.082	0.081	0.041	0.040							
2.9	0.081	0.080	0.085	0.084	0.043	0.041							
3.0	0.084	0.082	0.088	0.087	0.044	0.042							



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

Material Group ISO 513	M1	M2	M3					
	Hardness/Rm		55÷65*		50÷60*		40÷50*	
	Vc (m/min)		55÷65*		50÷60*		40÷50*	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
1.0	0.012	0.013	0.013					
1.1	0.014	0.014	0.014					
1.2	0.015	0.015	0.015					
1.3	0.016	0.016	0.016					
1.4	0.017	0.018	0.018					
1.5	0.018	0.019	0.019					
1.6	0.021	0.021	0.021					
1.7	0.022	0.022	0.023					
1.8	0.024	0.024	0.024					
1.9	0.025	0.025	0.025					
2.0	0.026	0.026	0.027					
2.1	0.029	0.029	0.029					
2.2	0.031	0.030	0.031					
2.3	0.032	0.032	0.032					
2.4	0.033	0.033	0.034					
2.5	0.035	0.034	0.035					
2.6	0.038	0.037	0.038					
2.7	0.040	0.039	0.040					
2.8	0.041	0.040	0.041					
2.9	0.043	0.041	0.043					
3.0	0.044	0.043	0.044					



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

### 358SUH MINI

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI**
- HL
- HSD
- C-SD-TA



Material Group ISO 513	K1	K2	K3	K4		
Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
Vc (m/min)	<b>80÷90*</b>	<b>70÷80*</b>	<b>60÷70*</b>	<b>55÷65*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.016	0.015	0.014	0.012		
1.1	0.018	0.017	0.015	0.014		
1.2	0.019	0.018	0.017	0.015		
1.3	0.021	0.020	0.018	0.016		
1.4	0.023	0.021	0.019	0.017		
1.5	0.024	0.023	0.021	0.018		
1.6	0.027	0.025	0.023	0.021		
1.7	0.028	0.027	0.025	0.022		
1.8	0.030	0.028	0.026	0.024		
1.9	0.032	0.030	0.028	0.025		
2.0	0.033	0.031	0.029	0.026		
2.1	0.036	0.034	0.032	0.029		
2.2	0.038	0.036	0.034	0.031		
2.3	0.040	0.038	0.035	0.032		
2.4	0.041	0.039	0.037	0.033		
2.5	0.043	0.041	0.038	0.035		
2.6	0.046	0.044	0.041	0.038		
2.7	0.048	0.046	0.043	0.040		
2.8	0.050	0.047	0.045	0.041		
2.9	0.051	0.049	0.046	0.043		
3.0	0.053	0.051	0.048	0.044		

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

Material Group ISO 513	N1	N2	N3 N4	N5		
Hardness/Rm						
Vc (m/min)	<b>140÷150*</b>	<b>120÷130*</b>	<b>110÷120*</b>	<b>155÷165*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.016	0.016	0.015	0.016		
1.1	0.018	0.018	0.016	0.017		
1.2	0.019	0.019	0.018	0.019		
1.3	0.021	0.021	0.019	0.020		
1.4	0.022	0.023	0.021	0.022		
1.5	0.024	0.024	0.022	0.023		
1.6	0.026	0.027	0.024	0.026		
1.7	0.028	0.028	0.026	0.027		
1.8	0.030	0.030	0.028	0.029		
1.9	0.031	0.032	0.029	0.031		
2.0	0.033	0.033	0.031	0.032		
2.1	0.035	0.036	0.033	0.035		
2.2	0.037	0.038	0.035	0.037		
2.3	0.039	0.039	0.036	0.038		
2.4	0.041	0.041	0.038	0.040		
2.5	0.042	0.043	0.040	0.042		
2.6	0.045	0.046	0.043	0.045		
2.7	0.047	0.048	0.044	0.047		
2.8	0.049	0.049	0.046	0.048		
2.9	0.050	0.051	0.048	0.050		
3.0	0.052	0.053	0.049	0.052		

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



HSS END-MILLS

CARBIDE BURRS

### 358SUH MINI

	Material Group ISO 513	S1 S2	S3	S4	S5			
	Hardness/Rm	<35 HRC		35÷45 HRC				
	Vc (m/min)	<b>26÷30*</b>		<b>24÷26*</b>		<b>34÷36*</b>		<b>28÷32*</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
1.0	0.009	0.011	0.011	0.009				
1.1	0.010	0.012	0.012	0.010				
1.2	0.011	0.013	0.013	0.011				
1.3	0.012	0.014	0.014	0.012				
1.4	0.013	0.015	0.015	0.013				
1.5	0.013	0.016	0.016	0.014				
1.6	0.016	0.018	0.019	0.017				
1.7	0.017	0.019	0.020	0.018				
1.8	0.018	0.020	0.021	0.019				
1.9	0.019	0.021	0.022	0.020				
2.0	0.020	0.023	0.023	0.021				
2.1	0.024	0.025	0.026	0.024				
2.2	0.025	0.026	0.028	0.025				
2.3	0.026	0.027	0.029	0.027				
2.4	0.027	0.029	0.030	0.028				
2.5	0.028	0.030	0.031	0.029				
2.6	0.032	0.033	0.035	0.033				
2.7	0.033	0.034	0.036	0.034				
2.8	0.035	0.035	0.038	0.035				
2.9	0.036	0.036	0.039	0.036				
3.0	0.037	0.038	0.040	0.038				



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# 3512SUH MINI

3 mm shank, polished flutes

12XD

OSAWA NORM

SUH MINI

MG PV300

135°

30°

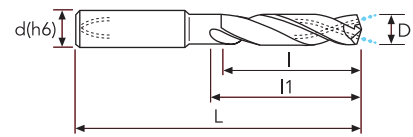


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI**
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	★	☆	☆	☆

★ 1st choice ☆ suitable



D(h7)	D Tol.	d(h6)	l	l1	L	drilling length	EDP No.	Stock
1.00	0/-0.010	3	13.5	15	55	12 x D	3512SUH0100N	●
1.10	0/-0.010	3	14.9	16.4	55	12 x D	3512SUH0110N	●
1.20	0/-0.010	3	16.2	17.7	55	12 x D	3512SUH0120N	●
1.30	0/-0.010	3	17.6	19.1	55	12 x D	3512SUH0130N	●
1.40	0/-0.010	3	18.9	20.4	55	12 x D	3512SUH0140N	●
1.50	0/-0.010	3	20.3	21.8	55	12 x D	3512SUH0150N	●
1.60	0/-0.010	3	21.6	23.1	65	12 x D	3512SUH0160N	●
1.70	0/-0.010	3	23	24.5	65	12 x D	3512SUH0170N	●
1.80	0/-0.010	3	24.3	25.8	65	12 x D	3512SUH0180N	●
1.90	0/-0.010	3	25.7	27.2	65	12 x D	3512SUH0190N	●
2.00	0/-0.010	3	27	30	65	12 x D	3512SUH0200N	●
2.10	0/-0.010	3	28.4	31.6	65	12 x D	3512SUH0210N	●
2.20	0/-0.010	3	29.7	33	65	12 x D	3512SUH0220N	●
2.30	0/-0.010	3	31.1	34.6	65	12 x D	3512SUH0230N	●
2.40	0/-0.010	3	32.4	36	75	12 x D	3512SUH0240N	●
2.50	0/-0.010	3	33.8	37.6	75	12 x D	3512SUH0250N	●
2.60	0/-0.010	3	35.1	39	75	12 x D	3512SUH0260N	●
2.70	0/-0.010	3	36.5	40.6	75	12 x D	3512SUH0270N	●
2.80	0/-0.010	3	37.8	42	75	12 x D	3512SUH0280N	●
2.90	0/-0.010	3	39.2	43.6	75	12 x D	3512SUH0290N	●
3.00	0/-0.010	3	40.5	45	75	12 x D	3512SUH0300N	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



CUTTING PARAMETERS

### 3512SUH MINI

Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8							
	Hardness/Rm		500÷700 N/mm <sup>2</sup>		600÷1000 N/mm <sup>2</sup>		900÷1200 N/mm <sup>2</sup>		1200÷1400 N/mm <sup>2</sup>				
	Vc (m/min)		80÷90*		60÷70*		55÷65*		50÷60*		45÷55*		38÷42*
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
1.0	0.012	0.010	0.010	0.010	0.007	0.008	0.007						
1.1	0.013	0.011	0.011	0.011	0.008	0.009	0.008						
1.2	0.014	0.012	0.012	0.012	0.008	0.010	0.008						
1.3	0.015	0.014	0.014	0.014	0.009	0.011	0.009						
1.4	0.016	0.015	0.015	0.015	0.010	0.011	0.010						
1.5	0.017	0.016	0.016	0.016	0.010	0.012	0.011						
1.6	0.020	0.019	0.019	0.019	0.013	0.014	0.013						
1.7	0.021	0.020	0.020	0.020	0.014	0.015	0.013						
1.8	0.023	0.021	0.021	0.021	0.014	0.016	0.014						
1.9	0.024	0.022	0.022	0.022	0.015	0.017	0.015						
2.0	0.025	0.023	0.023	0.023	0.016	0.018	0.016						
2.1	0.028	0.027	0.027	0.027	0.019	0.020	0.018						
2.2	0.030	0.028	0.028	0.028	0.020	0.021	0.019						
2.3	0.031	0.029	0.029	0.029	0.021	0.022	0.020						
2.4	0.032	0.031	0.031	0.031	0.022	0.023	0.021						
2.5	0.034	0.032	0.032	0.032	0.023	0.024	0.022						
2.6	0.037	0.035	0.035	0.035	0.027	0.026	0.024						
2.7	0.038	0.037	0.037	0.037	0.028	0.027	0.025						
2.8	0.039	0.038	0.038	0.038	0.029	0.028	0.026						
2.9	0.041	0.039	0.039	0.039	0.030	0.029	0.027						
3.0	0.042	0.041	0.041	0.041	0.031	0.030	0.028						



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

Material Group ISO 513	M1	M2	M3			
Hardness/Rm						
Vc (m/min)	45÷55*	45÷50*	40÷45*			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
1.0	0.008	0.008	0.007			
1.1	0.009	0.008	0.008			
1.2	0.010	0.009	0.009			
1.3	0.011	0.010	0.009			
1.4	0.011	0.011	0.010			
1.5	0.012	0.012	0.011			
1.6	0.014	0.013	0.013			
1.7	0.015	0.014	0.014			
1.8	0.016	0.015	0.014			
1.9	0.017	0.016	0.015			
2.0	0.018	0.017	0.016			
2.1	0.020	0.019	0.018			
2.2	0.021	0.020	0.019			
2.3	0.022	0.021	0.020			
2.4	0.023	0.022	0.021			
2.5	0.024	0.023	0.022			
2.6	0.026	0.025	0.025			
2.7	0.027	0.026	0.026			
2.8	0.028	0.027	0.027			
2.9	0.029	0.028	0.028			
3.0	0.030	0.029	0.029			



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

### 3512SUH MINI

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI**
- HL
- HSD
- C-SD-TA



Material Group ISO 513	K1	K2	K3	K4		
Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
Vc (m/min)	<b>75÷85*</b>	<b>60÷70*</b>	<b>50÷60*</b>	<b>48÷52*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.012	0.013	0.013	0.008		
1.1	0.014	0.014	0.014	0.009		
1.2	0.015	0.015	0.015	0.010		
1.3	0.016	0.016	0.016	0.011		
1.4	0.017	0.018	0.018	0.011		
1.5	0.019	0.019	0.019	0.012		
1.6	0.021	0.021	0.021	0.014		
1.7	0.022	0.023	0.022	0.015		
1.8	0.023	0.024	0.024	0.016		
1.9	0.025	0.025	0.025	0.017		
2.0	0.026	0.027	0.026	0.018		
2.1	0.028	0.029	0.029	0.020		
2.2	0.030	0.031	0.030	0.021		
2.3	0.031	0.032	0.032	0.022		
2.4	0.033	0.034	0.033	0.023		
2.5	0.034	0.035	0.034	0.024		
2.6	0.037	0.038	0.037	0.026		
2.7	0.038	0.040	0.039	0.027		
2.8	0.040	0.041	0.040	0.028		
2.9	0.041	0.043	0.041	0.029		
3.0	0.042	0.044	0.043	0.030		

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

Material Group ISO 513	N1	N2	N3 N4	N5		
Hardness/Rm						
Vc (m/min)	<b>125÷135*</b>	<b>110÷120*</b>	<b>100÷110*</b>	<b>140÷150*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.015	0.014	0.013	0.014		
1.1	0.016	0.016	0.014	0.016		
1.2	0.018	0.017	0.016	0.017		
1.3	0.019	0.018	0.017	0.019		
1.4	0.021	0.020	0.018	0.020		
1.5	0.022	0.021	0.020	0.021		
1.6	0.025	0.024	0.022	0.024		
1.7	0.026	0.025	0.023	0.025		
1.8	0.028	0.027	0.024	0.027		
1.9	0.029	0.028	0.026	0.028		
2.0	0.031	0.030	0.027	0.030		
2.1	0.034	0.032	0.029	0.033		
2.2	0.035	0.034	0.031	0.034		
2.3	0.037	0.035	0.032	0.036		
2.4	0.038	0.037	0.033	0.037		
2.5	0.040	0.038	0.035	0.039		
2.6	0.043	0.041	0.037	0.042		
2.7	0.044	0.043	0.039	0.044		
2.8	0.046	0.044	0.040	0.046		
2.9	0.048	0.046	0.042	0.047		
3.0	0.049	0.048	0.043	0.049		

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH




HSS END-MILLS

CARBIDE BURRS



### 3512SUH MINI

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	<b>26÷30*</b>	<b>24÷26*</b>	<b>34÷36*</b>	<b>28÷32*</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.008	0.007	0.008	0.009			
1.1	0.009	0.008	0.009	0.010			
1.2	0.009	0.008	0.010	0.011			
1.3	0.010	0.009	0.011	0.012			
1.4	0.011	0.010	0.011	0.012			
1.5	0.012	0.010	0.012	0.013			
1.6	0.013	0.012	0.014	0.015			
1.7	0.014	0.013	0.015	0.016			
1.8	0.015	0.014	0.016	0.017			
1.9	0.016	0.014	0.017	0.018			
2.0	0.017	0.015	0.018	0.019			
2.1	0.019	0.017	0.021	0.021			
2.2	0.020	0.018	0.022	0.022			
2.3	0.021	0.019	0.023	0.023			
2.4	0.022	0.020	0.024	0.024			
2.5	0.022	0.020	0.025	0.025			
2.6	0.025	0.023	0.028	0.027			
2.7	0.026	0.024	0.029	0.028			
2.8	0.027	0.025	0.030	0.029			
2.9	0.028	0.026	0.031	0.030			
3.0	0.029	0.026	0.032	0.031			

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



CUTTING PARAMETERS

### 3520SUH MINI

Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8							
	Hardness/Rm		500÷700 N/mm <sup>2</sup>		600÷1000 N/mm <sup>2</sup>		900÷1200 N/mm <sup>2</sup>		1200÷1400 N/mm <sup>2</sup>				
	Vc (m/min)		80÷90*		60÷70*		55÷65*		50÷60*		45÷55*		38÷42*
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
1.0	0.012	0.010	0.010	0.010	0.007	0.008	0.007						
1.1	0.013	0.011	0.011	0.011	0.008	0.009	0.008						
1.2	0.014	0.012	0.012	0.012	0.008	0.010	0.008						
1.3	0.015	0.014	0.014	0.014	0.009	0.011	0.009						
1.4	0.016	0.015	0.015	0.015	0.010	0.011	0.010						
1.5	0.017	0.016	0.016	0.016	0.010	0.012	0.011						
1.6	0.020	0.019	0.019	0.019	0.013	0.014	0.013						
1.7	0.021	0.020	0.020	0.020	0.014	0.015	0.013						
1.8	0.023	0.021	0.021	0.021	0.014	0.016	0.014						
1.9	0.024	0.022	0.022	0.022	0.015	0.017	0.015						
2.0	0.025	0.023	0.023	0.023	0.016	0.018	0.016						
2.1	0.028	0.027	0.027	0.027	0.019	0.020	0.018						
2.2	0.030	0.028	0.028	0.028	0.020	0.021	0.019						
2.3	0.031	0.029	0.029	0.029	0.021	0.022	0.020						
2.4	0.032	0.031	0.031	0.031	0.022	0.023	0.021						
2.5	0.034	0.032	0.032	0.032	0.023	0.024	0.022						
2.6	0.037	0.035	0.035	0.035	0.027	0.026	0.024						
2.7	0.038	0.037	0.037	0.037	0.028	0.027	0.025						
2.8	0.039	0.038	0.038	0.038	0.029	0.028	0.026						
2.9	0.041	0.039	0.039	0.039	0.030	0.029	0.027						
3.0	0.042	0.041	0.041	0.041	0.031	0.030	0.028						



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

Material Group ISO 513	M1	M2	M3			
Hardness/Rm	45÷55*		45÷50*		40÷45*	
Vc (m/min)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
1.0	0.008	0.008	0.007			
1.1	0.009	0.008	0.008			
1.2	0.010	0.009	0.009			
1.3	0.011	0.010	0.009			
1.4	0.011	0.011	0.010			
1.5	0.012	0.012	0.011			
1.6	0.014	0.013	0.013			
1.7	0.015	0.014	0.014			
1.8	0.016	0.015	0.014			
1.9	0.017	0.016	0.015			
2.0	0.018	0.017	0.016			
2.1	0.020	0.019	0.018			
2.2	0.021	0.020	0.019			
2.3	0.022	0.021	0.020			
2.4	0.023	0.022	0.021			
2.5	0.024	0.023	0.022			
2.6	0.026	0.025	0.025			
2.7	0.027	0.026	0.026			
2.8	0.028	0.027	0.027			
2.9	0.029	0.028	0.028			
3.0	0.030	0.029	0.029			



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

### 3520SUH MINI

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI**
- HL
- HSD
- C-SD-TA



Material Group ISO 513	K1	K2	K3	K4		
Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
Vc (m/min)	<b>75÷85*</b>	<b>60÷70*</b>	<b>50÷60*</b>	<b>48÷52*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.012	0.013	0.013	0.008		
1.1	0.014	0.014	0.014	0.009		
1.2	0.015	0.015	0.015	0.010		
1.3	0.016	0.016	0.016	0.011		
1.4	0.017	0.018	0.018	0.011		
1.5	0.019	0.019	0.019	0.012		
1.6	0.021	0.021	0.021	0.014		
1.7	0.022	0.023	0.022	0.015		
1.8	0.023	0.024	0.024	0.016		
1.9	0.025	0.025	0.025	0.017		
2.0	0.026	0.027	0.026	0.018		
2.1	0.028	0.029	0.029	0.020		
2.2	0.030	0.031	0.030	0.021		
2.3	0.031	0.032	0.032	0.022		
2.4	0.033	0.034	0.033	0.023		
2.5	0.034	0.035	0.034	0.024		
2.6	0.037	0.038	0.037	0.026		
2.7	0.038	0.040	0.039	0.027		
2.8	0.040	0.041	0.040	0.028		
2.9	0.041	0.043	0.041	0.029		
3.0	0.042	0.044	0.043	0.030		

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

Material Group ISO 513	N1	N2	N3 N4	N5		
Hardness/Rm						
Vc (m/min)	<b>125÷135*</b>	<b>110÷120*</b>	<b>100÷110*</b>	<b>140÷150*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.015	0.014	0.013	0.014		
1.1	0.016	0.016	0.014	0.016		
1.2	0.018	0.017	0.016	0.017		
1.3	0.019	0.018	0.017	0.019		
1.4	0.021	0.020	0.018	0.020		
1.5	0.022	0.021	0.020	0.021		
1.6	0.025	0.024	0.022	0.024		
1.7	0.026	0.025	0.023	0.025		
1.8	0.028	0.027	0.024	0.027		
1.9	0.029	0.028	0.026	0.028		
2.0	0.031	0.030	0.027	0.030		
2.1	0.034	0.032	0.029	0.033		
2.2	0.035	0.034	0.031	0.034		
2.3	0.037	0.035	0.032	0.036		
2.4	0.038	0.037	0.033	0.037		
2.5	0.040	0.038	0.035	0.039		
2.6	0.043	0.041	0.037	0.042		
2.7	0.044	0.043	0.039	0.044		
2.8	0.046	0.044	0.040	0.046		
2.9	0.048	0.046	0.042	0.047		
3.0	0.049	0.048	0.043	0.049		

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

### 3520SUH MINI

	Material Group ISO 513	S1 S2	S3	S4	S5			
	Hardness/Rm	<35 HRC		35÷45 HRC				
	Vc (m/min)	<b>26÷30*</b>		<b>24÷26*</b>		<b>34÷36*</b>		<b>28÷32*</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
1.0	0.008	0.007	0.008	0.009	0.010			
1.1	0.009	0.008	0.009	0.010	0.011			
1.2	0.009	0.008	0.009	0.010	0.011			
1.3	0.010	0.009	0.010	0.011	0.012			
1.4	0.011	0.010	0.011	0.012	0.013			
1.5	0.012	0.010	0.012	0.013	0.014			
1.6	0.013	0.012	0.013	0.014	0.015			
1.7	0.014	0.013	0.014	0.015	0.016			
1.8	0.015	0.014	0.015	0.016	0.017			
1.9	0.016	0.014	0.016	0.017	0.018			
2.0	0.017	0.015	0.017	0.018	0.019			
2.1	0.019	0.017	0.019	0.021	0.022			
2.2	0.020	0.018	0.020	0.022	0.023			
2.3	0.021	0.019	0.021	0.023	0.024			
2.4	0.022	0.020	0.022	0.024	0.025			
2.5	0.022	0.020	0.022	0.024	0.025			
2.6	0.025	0.023	0.025	0.028	0.029			
2.7	0.026	0.024	0.026	0.029	0.030			
2.8	0.027	0.025	0.027	0.030	0.031			
2.9	0.028	0.026	0.028	0.031	0.032			
3.0	0.029	0.026	0.029	0.032	0.033			



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS





### 3525SUH MINI

Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8	
	Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
	Vc (m/min)	<b>80÷90*</b>	<b>60÷70*</b>	<b>55÷65*</b>	<b>50÷60*</b>	<b>45÷55*</b>	<b>38÷42*</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
1.0	0.008	0.008	0.007	0.005	0.005	0.005	
1.1	0.009	0.009	0.008	0.006	0.006	0.006	
1.2	0.010	0.010	0.008	0.006	0.006	0.006	
1.3	0.010	0.010	0.009	0.007	0.007	0.007	
1.4	0.011	0.011	0.010	0.007	0.007	0.007	
1.5	0.012	0.012	0.011	0.008	0.008	0.008	
1.6	0.014	0.014	0.012	0.009	0.009	0.009	
1.7	0.014	0.015	0.013	0.010	0.010	0.009	
1.8	0.015	0.016	0.014	0.010	0.010	0.010	
1.9	0.016	0.017	0.014	0.011	0.011	0.010	
2.0	0.017	0.017	0.015	0.011	0.011	0.011	
2.1	0.019	0.020	0.017	0.013	0.013	0.012	
2.2	0.020	0.021	0.018	0.014	0.013	0.013	
2.3	0.021	0.022	0.019	0.014	0.014	0.014	
2.4	0.022	0.023	0.019	0.015	0.014	0.014	
2.5	0.023	0.024	0.020	0.016	0.015	0.015	
2.6	0.025	0.026	0.022	0.018	0.016	0.016	
2.7	0.026	0.027	0.023	0.019	0.017	0.017	
2.8	0.027	0.028	0.024	0.019	0.018	0.018	
2.9	0.028	0.029	0.025	0.020	0.018	0.018	
3.0	0.029	0.030	0.026	0.021	0.019	0.019	



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

Material Group ISO 513	M1	M2	M3			
	Hardness/Rm					
	Vc (m/min)	<b>45÷55*</b>	<b>45÷50*</b>	<b>40÷45*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
1.0	0.005	0.005	0.005			
1.1	0.006	0.006	0.006			
1.2	0.006	0.006	0.007			
1.3	0.007	0.007	0.007			
1.4	0.007	0.007	0.008			
1.5	0.008	0.008	0.008			
1.6	0.009	0.009	0.009			
1.7	0.010	0.010	0.010			
1.8	0.010	0.010	0.011			
1.9	0.011	0.011	0.011			
2.0	0.011	0.011	0.012			
2.1	0.013	0.013	0.013			
2.2	0.013	0.013	0.014			
2.3	0.014	0.014	0.014			
2.4	0.014	0.014	0.015			
2.5	0.015	0.015	0.016			
2.6	0.016	0.017	0.017			
2.7	0.017	0.017	0.018			
2.8	0.018	0.018	0.018			
2.9	0.018	0.018	0.019			
3.0	0.019	0.019	0.020			



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

### 3525SUH MINI

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI**
- HL
- HSD
- C-SD-TA



Material Group ISO 513	K1	K2	K3	K4		
Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
Vc (m/min)	<b>75÷85*</b>	<b>60÷70*</b>	<b>50÷60*</b>	<b>45÷55*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.008	0.009	0.010	0.005		
1.1	0.009	0.010	0.011	0.006		
1.2	0.010	0.011	0.012	0.006		
1.3	0.011	0.012	0.013	0.007		
1.4	0.012	0.013	0.014	0.007		
1.5	0.012	0.014	0.015	0.008		
1.6	0.014	0.015	0.016	0.009		
1.7	0.015	0.016	0.017	0.010		
1.8	0.016	0.017	0.019	0.010		
1.9	0.016	0.018	0.020	0.011		
2.0	0.017	0.019	0.021	0.011		
2.1	0.019	0.021	0.023	0.013		
2.2	0.020	0.022	0.024	0.013		
2.3	0.021	0.023	0.025	0.014		
2.4	0.022	0.024	0.026	0.014		
2.5	0.023	0.025	0.027	0.015		
2.6	0.025	0.028	0.030	0.016		
2.7	0.025	0.029	0.031	0.017		
2.8	0.026	0.030	0.032	0.018		
2.9	0.027	0.031	0.033	0.018		
3.0	0.028	0.032	0.034	0.019		

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	N1	N2	N3 N4	N5		
Hardness/Rm						
Vc (m/min)	<b>125÷135*</b>	<b>105÷115*</b>	<b>96÷104*</b>	<b>135÷140*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.012	0.012	0.010	0.012		
1.1	0.013	0.013	0.011	0.013		
1.2	0.015	0.014	0.012	0.015		
1.3	0.016	0.015	0.013	0.016		
1.4	0.017	0.017	0.014	0.017		
1.5	0.018	0.018	0.015	0.018		
1.6	0.020	0.020	0.017	0.020		
1.7	0.021	0.021	0.018	0.021		
1.8	0.023	0.022	0.019	0.023		
1.9	0.024	0.023	0.020	0.024		
2.0	0.025	0.025	0.021	0.025		
2.1	0.027	0.027	0.023	0.027		
2.2	0.029	0.028	0.024	0.029		
2.3	0.030	0.029	0.025	0.030		
2.4	0.031	0.031	0.026	0.031		
2.5	0.033	0.032	0.027	0.033		
2.6	0.035	0.034	0.029	0.035		
2.7	0.037	0.035	0.031	0.036		
2.8	0.038	0.037	0.032	0.038		
2.9	0.039	0.038	0.033	0.039		
3.0	0.041	0.039	0.034	0.040		

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

### 3525SUH MINI

	Material Group ISO 513	S1 S2	S3	S4	S5			
	Hardness/Rm	<35 HRC		35÷45 HRC				
	Vc (m/min)	<b>26÷30*</b>		<b>24÷26*</b>		<b>34÷36*</b>		<b>28÷32*</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
1.0	0.005	0.005	0.004	0.005				
1.1	0.006	0.006	0.005	0.005				
1.2	0.006	0.007	0.005	0.006				
1.3	0.007	0.007	0.006	0.006				
1.4	0.007	0.008	0.006	0.007				
1.5	0.008	0.008	0.007	0.007				
1.6	0.009	0.010	0.008	0.008				
1.7	0.010	0.011	0.008	0.009				
1.8	0.010	0.011	0.009	0.009				
1.9	0.011	0.012	0.009	0.010				
2.0	0.011	0.013	0.010	0.010				
2.1	0.013	0.015	0.011	0.012				
2.2	0.014	0.016	0.012	0.013				
2.3	0.014	0.016	0.012	0.013				
2.4	0.015	0.017	0.013	0.014				
2.5	0.016	0.018	0.013	0.014				
2.6	0.018	0.020	0.015	0.016				
2.7	0.019	0.021	0.016	0.017				
2.8	0.019	0.022	0.016	0.018				
2.9	0.020	0.023	0.017	0.018				
3.0	0.021	0.024	0.018	0.019				



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

### 3530SUH MINI

Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8	
	Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
	Vc (m/min)	<b>80÷90*</b>	<b>60÷70*</b>	<b>55÷65*</b>	<b>50÷60*</b>	<b>45÷55*</b>	<b>38÷42*</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
1.0	0.008	0.008	0.007	0.005	0.005	0.005	
1.1	0.009	0.009	0.008	0.006	0.006	0.006	
1.2	0.010	0.010	0.008	0.006	0.006	0.006	
1.3	0.010	0.010	0.009	0.007	0.007	0.007	
1.4	0.011	0.011	0.010	0.007	0.007	0.007	
1.5	0.012	0.012	0.011	0.008	0.008	0.008	
1.6	0.014	0.014	0.012	0.009	0.009	0.009	
1.7	0.014	0.015	0.013	0.010	0.010	0.009	
1.8	0.015	0.016	0.014	0.010	0.010	0.010	
1.9	0.016	0.017	0.014	0.011	0.011	0.010	
2.0	0.017	0.017	0.015	0.011	0.011	0.011	
2.1	0.019	0.020	0.017	0.013	0.013	0.012	
2.2	0.020	0.021	0.018	0.014	0.013	0.013	
2.3	0.021	0.022	0.019	0.014	0.014	0.014	
2.4	0.022	0.023	0.019	0.015	0.014	0.014	
2.5	0.023	0.024	0.020	0.016	0.015	0.015	
2.6	0.025	0.026	0.022	0.018	0.016	0.016	
2.7	0.026	0.027	0.023	0.019	0.017	0.017	
2.8	0.027	0.028	0.024	0.019	0.018	0.018	
2.9	0.028	0.029	0.025	0.020	0.018	0.018	
3.0	0.029	0.030	0.026	0.021	0.019	0.019	



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

Material Group ISO 513	M1	M2	M3			
	Hardness/Rm					
	Vc (m/min)	<b>45÷55*</b>	<b>45÷50*</b>	<b>40÷45*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
1.0	0.005	0.005	0.005			
1.1	0.006	0.006	0.006			
1.2	0.006	0.006	0.007			
1.3	0.007	0.007	0.007			
1.4	0.007	0.007	0.008			
1.5	0.008	0.008	0.008			
1.6	0.009	0.009	0.009			
1.7	0.010	0.010	0.010			
1.8	0.010	0.010	0.011			
1.9	0.011	0.011	0.011			
2.0	0.011	0.011	0.012			
2.1	0.013	0.013	0.013			
2.2	0.013	0.013	0.014			
2.3	0.014	0.014	0.014			
2.4	0.014	0.014	0.015			
2.5	0.015	0.015	0.016			
2.6	0.016	0.017	0.017			
2.7	0.017	0.017	0.018			
2.8	0.018	0.018	0.018			
2.9	0.018	0.018	0.019			
3.0	0.019	0.019	0.020			



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

### 3530SUH MINI

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI**
- HL
- HSD
- C-SD-TA



Material Group ISO 513	K1	K2	K3	K4		
Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
Vc (m/min)	<b>75÷85*</b>	<b>60÷70*</b>	<b>50÷60*</b>	<b>45÷55*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.008	0.009	0.010	0.005		
1.1	0.009	0.010	0.011	0.006		
1.2	0.010	0.011	0.012	0.006		
1.3	0.011	0.012	0.013	0.007		
1.4	0.012	0.013	0.014	0.007		
1.5	0.012	0.014	0.015	0.008		
1.6	0.014	0.015	0.016	0.009		
1.7	0.015	0.016	0.017	0.010		
1.8	0.016	0.017	0.019	0.010		
1.9	0.016	0.018	0.020	0.011		
2.0	0.017	0.019	0.021	0.011		
2.1	0.019	0.021	0.023	0.013		
2.2	0.020	0.022	0.024	0.013		
2.3	0.021	0.023	0.025	0.014		
2.4	0.022	0.024	0.026	0.014		
2.5	0.023	0.025	0.027	0.015		
2.6	0.025	0.028	0.030	0.016		
2.7	0.025	0.029	0.031	0.017		
2.8	0.026	0.030	0.032	0.018		
2.9	0.027	0.031	0.033	0.018		
3.0	0.028	0.032	0.034	0.019		

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

Material Group ISO 513	N1	N2	N3 N4	N5		
Hardness/Rm						
Vc (m/min)	<b>125÷135*</b>	<b>105÷115*</b>	<b>96÷104*</b>	<b>135÷140*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.012	0.012	0.010	0.012		
1.1	0.013	0.013	0.011	0.013		
1.2	0.015	0.014	0.012	0.015		
1.3	0.016	0.015	0.013	0.016		
1.4	0.017	0.017	0.014	0.017		
1.5	0.018	0.018	0.015	0.018		
1.6	0.020	0.020	0.017	0.020		
1.7	0.021	0.021	0.018	0.021		
1.8	0.023	0.022	0.019	0.023		
1.9	0.024	0.023	0.020	0.024		
2.0	0.025	0.025	0.021	0.025		
2.1	0.027	0.027	0.023	0.027		
2.2	0.029	0.028	0.024	0.029		
2.3	0.030	0.029	0.025	0.030		
2.4	0.031	0.031	0.026	0.031		
2.5	0.033	0.032	0.027	0.033		
2.6	0.035	0.034	0.029	0.035		
2.7	0.037	0.035	0.031	0.036		
2.8	0.038	0.037	0.032	0.038		
2.9	0.039	0.038	0.033	0.039		
3.0	0.041	0.039	0.034	0.040		

\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



HSS  
END-MILLS

CARBIDE  
BURRS

### 3530SUH MINI

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	<b>26÷30*</b>	<b>24÷26*</b>	<b>34÷36*</b>	<b>28÷32*</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
1.0	0.005	0.005	0.004	0.005			
1.1	0.006	0.006	0.005	0.005			
1.2	0.006	0.007	0.005	0.006			
1.3	0.007	0.007	0.006	0.006			
1.4	0.007	0.008	0.006	0.007			
1.5	0.008	0.008	0.007	0.007			
1.6	0.009	0.010	0.008	0.008			
1.7	0.010	0.011	0.008	0.009			
1.8	0.010	0.011	0.009	0.009			
1.9	0.011	0.012	0.009	0.010			
2.0	0.011	0.013	0.010	0.010			
2.1	0.013	0.015	0.011	0.012			
2.2	0.014	0.016	0.012	0.013			
2.3	0.014	0.016	0.012	0.013			
2.4	0.015	0.017	0.013	0.014			
2.5	0.016	0.018	0.013	0.014			
2.6	0.018	0.020	0.015	0.016			
2.7	0.019	0.021	0.016	0.017			
2.8	0.019	0.022	0.016	0.018			
2.9	0.020	0.023	0.017	0.018			
3.0	0.021	0.024	0.018	0.019			



\*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value (Vf=n available x fn)

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
**SUH MINI**  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS







INFO

#### CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA

#### HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

#### CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

#### HSS END-MILLS

#### CARBIDE BURRS

## TYPHOON HL

HIGH PERFORMANCE - LONG AND EXTRA-LONG

🇬🇧 The Typhoon HL long and extra-long drills are the tool of choice for deep holes on ISO P, M, K, N, S.

🇮🇹 La gamma Typhoon HL di punte lunghe ed extra-lunghe è progettata per la foratura di materiali ISO P, M, K, N, S.

🇩🇪 Die Produktlinie Typhoon HL mit langen und extra-langen Bohrern wurde für das Bohren der Materialien ISO P, M, K, N, S entwickelt.

🇫🇷 La gamme Typhoon HL de forets longs et extra longs est conçue pour le perçage de matériaux ISO P, M, K, N, S.

🇪🇸 La gama Typhoon HL de brocas largas y extra-largas está diseñada para el taladro de materiales ISO P, M, K, N, S.

🇷🇺 Серия Typhoon HL длинных и супердлинных свёрл предназначена для сверления отверстий в материалах по ISO P, M, K, N, S.

TYPHOON HL

HIGH PERFORMANCE - LONG AND EXTRA-LONG

INFO

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL**
- HSD
- C-SD-TA

HSS DRILLS

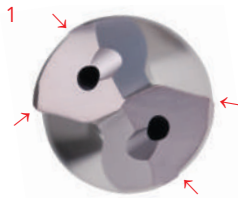
- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS



- Suitable for deep and extra-deep drilling on ISO P, M, K, N, S materials
- Drill geometry ①: 4 margin lands for accurate and straight deep holes. Very stable and reliable even in case of work-pieces with slant exit holes and cross holes
- Chip pocket ②: highly polished to prevent welding and to improve the chip ejection
- Wide gash ③ to protect the drill edge thanks to faster and smoother chip ejection
- Substrate and coating: specifically selected for high wear resistance, long and reliable life
- Drilling process: no steps for reliable and faster process
- Addressable industries: automotive, hydraulic component, mould and die, energy, general engineering
- Available from Ø3.1\*mm to Ø10 mm
- Different cutting length types, from long (12xD) to extra-long (30xD).



- Punta progettate per la foratura profonda di materiali ISO P, M, K, N, S
- Geometria del tagliente: 4 Margini per esecuzione di fori profondi precisi e rettilinei. Garantisce stabilità e affidabilità anche nel caso di fori con uscita inclinata o fori intersecanti
- Finitura gole: lappate per ridurre il problema dell'incollaggio e facilitare l'evacuazione dei trucioli
- Ampio scarico frontale ③ per proteggere il tagliente grazie ad una rapida ed efficace evacuazione dei trucioli
- Substrato e rivestimento: specifici per garantire durata e affidabilità
- Processo di foratura: la foratura senza step garantisce un processo affidabile e veloce
- Settori industriali: automotive, oleodinamica, stampi, energia, meccanica generale
- Disponibili dal Ø3.1\*mm fino a Ø10 mm
- Differenti tipi di lunghezza, dalle lunghe (12xD) alle extra-lunghie (30xD)

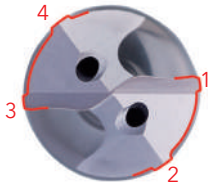


- Forets conçus pour le perçage profond de matériaux ISO P, M, K, N, S
- Géométrie de l'arête : « 4 listels » pour l'exécution de trous profonds précis et droits
- Elle garantit stabilité et fiabilité même en présence de trous avec sortie inclinée ou de trous croisés
- Large entaille ③ pour protéger l'arête de coupe du foret grâce à une meilleure évacuation des copeaux plus rapide et plus fluide
- Finition des goujures : polie pour réduire le problème du collage et faciliter l'évacuation des copeaux
- Substrat et revêtement : spécifiques pour garantir durée et fiabilité
- Processus de perçage : le perçage sans step garantit un processus fiable et rapide
- Secteurs industriels : automotive, oléohydraulique, moules, énergie, mécanique générale
- Disponibles du Ø3.1\*mm au Ø10 mm
- Différents types de longueur, de la longueur 12xD aux extra-longues 30xD



- Brocas proyectadas para el taladro profundo de materiales ISO P, M, K, N, S
- Geometría del filo: 4 Márgenes para el mecanizado de agujeros profundos, precisos y rectilíneos. Garantiza estabilidad y fiabilidad incluso en caso de agujeros con salida inclinada o agujeros que se cruzan
- Acabado ranuras: lapeadas para reducir el problema del encolado y facilitar la evacuación de las virutas
- corte frontal amplio ③ para proteger el filo de la broca gracias a una expulsión de viruta más rápida y suave
- Sustrato y revestimiento: específicos para garantizar duración y fiabilidad
- Proceso de taladro: el taladro sin step garantiza un proceso fiable y rápido
- Sectores industriales: automoción, oleodinámico, moldes, energía, mecánica general
- Disponibles de Ø3.1\*mm hasta Ø10 mm
- Diferentes tipos de longitud, desde las largas (12XD) hasta las extra-largas (30XD)

\* < Ø3.1 = SUH MINI



- Für das tiefe Bohren der Materialien ISO P, M, K, N, S entwickelte Bohrer
- Schneidkanten­geometrie: 4 Fasen für die Herstellung von präzisen und geraden Tiefbohrungen. Zur Gewährleistung von Stabilität und Zuverlässigkeit, auch bei Bohrungen mit geneigtem Ausgang oder sich kreuzenden Bohrungen
- Schlichtbearbeitung der Nuten: geläpft, um Probleme durch Verkleben zu reduzieren und um die Späneabführung zu erleichtern
- Großer Raum ③ auf der Stirnseite um die Schneide zu schützen, weil dadurch ein gute Spanabfuhr ermöglicht wird
- Trägermaterial und Beschichtung: speziell zur Gewährleistung von Standzeit und Zuverlässigkeit
- Bohrverfahren: das stufenlose Bohren gewährleistet ein zuverlässiges und rasches Verfahren
- Industriesektoren: Automobilindustrie, Ölhydraulik, Formpressen, Energie, allgemeine Mechanik
- Erhältlich von Ø3.1\*mm bis Ø10 mm
- Verschiedene Längen, von lang (12XD) bis extra-lang (30XD)



- Свёрла предназначены для сверления глубоких отверстий в материалах по ISO P, M, K, N, S
- Геометрия с 4 режущими кромками для выполнения точных и прямолинейных отверстий. Гарантирует стабильность и надёжность, даже, в случае обработки отверстий с выходом в наклонную плоскость или взаимопересекающихся отверстий
- Отполированные стружечные канавки: уменьшают вероятность приваривания стружки и облегчают ее вывод
- глубокая фронтальная ③ подточка служит для защиты режущей кромки и лучшему удалению стружки
- Специальное покрытие для повышения стойкости инструмента
- Процесс сверления отверстий: сверление без ступенчатых отходов, гарантирующее производительность
- Промышленные отрасли: автомобилестроение, детали гидравлики, пресс-формы, энергетика, общее машиностроение
- Доступны диаметром от Ø3.1\*мм до Ø10 мм
- Различные длины: от длинных (12XD) до супердлинных (30XD)

**CARBIDE DRILLS**

 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
**HL**  
 HSD  
 C-SD-TA

**HSS DRILLS**

 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE END-MILLS**

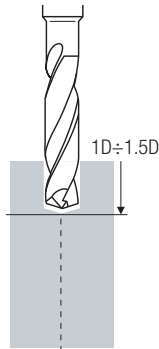
 G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

**HSS END-MILLS**
**CARBIDE BURRS**

\* &lt; Ø3.1 = SUH MINI

INFO

**CARBIDE DRILLS**

 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
**HL**  
 HSD  
 C-SD-TA

**MACHINING OF DEEP HOLES PERPENDICULAR TO THE SURFACE**
**ESECUZIONE FORI PROFONDI ORTOGONALI ALLA SUPERFICIE**
**HERSTELLUNG TIEFER RECHTWINKLIGER BOHRUNGEN**
**EXÉCUTION DE TROUS PROFONDS ORTHOGONAUX À LA SURFACE**
**MECANIZADO DE AGUJEROS PROFUNDOS PERPENDICULARES A LA SUPERFICIE**
**СВЕРЛЕНИЕ ГЛУБОКИХ ОТВЕРСТИЙ ПЕРПЕНДИКУЛЯРНО ОБРАБАТЫВАЕМОЙ ПОВЕРХНОСТИ**
**STEP 1**

As pilot drill (1xD,1.5xD), please use 353HTA or 353HPU with head angle 140° (HL=135°) and m7 tolerance (HL=h7).

Utilizzare una punta 353HTA o 353HPU con angolo in testa di 140° (HL=135°) e tolleranza m7 (HL=h7), per eseguire un foro pilota (1xD÷1.5xD) molto preciso.

Einen Bohrer 353HTA oder 353HPU mit einem Spitzenwinkel von 140° (HL=135°) und Toleranz m7 (HL=h7) für die Herstellung einer äußerst präzisen Richtbohrung (1xD÷1.5xD) verwenden.

Utiliser un foret 353HTA ou 353HPU avec un angle en bout de 140° (HL=135°) et une tolérance m7 (HL=h7), pour effectuer un trou pilote (1xD÷1.5xD) très précis.

Utilice una broca 353HTA o 353HPU con ángulo punta de 140° (HL=135°) y tolerancia m7 (HL=h7), para realizar un agujero piloto (1xD÷1,5xD) muy preciso.

Для пилотного отверстия (1xD÷1.5xD) используйте сверло 353HTA или 353HPU с углом при вершине 140° (HL=135°) и допуском на диаметр m7 (HL=h7).

**STEP 2**

With coolant feed OFF, enter the pilot hole with HL drill at Vc=20 m/min and fn=0.3 mm/rev. Position the HL drill at 1 mm from the end of the pilot hole, then start supplying the coolant and start drilling.

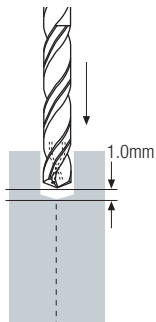
Senza azionare il refrigerante interno, entrare con la punta lunga serie HL all'interno del foro. Vc=20 m/min, fn=0.3 mm/rev. Posizionare la punta HL sino a 1 mm dal fondo del foro pilota. Azionare il refrigerante interno ad alta pressione e cominciare la foratura.

Ohne Aktivierung der internen Kühlung, einen langen Bohrer der Serie HL in die Bohrung einführen. Vc=20 m/min, fn=0.3 mm/U den Bohrer HL bis 1 mm vom Ende der Richtbohrung ansetzen. Die interne Kühlung mit Hochdruck aktivieren und mit der Bohrung beginnen.

Sans actionner la lubrification interne, entrer avec le foret long série HL à l'intérieur du trou. Vc=20 m/min, fn=0.3 mm/rév. Placer le foret HL jusqu'à 1 mm du fond du trou pilote. Actionner la lubrification interne à haute pression et commencer le perçage.

Sin accionar el refrigerante interno, entre con la broca larga de la serie HL dentro del agujero. Vc=20 m/min, fn=0.3 mm/rev. Posicione la punta HL hasta 1 mm del fondo del agujero piloto. Accione el refrigerante interno a alta presión y comience el taladro.

Без включения СОЖ, введите длинное сверло серии HL внутрь пилотного отверстия с режимами Vc=20 м/мин и fn=0.3 мм/об. Спозиционируйте сверло HL на расстоянии 1 мм от дна отверстия. Включите подачу СОЖ и начните сверление.


**HSS DRILLS**

 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE END-MILLS**

 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

**HSS END-MILLS**
**CARBIDE BURRS**


**STEP 3**


Make continue drilling operation without steps for chip ejection.  
In case of through holes, reduce the feed by 30% before the hole exit (approx. 1 mm).  
Stop the coolant feed.



Furare senza step per scarico trucioli.  
Nel caso di fori passanti, 1 mm prima di aver completato il foro, ridurre l'avanzamento del 30%.  
Fermare il refrigerante.



Für die Späneabführung Stufenlos bohren.  
Bei Durchgangsbohrungen 1 mm vor Fertigstellung der Bohrung den Vorschub um 30% reduzieren. Die Kühlung deaktivieren.



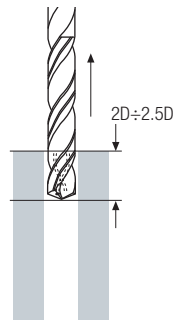
Perçer sans step pour l'évacuation des copeaux.  
En présence de trous débouchants, 1 mm avant d'avoir terminé le trou, réduire l'avancement du 30 %. Arrêter la lubrification.



Taladre sin step para la descarga de virutas.  
En el caso de agujeros pasantes, 1 mm antes de haber completado el agujero, reduzca el avance un 30%. Pare el refrigerante.



Сверлите без остановок и выводов инструмента.  
В случае обработки сквозного отверстия, снизьте подачу на 30%, за 1 мм до выхода. Отключите подачу СОЖ.


**STEP 4**


Withdraw the drill using max rpm and double fn, until 2xD from the hole entrance.



Ritirare la punta utilizzando il massimo dei giri disponibili e il doppio dell'avanzamento consigliato sino ad una profondità 2xD.



Den Bohrer zurückziehen, dabei die maximal verfügbare Drehzahl und den doppelten Wert des empfohlenen Vorschubs bis zu einer Tiefe 2xD einsetzen.



Retirer le foret en utilisant le maximum de tours disponibles et le double de l'avancement conseillé jusqu'à une profondeur 2xD.



Retire la broca utilizando el máximo de rpm disponibles y el doble del avance aconsejado hasta una profundidad 2xD.



Выньте сверло до уровня 2xD, используя максимальную частоту вращения и двойную подачу.


**STEP 5**


Completing the exit from the hole by using slow and constant speed.



Completare l'ultimo tratto di arretramento con velocità ridotta e costante.



Den letzten Abschnitt beim Zurückziehen mit reduzierter und konstanter Geschwindigkeit fertigstellen.



Terminer la dernière partie du perçage avec une vitesse réduite et constante.



Complete el último tramo de retroceso con velocidad reducida y constante.



Полностью выньте сверло на заниженных режимах.

 CARBIDE  
DRILLS

 PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA

 HSS  
DRILLS

 LFTA  
SUTA  
HSS-HSS/CO

 CARBIDE  
END-MILLS

 G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

 HSS  
END-MILLS

 CARBIDE  
BURRS

INFO

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL**
- HSD
- C-SD-TA





 **MACHINING OF DEEP HOLES ON SLANTED OR IRREGULAR SURFACES**

 **ESECUZIONE FORI PROFONDI SU SUPERFICI IRREGOLARI O OBLIQUE**


 **HERSTELLUNG TIEFER BOHRUNGEN AUF SCHRÄGEN ODER UNREGELMÄSSIGEN OBERFLÄCHEN**


 **EXÉCUTION DE TROUS PROFONDS SUR DES SURFACES IRRÉGULIÈRES OU OBLIQUES**


 **MECANIZADO DE AGUJEROS PROFUNDOS SOBRE SUPERFÍCIES IRREGULARES U OBLICUAS**


 **ОБРАБОТКА ГЛУБОКИХ ОТВЕРСТИЙ НА НАКЛОННЫХ ИЛИ НЕРОВНЫХ ПЛОСКОСТЯХ**


STEP 1


 Prepare a flat surface of the same size as the drilling diameter.

 Réaliser une surface plane en utilisant une fraise avec une arête frontale. Le plan réalisé doit avoir les mêmes dimensions que le diamètre de perçage profond.


 Realizzare una superficie piana utilizzando una fresa con tagliante frontale. Il piano realizzato deve avere le stesse dimensioni del diametro di foratura profonda.


 Realizar una superficie plana usando una fresa con filo frontal. El plano realizado tiene que tener las mismas dimensiones que el diámetro de taladro profundo.


 Eine ebene Oberfläche, durch einen Fräser mit stirnseitiger Schneidkante, herstellen. Die hergestellte Oberfläche muss dieselben Abmessungen des Durchmessers der tiefen Bohrung aufweisen.


 Подготовьте ровную поверхность с помощью концевой фрезы. Эта поверхность должна быть того же размера, что и диаметр будущего глубокого отверстия.


STEP 2


 As pilot drill (1xD, 1.5xD), please use 353HTA or 353HPU with head angle 140° (HL=135°) and m7 tolerance (HL=h7).

 Utiliser un foret 353HTA ou 353HPU avec un angle en bout de 140° (HL=135°) et une tolérance m7 (HL=h7), pour effectuer un trou pilote (1xD÷1.5xD) très précis.

 Utilizzare una punta 353HTA o 353HPU con angolo in testa di 140° (HL=135°) e tolleranza m7 (HL=h7), per eseguire un foro pilota (1xD÷1.5xD) molto preciso.

 Utilice una broca 353HTA o 353HPU con ángulo punta de 140° (HL=135°) y tolerancia m7 (HL=h7), para realizar un agujero piloto (1xD÷1,5xD) muy preciso.

 Einen Bohrer 353HTA oder 353HPU mit einem Spitzenwinkel von 140° (HL=135°) und Toleranz m7 (HL=h7) für die Herstellung einer äußerst präzisen Richtbohrung (1xD÷1.5xD) verwenden.

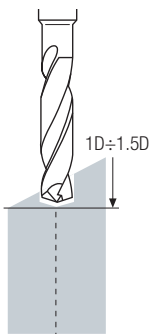
 Для пилотного отверстия (1xD÷1.5xD) используйте сверло 353HTA или 353HPU с углом при вершине 140° (HL=135°) и допуском на диаметр m7 (HL=h7).

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

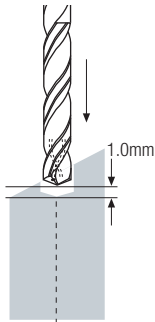
- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



HSS END-MILLS

CARBIDE BURRS




**STEP 3**

With coolant feed OFF, enter the pilot hole with HL drill at  $V_c=20$  m/min and  $f_n=0.3$  mm/rev. Position the HL drill at 1 mm from the end of the pilot hole, then start supplying the coolant and start drilling.

Sans actionner la lubrification interne, entrer avec le foret long série HL à l'intérieur du trou.  $V_c=20$  m/min,  $f_n=0.3$  mm/rév. Placer le foret HL jusqu'à 1 mm du fond du trou pilote. Actionner la lubrification interne à haute pression et commencer le perçage.

Senza azionare il refrigerante interno, entrare con la punta lunga serie HL all'interno del foro.  $V_c=20$  m/min,  $f_n=0.3$  mm/rev. Posizionare la punta HL sino a 1 mm dal fondo del foro pilota. Azionare il refrigerante interno ad alta pressione e cominciare la foratura.

Sin accionar el refrigerante interno, entre con la broca larga de la serie HL dentro del agujero.  $V_c=20$  m/min,  $f_n=0.3$  mm/rev. Posicione la broca HL hasta 1 mm del fondo del agujero piloto. Accione el refrigerante interno a alta presión y comience el taladro.

Ohne Aktivierung der internen Kühlung, einen langen Bohrer der Serie HL in die Bohrung einführen.  $V_c=20$  m/min,  $f_n=0.3$  mm/Umdr. Den Bohrer HL bis 1 mm vom Ende der Richtbohrung ansetzen. Die interne Kühlung mit Hochdruck aktivieren und mit der Bohrung beginnen.

Без включения СОЖ, введите длинное сверло серии HL внутрь пилотного отверстия с режимами  $V_c=20$  м/мин и  $f_n=0.3$  мм/об. Спозиционируйте сверло HL на расстоянии 1 мм от дна отверстия. Включите подачу СОЖ и начните сверление.


**STEP 4**

Make continue drilling operation without steps for chip ejection. In case of through holes, reduce the feed by 30% before the hole exit (approx 1 mm). Stop the coolant feed.

Percer sans step pour l'évacuation des copeaux. En présence de trous débouchants, 1 mm avant d'avoir terminé le trou, réduire l'avancement du 30%. Arrêter la lubrification.

Forare senza step per scarico trucioli. Nel caso di fori passanti, 1 mm prima di aver completato il foro, ridurre l'avanzamento del 30%. Fermare il refrigerante.

Taladre sin step para la descarga de virutas. En el caso de agujeros pasantes, 1 mm antes de haber completado el agujero, reduzca el avance un 30%. Pare el refrigerante.

Für die Späneabführung Stufenlos bohren. Bei Durchgangsbohrungen 1 mm vor Fertigstellung der Bohrung den Vorschub um 30% reduzieren. Die Kühlung deaktivieren.

Сверлите без остановок и выводов инструмента. В случае обработки сквозного отверстия, снизьте подачу на 30%, за 1 мм до выхода. Отключите подачу СОЖ.

**CARBIDE DRILLS**

 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
**HL**  
 HSD  
 C-SD-TA

**HSS DRILLS**

 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE END-MILLS**

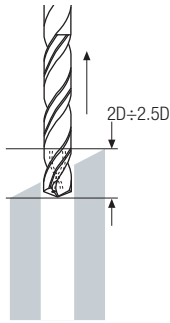
 G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

**HSS END-MILLS**
**CARBIDE BURRS**

**TYPHOON HL**
**HIGH PERFORMANCE - LONG AND EXTRA-LONG**

INFO

**CARBIDE DRILLS**

 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
**HL**  
 HSD  
 C-SD-TA

**STEP 5**


Withdraw the drill using max rpm and double  $f_n$ , until  $2xD \div 2.5xD$  from the hole entrance.



Ritirare la punta utilizzando il massimo dei giri disponibili e il doppio dell'avanzamento consigliato sino ad una profondità  $2xD \div 2.5xD$ .



Den Bohrer zurückziehen, dabei die maximal verfügbare Drehzahl und den doppelten Wert des empfohlenen Vorschubs bis zu einer Tiefe  $2xD \div 2.5xD$  einsetzen.



Retirer le foret en utilisant le maximum de tours disponibles et le double de l'avancement conseillé jusqu'à une profondeur  $2xD \div 2.5xD$ .



Retire la broca utilizando el máximo de rpm disponibles y el doble del avance aconsejado hasta una profundidad de  $2xD \div 2.5xD$ .



Выньте сверло до уровня  $2xD \div 2.5xD$ , используя максимальную частоту вращения и двойную подачу.

**STEP 6**


Completing the exit from the hole by using slow and constant speed.



Completare l'ultimo tratto di arretramento con velocità ridotta e costante.



Den letzten Abschnitt beim Zurückziehen mit reduzierter und konstanter Geschwindigkeit fertigstellen.



Terminer la dernière partie du perçage avec une vitesse réduite et constante.



Complete el último tramo de retroceso con velocidad reducida y constante.



Полностью выньте сверло на заниженных режимах.


**HSS DRILLS**

 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE END-MILLS**

 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

**HSS END-MILLS**
**CARBIDE BURRS**



# 3512HL

4-margin lands, polished flutes

12XD

OSAWA  
NORM

HL

**MG**  
PV250

135°

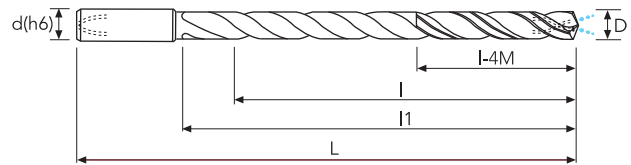
30°

INFO



P	M	K	N	S	H
★	★	★	☆	☆	

★ 1st choice ☆ suitable



**CARBIDE DRILLS**

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL**
- HSD
- C-SD-TA

D(h7)	D Tol.	d(h6)	l	l1	L	I-4M	drilling length	EDP No.	Stock
3.10*	0/-0.012	4	45	50	85	15.5	12 x D	3512HL0310N	●
3.20	0/-0.012	4	45	50	85	16	12 x D	3512HL0320N	●
3.30	0/-0.012	4	45	50	85	16.5	12 x D	3512HL0330N	●
3.40	0/-0.012	4	48	54	90	17	12 x D	3512HL0340N	○
3.50	0/-0.012	4	48	54	90	17.5	12 x D	3512HL0350N	●
3.60	0/-0.012	4	48	54	90	18	12 x D	3512HL0360N	○
3.70	0/-0.012	4	48	54	90	18.5	12 x D	3512HL0370N	●
3.80	0/-0.012	4	57	64	100	19	12 x D	3512HL0380N	●
3.90	0/-0.012	4	57	64	100	19.5	12 x D	3512HL0390N	○
4.00	0/-0.012	4	57	64	100	20	12 x D	3512HL0400N	●
4.10	0/-0.012	5	57	64	100	20.5	12 x D	3512HL0410N	●
4.20	0/-0.012	5	57	64	100	21	12 x D	3512HL0420N	●
4.30	0/-0.012	5	57	64	100	21.5	12 x D	3512HL0430N	●
4.40	0/-0.012	5	57	64	100	22	12 x D	3512HL0440N	○
4.50	0/-0.012	5	57	64	100	22.5	12 x D	3512HL0450N	●
4.60	0/-0.012	5	57	64	100	23	12 x D	3512HL0460N	○
4.70	0/-0.012	5	57	64	100	23.5	12 x D	3512HL0470N	○
4.80	0/-0.012	5	67	74	110	24	12 x D	3512HL0480N	●
4.90	0/-0.012	5	72	81	120	24.5	12 x D	3512HL0490N	○
5.00	0/-0.012	5	72	81	120	25	12 x D	3512HL0500N	●
5.10	0/-0.012	6	72	81	120	25.5	12 x D	3512HL0510N	●
5.20	0/-0.012	6	72	81	120	26	12 x D	3512HL0520N	●
5.30	0/-0.012	6	72	81	120	26.5	12 x D	3512HL0530N	●
5.40	0/-0.012	6	72	81	120	27	12 x D	3512HL0540N	○
5.50	0/-0.012	6	72	81	120	27.5	12 x D	3512HL0550N	●
5.60	0/-0.012	6	72	81	120	28	12 x D	3512HL0560N	●
5.70	0/-0.012	6	72	81	120	28.5	12 x D	3512HL0570N	○
5.80	0/-0.012	6	72	81	120	29	12 x D	3512HL0580N	●
5.90	0/-0.012	6	72	81	120	29.5	12 x D	3512HL0590N	○
6.00	0/-0.012	6	72	81	120	30	12 x D	3512HL0600N	●
6.10	0/-0.015	8	88	97	135	30.5	12 x D	3512HL0610N	●
6.20	0/-0.015	8	88	97	135	31	12 x D	3512HL0620N	●
6.30	0/-0.015	8	88	97	135	31.5	12 x D	3512HL0630N	●
6.40	0/-0.015	8	96	108	145	32	12 x D	3512HL0640N	○
6.50	0/-0.015	8	96	108	145	32.5	12 x D	3512HL0650N	●
6.60	0/-0.015	8	96	108	145	33	12 x D	3512HL0660N	○
6.70	0/-0.015	8	96	108	145	33.5	12 x D	3512HL0670N	○
6.80	0/-0.015	8	96	108	145	34	12 x D	3512HL0680N	●
6.90	0/-0.015	8	96	108	145	34.5	12 x D	3512HL0690N	○

**HSS DRILLS**

- LFTA
- SUTA
- HSS-HSS/CO

**CARBIDE END-MILLS**

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

**HSS END-MILLS**

**CARBIDE BURRS**

\* Ø1+Ø3 = 3512 SUH MINI page 148

INFO

# 3512HL

4-margin lands, polished flutes

12XD

OSAWA  
NORM

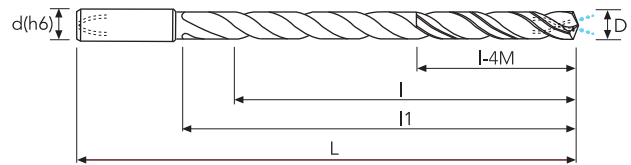


CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL**
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	★	☆	☆	

★ 1st choice ☆ suitable



D(h7)	D Tol.	d(h6)	l	l1	L	l-4M	drilling length	EDP No.	Stock
7.00	0/-0.015	8	96	108	145	35	12 x D	3512HL0700N	●
7.10	0/-0.015	8	96	108	145	35.5	12 x D	3512HL0710N	○
7.20	0/-0.015	8	96	108	145	36	12 x D	3512HL0720N	○
7.30	0/-0.015	8	96	108	145	36.5	12 x D	3512HL0730N	○
7.40	0/-0.015	8	96	108	145	37	12 x D	3512HL0740N	○
7.50	0/-0.015	8	96	108	145	37.5	12 x D	3512HL0750N	●
7.60	0/-0.015	8	96	108	145	38	12 x D	3512HL0760N	○
7.70	0/-0.015	8	96	108	145	38.5	12 x D	3512HL0770N	○
7.80	0/-0.015	8	96	108	145	39	12 x D	3512HL0780N	●
7.90	0/-0.015	8	96	108	145	39.5	12 x D	3512HL0790N	○
8.00	0/-0.015	8	96	108	145	40	12 x D	3512HL0800N	●
8.10	0/-0.015	10	115	127	170	40.5	12 x D	3512HL0810N	○
8.20	0/-0.015	10	120	135	180	41	12 x D	3512HL0820N	○
8.30	0/-0.015	10	120	135	180	41.5	12 x D	3512HL0830N	○
8.40	0/-0.015	10	120	135	180	42	12 x D	3512HL0840N	○
8.50	0/-0.015	10	120	135	180	42.5	12 x D	3512HL0850N	●
8.60	0/-0.015	10	120	135	180	43	12 x D	3512HL0860N	●
8.70	0/-0.015	10	120	135	180	43.5	12 x D	3512HL0870N	●
8.80	0/-0.015	10	120	135	180	44	12 x D	3512HL0880N	●
8.90	0/-0.015	10	120	135	180	44.5	12 x D	3512HL0890N	○
9.00	0/-0.015	10	120	135	180	45	12 x D	3512HL0900N	●
9.10	0/-0.015	10	120	135	180	45.5	12 x D	3512HL0910N	○
9.20	0/-0.015	10	120	135	180	46	12 x D	3512HL0920N	○
9.30	0/-0.015	10	120	135	180	46.5	12 x D	3512HL0930N	○
9.40	0/-0.015	10	120	135	180	47	12 x D	3512HL0940N	○
9.50	0/-0.015	10	120	135	180	47.5	12 x D	3512HL0950N	●
9.60	0/-0.015	10	120	135	180	48	12 x D	3512HL0960N	○
9.70	0/-0.015	10	120	135	180	48.5	12 x D	3512HL0970N	○
9.80	0/-0.015	10	120	135	180	49	12 x D	3512HL0980N	●
9.90	0/-0.015	10	120	135	180	49.5	12 x D	3512HL0990N	○
10.00	0/-0.015	10	120	135	180	50	12 x D	3512HL1000N	●

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

### 3512HL

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8	
	Hardness/Rm	500÷700 N/mm <sup>2</sup>		600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
	Vc (m/min)	<b>70÷90</b>		<b>60÷80</b>	<b>50÷70</b>	<b>45÷65</b>	<b>40÷60</b>	<b>35÷40</b>
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
3.0	0.047	0.046	0.046	0.045	0.047	0.044		
3.5	0.057	0.055	0.054	0.053	0.056	0.053		
4.0	0.068	0.066	0.064	0.063	0.067	0.063		
4.5	0.079	0.076	0.076	0.075	0.077	0.071		
5.0	0.090	0.088	0.087	0.086	0.087	0.081		
5.5	0.102	0.098	0.099	0.097	0.100	0.092		
6.0	0.117	0.109	0.110	0.109	0.113	0.105		
6.5	0.128	0.121	0.125	0.123	0.123	0.118		
7.0	0.144	0.135	0.138	0.137	0.136	0.126		
7.5	0.156	0.151	0.152	0.150	0.150	0.144		
8.0	0.175	0.166	0.167	0.165	0.167	0.156		
8.5	0.184	0.173	0.170	0.168	0.172	0.163		
9.0	0.194	0.176	0.180	0.178	0.177	0.160		
9.5	0.198	0.185	0.186	0.184	0.181	0.168		
10.0	0.210	0.188	0.192	0.190	0.185	0.177		

	Material Group ISO 513	M1	M2	M3			
	Hardness/Rm						
	Vc (m/min)	<b>40÷60</b>		<b>40÷60</b>	<b>35÷55</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
3.0	0.047	0.042	0.041				
3.5	0.056	0.051	0.048				
4.0	0.067	0.060	0.058				
4.5	0.077	0.070	0.067				
5.0	0.087	0.079	0.075				
5.5	0.100	0.091	0.086				
6.0	0.113	0.103	0.096				
6.5	0.123	0.113	0.108				
7.0	0.136	0.125	0.122				
7.5	0.150	0.135	0.127				
8.0	0.167	0.150	0.145				
8.5	0.172	0.157	0.147				
9.0	0.177	0.159	0.156				
9.5	0.181	0.162	0.159				
10.0	0.185	0.170	0.169				

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

### 3512HL

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL**
- HSD
- C-SD-TA



Material Group ISO 513	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>K4</b>		
Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
Vc (m/min)	<b>65÷85</b>	<b>60÷80</b>	<b>45÷65</b>	<b>45÷65</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
<b>3.0</b>	0.048	0.045	0.048	0.047		
<b>3.5</b>	0.058	0.055	0.057	0.056		
<b>4.0</b>	0.069	0.064	0.067	0.066		
<b>4.5</b>	0.080	0.075	0.079	0.078		
<b>5.0</b>	0.093	0.087	0.090	0.089		
<b>5.5</b>	0.105	0.097	0.103	0.101		
<b>6.0</b>	0.117	0.109	0.114	0.113		
<b>6.5</b>	0.133	0.122	0.130	0.128		
<b>7.0</b>	0.149	0.136	0.143	0.142		
<b>7.5</b>	0.161	0.152	0.157	0.155		
<b>8.0</b>	0.179	0.166	0.173	0.171		
<b>8.5</b>	0.186	0.173	0.176	0.174		
<b>9.0</b>	0.187	0.174	0.187	0.185		
<b>9.5</b>	0.197	0.183	0.191	0.189		
<b>10.0</b>	0.200	0.187	0.195	0.194		

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	<b>N1</b>	<b>N2</b>	<b>N3 N4</b>			
Hardness/Rm						
Vc (m/min)	<b>125÷145</b>	<b>110÷130</b>	<b>100÷120</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
<b>3.0</b>	0.060	0.059	0.058			
<b>3.5</b>	0.073	0.071	0.070			
<b>4.0</b>	0.086	0.085	0.083			
<b>4.5</b>	0.100	0.099	0.096			
<b>5.0</b>	0.115	0.114	0.111			
<b>5.5</b>	0.132	0.129	0.126			
<b>6.0</b>	0.149	0.145	0.140			
<b>6.5</b>	0.167	0.161	0.158			
<b>7.0</b>	0.185	0.181	0.175			
<b>7.5</b>	0.202	0.196	0.195			
<b>8.0</b>	0.222	0.218	0.213			
<b>8.5</b>	0.229	0.227	0.218			
<b>9.0</b>	0.237	0.231	0.229			
<b>9.5</b>	0.246	0.243	0.236			
<b>10.0</b>	0.251	0.250	0.243			

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS



### 3512HL

Material Group ISO 513	S1 S2	S3	S4	S5			
	Hardness/Rm		<35 HRC	35÷45 HRC			
	Vc (m/min)		<b>24+28</b>	<b>20+25</b>	<b>28+32</b>	<b>25+30</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
3.0	0.040	0.037	0.047	0.044			
3.5	0.048	0.046	0.055	0.052			
4.0	0.057	0.055	0.065	0.063			
4.5	0.067	0.061	0.077	0.070			
5.0	0.075	0.069	0.088	0.080			
5.5	0.084	0.077	0.104	0.094			
6.0	0.100	0.086	0.124	0.113			
6.5	0.109	0.092	0.136	0.123			
7.0	0.119	0.100	0.150	0.136			
7.5	0.133	0.114	0.164	0.150			
8.0	0.138	0.130	0.181	0.167			
8.5	0.148	0.130	0.189	0.163			
9.0	0.160	0.144	0.183	0.173			
9.5	0.155	0.139	0.195	0.168			
10.0	0.167	0.150	0.191	0.180			



\*during the exit phase the use of external coolant supply is recommended to keep the tool and the workpiece cooled and lubricated to avoid failures due to overheating.

\*nella fase di uscita, per evitare il grippaggio causa surriscaldamento, è necessario usare l'adduzione esterna del refrigerante per mantenere raffreddati e lubrificati l'utensile ed il pezzo in lavorazione.

\*beim Herausfahren des Bohrers aus der Bohrung, muss beachtet werden, um das Einklemmen wegen Überhitzung zu verhindern, dass von Aussen Kühlmittel zugeführt wird um das Werkzeug und das Teil zu kühlen und zu schmieren.

\*en phase de sortie, pour éviter le grippage dû à une surchauffe, il est nécessaire d'utiliser l'arrosage externe pour maintenir l'outil et la pièce refroidis et lubrifiés.

\*en la fase de salida, para evitar el bloqueo debido al sobrecalentamiento, es necesario usar la aducción externa del refrigerante para mantener enfriadas y lubricadas la herramienta y la pieza.

\*на этапе выхода, чтобы избежать заклинивания из-за перегрева, необходимо использовать внешний подвод СОЖ, чтобы инструмент и заготовка охлаждались и смазывались.

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

# 3515HL

4-margin lands, polished flutes

15XD

OSAWA  
NORM



MG  
PV250

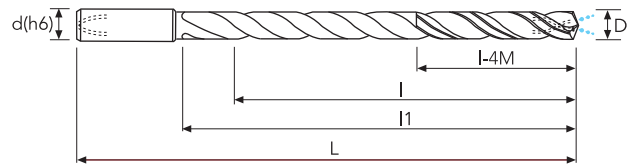


CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA

P	M	K	N	S	H
★	★	★	☆	☆	

★ 1st choice ☆ suitable



D(h7)	D Tol.	d(h6)	l	l1	L	l-4M	drilling length	EDP No.	Stock
3.10	0/-0.012	4	50	55	90	15.5	15 x D	3515HL0310N	○
3.20	0/-0.012	4	50	55	90	16	15 x D	3515HL0320N	○
3.30	0/-0.012	4	52	56	90	16.5	15 x D	3515HL0330N	○
3.40	0/-0.012	4	53	58	95	17	15 x D	3515HL0340N	○
3.50	0/-0.012	4	55	60	95	17.5	15 x D	3515HL0350N	●
3.60	0/-0.012	4	56	61	95	18	15 x D	3515HL0360N	○
3.70	0/-0.012	4	58	63	100	18.5	15 x D	3515HL0370N	○
3.80	0/-0.012	4	60	65	100	19	15 x D	3515HL0380N	○
3.90	0/-0.012	4	60	66	100	19.5	15 x D	3515HL0390N	○
4.00	0/-0.012	4	62	68	105	20	15 x D	3515HL0400N	●
4.10	0/-0.012	5	64	70	105	20.5	15 x D	3515HL0410N	○
4.20	0/-0.012	5	65	71	110	21	15 x D	3515HL0420N	○
4.30	0/-0.012	5	67	73	110	21.5	15 x D	3515HL0430N	●
4.40	0/-0.012	5	68	75	110	22	15 x D	3515HL0440N	○
4.50	0/-0.012	5	70	76	115	22.5	15 x D	3515HL0450N	●
4.60	0/-0.012	5	71	78	115	23	15 x D	3515HL0460N	○
4.70	0/-0.012	5	73	80	115	23.5	15 x D	3515HL0470N	○
4.80	0/-0.012	5	75	82	115	24	15 x D	3515HL0480N	○
4.90	0/-0.012	5	76	83	120	24.5	15 x D	3515HL0490N	○
5.00	0/-0.012	5	77	85	120	25	15 x D	3515HL0500N	●
5.10	0/-0.012	6	79	86	125	25.5	15 x D	3515HL0510N	○
5.20	0/-0.012	6	80	88	125	26	15 x D	3515HL0520N	○
5.30	0/-0.012	6	82	89	130	26.5	15 x D	3515HL0530N	○
5.40	0/-0.012	6	83	91	130	27	15 x D	3515HL0540N	○
5.50	0/-0.012	6	85	93	130	27.5	15 x D	3515HL0550N	●
5.60	0/-0.012	6	86	94	135	28	15 x D	3515HL0560N	○
5.70	0/-0.012	6	88	96	135	28.5	15 x D	3515HL0570N	○
5.80	0/-0.012	6	89	98	135	29	15 x D	3515HL0580N	○
5.90	0/-0.012	6	91	99	140	29.5	15 x D	3515HL0590N	○
6.00	0/-0.012	6	92	101	140	30	15 x D	3515HL0600N	●
6.10	0/-0.015	8	94	103	140	30.5	15 x D	3515HL0610N	○
6.20	0/-0.015	8	95	104	140	31	15 x D	3515HL0620N	○
6.30	0/-0.015	8	98	108	145	31.5	15 x D	3515HL0630N	○
6.40	0/-0.015	8	100	110	145	32	15 x D	3515HL0640N	○
6.50	0/-0.015	8	100	110	150	32.5	15 x D	3515HL0650N	●
6.60	0/-0.015	8	101	111	150	33	15 x D	3515HL0660N	○
6.70	0/-0.015	8	103	113	150	33.5	15 x D	3515HL0670N	○
6.80	0/-0.015	8	104	114	155	34	15 x D	3515HL0680N	○
6.90	0/-0.015	8	106	116	155	34.5	15 x D	3515HL0690N	○

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



INFO

### 3515HL

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
Vc (m/min)	<b>65÷85</b>	<b>50÷70</b>	<b>40÷60</b>	<b>35÷55</b>	<b>40÷50</b>	<b>30÷40</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
3.0	0.044	0.043	0.045	0.044	0.043	0.035
3.5	0.054	0.053	0.054	0.053	0.052	0.042
4.0	0.065	0.063	0.065	0.064	0.063	0.050
4.5	0.075	0.075	0.077	0.076	0.072	0.057
5.0	0.085	0.086	0.088	0.086	0.084	0.065
5.5	0.098	0.097	0.102	0.100	0.097	0.075
6.0	0.111	0.109	0.112	0.110	0.107	0.086
6.5	0.125	0.123	0.130	0.128	0.120	0.098
7.0	0.138	0.137	0.140	0.138	0.135	0.105
7.5	0.151	0.152	0.156	0.154	0.145	0.121
8.0	0.171	0.169	0.175	0.173	0.165	0.131
8.5	0.177	0.172	0.179	0.176	0.171	0.137
9.0	0.177	0.183	0.183	0.180	0.178	0.133
9.5	0.186	0.186	0.189	0.187	0.182	0.139
10.0	0.189	0.190	0.196	0.194	0.188	0.146

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	M1	M2	M3
Hardness/Rm			
Vc (m/min)	<b>40÷50</b>	<b>40÷50</b>	<b>35÷45</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
3.0	0.043	0.039	0.031
3.5	0.052	0.048	0.038
4.0	0.063	0.057	0.046
4.5	0.072	0.066	0.053
5.0	0.084	0.077	0.061
5.5	0.097	0.088	0.071
6.0	0.107	0.098	0.080
6.5	0.120	0.110	0.088
7.0	0.135	0.123	0.099
7.5	0.145	0.132	0.106
8.0	0.165	0.150	0.120
8.5	0.171	0.155	0.124
9.0	0.178	0.161	0.128
9.5	0.182	0.165	0.132
10.0	0.188	0.171	0.136

✚ \*during the exit phase the use of external coolant supply is recommended to keep the tool and the workpiece cooled and lubricated to avoid failures due to overheating.

🇮🇹 \*nella fase di uscita, per evitare il grippaggio causa surriscaldamento, è necessario usare l'adduzione esterna del refrigerante per mantenere raffreddati e lubrificati l'utensile ed il pezzo in lavorazione.

🇩🇪 \*beim Herausfahren des Bohrers aus der Bohrung, muss beachtet werden, um das Einklemmen wegen Überhitzung zu verhindern, dass von Aussen Kühlmittel zugeführt wird um das Werkzeug und das Teil zu kühlen und zu schmieren.

🇫🇷 \*en phase de sortie, pour éviter le grippage dû à une surchauffe, il est nécessaire d'utiliser l'arrosage externe pour maintenir l'outil et la pièce refroidis et lubrifiés.

🇪🇸 \*en la fase de salida, para evitar el bloqueo debido al sobrecalentamiento, es necesario usar la aducción externa del refrigerante para mantener enfriadas y lubricadas la herramienta y la pieza.

🇷🇺 \*на этапе выхода, чтобы избежать заклинивания из-за перегрева, необходимо использовать внешний подвод СОЖ, чтобы инструмент и заготовка охлаждались и смазывались.

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



### 3515HL

	Material Group ISO 513	K1	K2	K3	K4		
	Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
	Vc (m/min)	<b>60÷80</b>	<b>55÷75</b>	<b>40÷60</b>	<b>40÷60</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3.0	0.047	0.045	0.047	0.047			
3.5	0.057	0.055	0.057	0.056			
4.0	0.067	0.065	0.068	0.067			
4.5	0.079	0.077	0.081	0.079			
5.0	0.092	0.089	0.092	0.090			
5.5	0.103	0.101	0.106	0.105			
6.0	0.116	0.112	0.117	0.115			
6.5	0.130	0.127	0.135	0.133			
7.0	0.146	0.144	0.146	0.144			
7.5	0.163	0.158	0.163	0.160			
8.0	0.178	0.173	0.182	0.180			
8.5	0.185	0.175	0.186	0.183			
9.0	0.186	0.184	0.190	0.188			
9.5	0.196	0.188	0.195	0.193			
10.0	0.200	0.191	0.200	0.199			

	Material Group ISO 513	N1	N2	N3 N4		
	Hardness/Rm					
	Vc (m/min)	<b>115÷135</b>	<b>95÷115</b>	<b>85÷105</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3.0	0.058	0.057	0.056			
3.5	0.071	0.070	0.068			
4.0	0.084	0.083	0.081			
4.5	0.098	0.096	0.095			
5.0	0.114	0.111	0.110			
5.5	0.129	0.127	0.125			
6.0	0.147	0.142	0.141			
6.5	0.163	0.160	0.158			
7.0	0.182	0.177	0.177			
7.5	0.201	0.198	0.194			
8.0	0.222	0.217	0.214			
8.5	0.229	0.222	0.220			
9.0	0.238	0.232	0.226			
9.5	0.242	0.238	0.233			
10.0	0.253	0.246	0.241			

✚ \*during the exit phase the use of external coolant supply is recommended to keep the tool and the workpiece cooled and lubricated to avoid failures due to overheating.

🇮🇹 \*nella fase di uscita, per evitare il grippaggio causa surriscaldamento, è necessario usare l'adduzione esterna del refrigerante per mantenere raffreddati e lubrificati l'utensile ed il pezzo in lavorazione.

🇩🇪 \*beim Herausfahren des Bohrers aus der Bohrung, muss beachtet werden, um das Einklemmen wegen Überhitzung zu verhindern, dass von Aussen Kühlmittel zugeführt wird um das Werkzeug und das Teil zu kühlen und zu schmieren.

🇫🇷 \*en phase de sortie, pour éviter le grippage dû à une surchauffe, il est nécessaire d'utiliser l'arrosage externe pour maintenir l'outil et la pièce refroidis et lubrifiés.

🇪🇸 \*en la fase de salida, para evitar el bloqueo debido al sobrecalentamiento, es necesario usar la aducción externa del refrigerante para mantener enfriadas y lubricadas la herramienta y la pieza.

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INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

# 3515HL

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA



Material Group ISO 513	S1 S2	S3	S4	S5		
Hardness/Rm	<35 HRC	35÷45 HRC				
Vc (m/min)	<b>24+28</b>	<b>20+25</b>	<b>28+32</b>	<b>25+30</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3.0	0.037	0.030	0.050	0.044		
3.5	0.044	0.037	0.058	0.052		
4.0	0.052	0.045	0.069	0.063		
4.5	0.062	0.050	0.081	0.070		
5.0	0.069	0.056	0.093	0.080		
5.5	0.078	0.063	0.109	0.094		
6.0	0.093	0.071	0.129	0.113		
6.5	0.102	0.077	0.142	0.123		
7.0	0.112	0.083	0.157	0.136		
7.5	0.125	0.095	0.171	0.150		
8.0	0.129	0.110	0.188	0.167		
8.5	0.139	0.110	0.198	0.163		
9.0	0.150	0.122	0.192	0.173		
9.5	0.145	0.117	0.205	0.168		
10.0	0.156	0.125	0.200	0.180		

✚ \*during the exit phase the use of external coolant supply is recommended to keep the tool and the workpiece cooled and lubricated to avoid failures due to overheating.

🇮🇹 \*nella fase di uscita, per evitare il grippaggio causa surriscaldamento, è necessario usare l'adduzione esterna del refrigerante per mantenere raffreddati e lubrificati l'utensile ed il pezzo in lavorazione.

🇩🇪 \*beim Herausfahren des Bohrers aus der Bohrung, muss beachtet werden, um das Einklemmen wegen Überhitzung zu verhindern, dass von Aussen Kühlmittel zugeführt wird um das Werkzeug und das Teil zu kühlen und zu schmieren.

🇫🇷 \*en phase de sortie, pour éviter le grippage dû à une surchauffe, il est nécessaire d'utiliser l'arrosage externe pour maintenir l'outil et la pièce refroidis et lubrifiés.

🇪🇸 \*en la fase de salida, para evitar el bloqueo debido al sobrecalentamiento, es necesario usar la aducción externa del refrigerante para mantener enfriadas y lubricadas la herramienta y la pieza.

🇷🇺 \*на этапе выхода, чтобы избежать заклинивания из-за перегрева, необходимо использовать внешний подвод СОЖ, чтобы инструмент и заготовка охлаждались и смазывались.

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

# 3520HL

4-margin lands, polished flutes

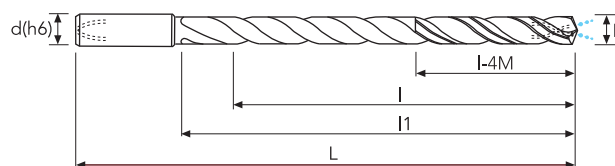


INFO



P	M	K	N	S	H
★	★	★	☆	☆	

★ 1st choice ☆ suitable



CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL**
- HSD
- C-SD-TA

D(h7)	D Tol.	d(h6)	l	l1	L	I-4M	drilling length	EDP No.	Stock
3.10*	0/-0.012	4	64	69	105	15.5	20 x D	3520HL0310N	○
3.20	0/-0.012	4	66	71	105	16	20 x D	3520HL0320N	●
3.30	0/-0.012	4	68	73	110	16.5	20 x D	3520HL0330N	●
3.40	0/-0.012	4	70	75	110	17	20 x D	3520HL0340N	○
3.50	0/-0.012	4	72	77	110	17.5	20 x D	3520HL0350N	●
3.60	0/-0.012	4	74	79	115	18	20 x D	3520HL0360N	○
3.70	0/-0.012	4	76	82	115	18.5	20 x D	3520HL0370N	○
3.80	0/-0.012	4	78	84	120	19	20 x D	3520HL0380N	○
3.90	0/-0.012	4	80	86	120	19.5	20 x D	3520HL0390N	○
4.00	0/-0.012	4	82	88	125	20	20 x D	3520HL0400N	●
4.10	0/-0.012	5	84	90	125	20.5	20 x D	3520HL0410N	○
4.20	0/-0.012	5	86	92	130	21	20 x D	3520HL0420N	○
4.30	0/-0.012	5	88	94	130	21.5	20 x D	3520HL0430N	○
4.40	0/-0.012	5	90	97	135	22	20 x D	3520HL0440N	○
4.50	0/-0.012	5	92	99	135	22.5	20 x D	3520HL0450N	●
4.60	0/-0.012	5	94	101	140	23	20 x D	3520HL0460N	○
4.70	0/-0.012	5	96	103	140	23.5	20 x D	3520HL0470N	○
4.80	0/-0.012	5	98	105	140	24	20 x D	3520HL0480N	○
4.90	0/-0.012	5	100	107	145	24.5	20 x D	3520HL0490N	○
5.00	0/-0.012	5	102	110	145	25	20 x D	3520HL0500N	●
5.10	0/-0.012	6	104	112	150	25.5	20 x D	3520HL0510N	○
5.20	0/-0.012	6	106	114	155	26	20 x D	3520HL0520N	○
5.30	0/-0.012	6	108	116	155	26.5	20 x D	3520HL0530N	○
5.40	0/-0.012	6	110	118	155	27	20 x D	3520HL0540N	○
5.50	0/-0.012	6	112	120	160	27.5	20 x D	3520HL0550N	●
5.60	0/-0.012	6	114	122	160	28	20 x D	3520HL0560N	○
5.70	0/-0.012	6	116	125	165	28.5	20 x D	3520HL0570N	○
5.80	0/-0.012	6	118	127	165	29	20 x D	3520HL0580N	○
5.90	0/-0.012	6	120	129	170	29.5	20 x D	3520HL0590N	○
6.00	0/-0.012	6	122	131	170	30	20 x D	3520HL0600N	●
6.10	0/-0.015	8	124	133	170	30.5	20 x D	3520HL0610N	○
6.20	0/-0.015	8	126	135	175	31	20 x D	3520HL0620N	○
6.30	0/-0.015	8	128	137	175	31.5	20 x D	3520HL0630N	○
6.40	0/-0.015	8	130	140	180	32	20 x D	3520HL0640N	○
6.50	0/-0.015	8	132	142	180	32.5	20 x D	3520HL0650N	●
6.60	0/-0.015	8	134	144	185	33	20 x D	3520HL0660N	○
6.70	0/-0.015	8	136	146	185	33.5	20 x D	3520HL0670N	○
6.80	0/-0.015	8	138	148	185	34	20 x D	3520HL0680N	○
6.90	0/-0.015	8	140	150	190	34.5	20 x D	3520HL0690N	○

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

\* Ø1+Ø3 = 3520 SUH MINI page 152

INFO

# 3520HL

4-margin lands, polished flutes

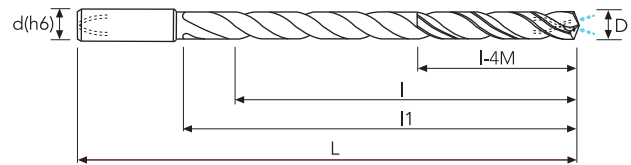


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL**
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	★	☆	☆	☆

★ 1st choice ☆ suitable



D(h7)	D Tol.	d(h6)	l	l1	L	I-4M	drilling length	EDP No.	Stock
7.00	0/-0.015	8	142	153	195	35	20 x D	3520HL0700N	●
7.10	0/-0.015	8	144	155	195	35.5	20 x D	3520HL0710N	○
7.20	0/-0.015	8	146	157	200	36	20 x D	3520HL0720N	○
7.30	0/-0.015	8	148	159	200	36.5	20 x D	3520HL0730N	○
7.40	0/-0.015	8	150	161	200	37	20 x D	3520HL0740N	○
7.50	0/-0.015	8	152	163	205	37.5	20 x D	3520HL0750N	●
7.60	0/-0.015	8	154	165	205	38	20 x D	3520HL0760N	○
7.70	0/-0.015	8	156	168	210	38.5	20 x D	3520HL0770N	○
7.80	0/-0.015	8	158	170	210	39	20 x D	3520HL0780N	○
7.90	0/-0.015	8	160	172	215	39.5	20 x D	3520HL0790N	○
8.00	0/-0.015	8	162	174	215	40	20 x D	3520HL0800N	●
8.10	0/-0.015	10	164	176	220	40.5	20 x D	3520HL0810N	○
8.20	0/-0.015	10	166	178	220	41	20 x D	3520HL0820N	○
8.30	0/-0.015	10	168	180	225	41.5	20 x D	3520HL0830N	○
8.40	0/-0.015	10	170	183	225	42	20 x D	3520HL0840N	○
8.50	0/-0.015	10	172	185	230	42.5	20 x D	3520HL0850N	●
8.60	0/-0.015	10	174	187	230	43	20 x D	3520HL0860N	○
8.70	0/-0.015	10	176	189	230	43.5	20 x D	3520HL0870N	○
8.80	0/-0.015	10	178	191	235	44	20 x D	3520HL0880N	○
8.90	0/-0.015	10	180	193	235	44.5	20 x D	3520HL0890N	○
9.00	0/-0.015	10	182	196	240	45	20 x D	3520HL0900N	●
9.10	0/-0.015	10	184	198	240	45.5	20 x D	3520HL0910N	○
9.20	0/-0.015	10	186	200	245	46	20 x D	3520HL0920N	○
9.30	0/-0.015	10	188	202	245	46.5	20 x D	3520HL0930N	○
9.40	0/-0.015	10	190	204	245	47	20 x D	3520HL0940N	○
9.50	0/-0.015	10	192	206	250	47.5	20 x D	3520HL0950N	●
9.60	0/-0.015	10	194	208	250	48	20 x D	3520HL0960N	○
9.70	0/-0.015	10	196	211	255	48.5	20 x D	3520HL0970N	○
9.80	0/-0.015	10	198	213	255	49	20 x D	3520HL0980N	○
9.90	0/-0.015	10	200	215	260	49.5	20 x D	3520HL0990N	○
10.00	0/-0.015	10	202	217	260	50	20 x D	3520HL1000N	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

### 3520HL

Material Group ISO 513	P1 P2		P3 P4		P5	P6	P7	P8					
	Hardness/Rm		500÷700 N/mm <sup>2</sup>		600÷1000 N/mm <sup>2</sup>		900÷1200 N/mm <sup>2</sup>		1200÷1400 N/mm <sup>2</sup>				
	Vc (m/min)		<b>65÷85</b>		<b>50÷70</b>		<b>40÷60</b>		<b>35÷55</b>		<b>40÷50</b>		<b>30÷40</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)				
3.0	0.044	0.043	0.045	0.044	0.043	0.035							
3.5	0.054	0.053	0.054	0.053	0.052	0.042							
4.0	0.065	0.063	0.065	0.064	0.063	0.050							
4.5	0.075	0.075	0.077	0.076	0.072	0.057							
5.0	0.085	0.086	0.088	0.086	0.084	0.065							
5.5	0.098	0.097	0.102	0.100	0.097	0.075							
6.0	0.111	0.109	0.112	0.110	0.107	0.086							
6.5	0.125	0.123	0.130	0.128	0.120	0.098							
7.0	0.138	0.137	0.140	0.138	0.135	0.105							
7.5	0.151	0.152	0.156	0.154	0.145	0.121							
8.0	0.171	0.169	0.175	0.173	0.165	0.131							
8.5	0.177	0.172	0.179	0.176	0.171	0.137							
9.0	0.177	0.183	0.183	0.180	0.178	0.133							
9.5	0.186	0.186	0.189	0.187	0.182	0.139							
10.0	0.189	0.190	0.196	0.194	0.188	0.146							



CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA

Material Group ISO 513	M1		M2		M3		
	Hardness/Rm						
	Vc (m/min)		<b>40÷50</b>		<b>40÷50</b>		<b>35÷45</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
3.0	0.043	0.039	0.031				
3.5	0.052	0.048	0.038				
4.0	0.063	0.057	0.046				
4.5	0.072	0.066	0.053				
5.0	0.084	0.077	0.061				
5.5	0.097	0.088	0.071				
6.0	0.107	0.098	0.080				
6.5	0.120	0.110	0.088				
7.0	0.135	0.123	0.099				
7.5	0.145	0.132	0.106				
8.0	0.165	0.150	0.120				
8.5	0.171	0.155	0.124				
9.0	0.178	0.161	0.128				
9.5	0.182	0.165	0.132				
10.0	0.188	0.171	0.136				



HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

✚ \*during the exit phase the use of external coolant supply is recommended to keep the tool and the workpiece cooled and lubricated to avoid failures due to overheating.

🇮🇹 \*nella fase di uscita, per evitare il grippaggio causa surriscaldamento, è necessario usare l'adduzione esterna del refrigerante per mantenere raffreddati e lubrificati l'utensile ed il pezzo in lavorazione.

🇩🇪 \*beim Herausfahren des Bohrers aus der Bohrung, muss beachtet werden, um das Einklemmen wegen Überhitzung zu verhindern, dass von Aussen Kühlmittel zugeführt wird um das Werkzeug und das Teil zu kühlen und zu schmieren.

🇫🇷 \*en phase de sortie, pour éviter le grippage dû à une surchauffe, il est nécessaire d'utiliser l'arrosage externe pour maintenir l'outil et la pièce refroidis et lubrifiés.

🇪🇸 \*en la fase de salida, para evitar el bloqueo debido al sobrecalentamiento, es necesario usar la aducción externa del refrigerante para mantener enfriadas y lubricadas la herramienta y la pieza.

🇷🇺 \*на этапе выхода, чтобы избежать заклинивания из-за перегрева, необходимо использовать внешний подвод СОЖ, чтобы инструмент и заготовка охлаждались и смазывались.

INFO

### 3520HL

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA



Material Group ISO 513	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>K4</b>		
Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
Vc (m/min)	<b>60÷80</b>	<b>55÷75</b>	<b>40÷60</b>	<b>40÷60</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
<b>3.0</b>	0.047	0.045	0.047	0.047		
<b>3.5</b>	0.057	0.055	0.057	0.056		
<b>4.0</b>	0.067	0.065	0.068	0.067		
<b>4.5</b>	0.079	0.077	0.081	0.079		
<b>5.0</b>	0.092	0.089	0.092	0.090		
<b>5.5</b>	0.103	0.101	0.106	0.105		
<b>6.0</b>	0.116	0.112	0.117	0.115		
<b>6.5</b>	0.130	0.127	0.135	0.133		
<b>7.0</b>	0.146	0.144	0.146	0.144		
<b>7.5</b>	0.163	0.158	0.163	0.160		
<b>8.0</b>	0.178	0.173	0.182	0.180		
<b>8.5</b>	0.185	0.175	0.186	0.183		
<b>9.0</b>	0.186	0.184	0.190	0.188		
<b>9.5</b>	0.196	0.188	0.195	0.193		
<b>10.0</b>	0.200	0.191	0.200	0.199		

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	<b>N1</b>	<b>N2</b>	<b>N3 N4</b>			
Hardness/Rm						
Vc (m/min)	<b>115÷135</b>	<b>95÷115</b>	<b>85÷105</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
<b>3.0</b>	0.058	0.057	0.056			
<b>3.5</b>	0.071	0.070	0.068			
<b>4.0</b>	0.084	0.083	0.081			
<b>4.5</b>	0.098	0.096	0.095			
<b>5.0</b>	0.114	0.111	0.110			
<b>5.5</b>	0.129	0.127	0.125			
<b>6.0</b>	0.147	0.142	0.141			
<b>6.5</b>	0.163	0.160	0.158			
<b>7.0</b>	0.182	0.177	0.177			
<b>7.5</b>	0.201	0.198	0.194			
<b>8.0</b>	0.222	0.217	0.214			
<b>8.5</b>	0.229	0.222	0.220			
<b>9.0</b>	0.238	0.232	0.226			
<b>9.5</b>	0.242	0.238	0.233			
<b>10.0</b>	0.253	0.246	0.241			

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

### 3520HL

Material Group ISO 513	S1 S2	S3	S4	S5		
	<35 HRC		35÷45 HRC			
Hardness/Rm						
Vc (m/min)	<b>24+28</b>	<b>20+25</b>	<b>28+32</b>	<b>25+30</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3.0	0.037	0.030	0.050	0.044		
3.5	0.044	0.037	0.058	0.052		
4.0	0.052	0.045	0.069	0.063		
4.5	0.062	0.050	0.081	0.070		
5.0	0.069	0.056	0.093	0.080		
5.5	0.078	0.063	0.109	0.094		
6.0	0.093	0.071	0.129	0.113		
6.5	0.102	0.077	0.142	0.123		
7.0	0.112	0.083	0.157	0.136		
7.5	0.125	0.095	0.171	0.150		
8.0	0.129	0.110	0.188	0.167		
8.5	0.139	0.110	0.198	0.163		
9.0	0.150	0.122	0.192	0.173		
9.5	0.145	0.117	0.205	0.168		
10.0	0.156	0.125	0.200	0.180		



\*during the exit phase the use of external coolant supply is recommended to keep the tool and the workpiece cooled and lubricated to avoid failures due to overheating.

\*nella fase di uscita, per evitare il grippaggio causa surriscaldamento, è necessario usare l'adduzione esterna del refrigerante per mantenere raffreddati e lubrificati l'utensile ed il pezzo in lavorazione.

\*beim Herausfahren des Bohrers aus der Bohrung, muss beachtet werden, um das Einklemmen wegen Überhitzung zu verhindern, dass von Aussen Kühlmittel zugeführt wird um das Werkzeug und das Teil zu kühlen und zu schmieren.

\*en phase de sortie, pour éviter le grippage dû à une surchauffe, il est nécessaire d'utiliser l'arrosage externe pour maintenir l'outil et la pièce refroidis et lubrifiés.

\*en la fase de salida, para evitar el bloqueo debido al sobrecalentamiento, es necesario usar la aducción externa del refrigerante para mantener enfriadas y lubricadas la herramienta y la pieza.

\*на этапе выхода, чтобы избежать заклинивания из-за перегрева, необходимо использовать внешний подвод СОЖ, чтобы инструмент и заготовка охлаждались и смазывались.

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

# 3525HL

4-margin lands, polished flutes

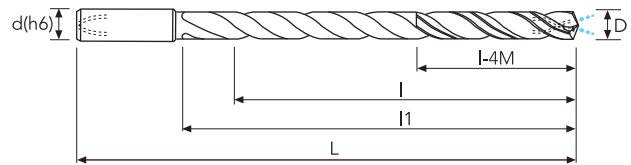


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL**
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	★	☆	☆	☆

★ 1st choice ☆ suitable



D(h7)	D Tol.	d(h6)	l	l1	L	l-4M	drilling length	EDP No.	Stock
<b>3.10*</b>	0/-0.012	4	79	83	120	15.5	25 x D	3525HL0310N	○
<b>3.20</b>	0/-0.012	4	81	86	120	16	25 x D	3525HL0320N	○
<b>3.30</b>	0/-0.012	4	84	88	125	16.5	25 x D	3525HL0330N	○
<b>3.40</b>	0/-0.012	4	86	91	125	17	25 x D	3525HL0340N	○
<b>3.50</b>	0/-0.012	4	89	94	130	17.5	25 x D	3525HL0350N	●
<b>3.60</b>	0/-0.012	4	91	96	130	18	25 x D	3525HL0360N	○
<b>3.70</b>	0/-0.012	4	94	99	135	18.5	25 x D	3525HL0370N	○
<b>3.80</b>	0/-0.012	4	96	102	135	19	25 x D	3525HL0380N	○
<b>3.90</b>	0/-0.012	4	99	104	140	19.5	25 x D	3525HL0390N	○
<b>4.00</b>	0/-0.012	4	101	107	140	20	25 x D	3525HL0400N	●
<b>4.10</b>	0/-0.012	5	104	110	145	20.5	25 x D	3525HL0410N	○
<b>4.20</b>	0/-0.012	5	106	112	150	21	25 x D	3525HL0420N	○
<b>4.30</b>	0/-0.012	5	109	115	150	21.5	25 x D	3525HL0430N	○
<b>4.40</b>	0/-0.012	5	111	118	155	22	25 x D	3525HL0440N	○
<b>4.50</b>	0/-0.012	5	114	120	155	22.5	25 x D	3525HL0450N	●
<b>4.60</b>	0/-0.012	5	116	123	160	23	25 x D	3525HL0460N	○
<b>4.70</b>	0/-0.012	5	119	126	165	23.5	25 x D	3525HL0470N	○
<b>4.80</b>	0/-0.012	5	121	128	165	24	25 x D	3525HL0480N	○
<b>4.90</b>	0/-0.012	5	124	131	170	24.5	25 x D	3525HL0490N	○
<b>5.00</b>	0/-0.012	5	126	134	170	25	25 x D	3525HL0500N	●
<b>5.10</b>	0/-0.012	6	129	136	175	25.5	25 x D	3525HL0510N	○
<b>5.20</b>	0/-0.012	6	131	139	180	26	25 x D	3525HL0520N	○
<b>5.30</b>	0/-0.012	6	134	141	180	26.5	25 x D	3525HL0530N	○
<b>5.40</b>	0/-0.012	6	136	144	185	27	25 x D	3525HL0540N	○
<b>5.50</b>	0/-0.012	6	139	147	185	27.5	25 x D	3525HL0550N	●
<b>5.60</b>	0/-0.012	6	141	149	190	28	25 x D	3525HL0560N	○
<b>5.70</b>	0/-0.012	6	144	152	190	28.5	25 x D	3525HL0570N	○
<b>5.80</b>	0/-0.012	6	146	155	195	29	25 x D	3525HL0580N	○
<b>5.90</b>	0/-0.012	6	149	157	195	29.5	25 x D	3525HL0590N	○
<b>6.00</b>	0/-0.012	6	151	160	200	30	25 x D	3525HL0600N	●
<b>6.10</b>	0/-0.015	8	154	163	200	30.5	25 x D	3525HL0610N	○
<b>6.20</b>	0/-0.015	8	156	165	205	31	25 x D	3525HL0620N	○
<b>6.30</b>	0/-0.015	8	159	168	205	31.5	25 x D	3525HL0630N	○
<b>6.40</b>	0/-0.015	8	161	171	210	32	25 x D	3525HL0640N	○
<b>6.50</b>	0/-0.015	8	164	173	210	32.5	25 x D	3525HL0650N	●
<b>6.60</b>	0/-0.015	8	166	176	215	33	25 x D	3525HL0660N	○
<b>6.70</b>	0/-0.015	8	169	179	220	33.5	25 x D	3525HL0670N	○
<b>6.80</b>	0/-0.015	8	171	181	220	34	25 x D	3525HL0680N	○
<b>6.90</b>	0/-0.015	8	174	184	225	34.5	25 x D	3525HL0690N	○

\* Ø1+Ø3 = 3525 SUH MINI page 156

● stock standard ○ non-standard stock ▽ stock exhaustion





INFO

### 3525HL

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
Vc (m/min)	<b>60÷80</b>	<b>45÷65</b>	<b>40÷55</b>	<b>35÷50</b>	<b>35÷45</b>	<b>25÷35</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
3.0	0.040	0.041	0.042	0.041	0.035	0.037
3.5	0.049	0.050	0.051	0.050	0.044	0.045
4.0	0.059	0.060	0.061	0.060	0.053	0.054
4.5	0.070	0.071	0.072	0.071	0.063	0.062
5.0	0.082	0.082	0.086	0.084	0.072	0.070
5.5	0.094	0.094	0.098	0.097	0.081	0.081
6.0	0.107	0.106	0.109	0.107	0.096	0.095
6.5	0.120	0.118	0.124	0.122	0.104	0.103
7.0	0.135	0.132	0.141	0.139	0.119	0.119
7.5	0.153	0.148	0.152	0.150	0.130	0.130
8.0	0.169	0.167	0.173	0.170	0.150	0.143
8.5	0.177	0.167	0.174	0.171	0.153	0.139
9.0	0.179	0.168	0.175	0.172	0.156	0.146
9.5	0.187	0.167	0.176	0.174	0.147	0.150

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	M1	M2	M3		
Hardness/Rm					
Vc (m/min)	<b>35÷45</b>	<b>35÷45</b>	<b>25÷35</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3.0	0.035	0.035	0.036		
3.5	0.044	0.043	0.044		
4.0	0.053	0.051	0.052		
4.5	0.063	0.061	0.061		
5.0	0.072	0.071	0.069		
5.5	0.081	0.083	0.083		
6.0	0.096	0.095	0.092		
6.5	0.104	0.103	0.105		
7.0	0.119	0.118	0.114		
7.5	0.130	0.128	0.124		
8.0	0.150	0.141	0.136		
8.5	0.153	0.144	0.141		
9.0	0.156	0.147	0.146		
9.5	0.147	0.147	0.149		

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

\*during the exit phase the use of external coolant supply is recommended to keep the tool and the workpiece cooled and lubricated to avoid failures due to overheating.

\*nella fase di uscita, per evitare il grippaggio causa surriscaldamento, è necessario usare l'adduzione esterna del refrigerante per mantenere raffreddati e lubrificati l'utensile ed il pezzo in lavorazione.

\*beim Herausfahren des Bohrers aus der Bohrung, muss beachtet werden, um das Einklemmen wegen Überhitzung zu verhindern, dass von Aussen Kühlmittel zugeführt wird um das Werkzeug und das Teil zu kühlen und zu schmieren.

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\*на этапе выхода, чтобы избежать заклинивания из-за перегрева, необходимо использовать внешний подвод СОЖ, чтобы инструмент и заготовка охлаждались и смазывались.

HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

### 3525HL

	Material Group ISO 513	K1	K2	K3	K4		
	Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
	Vc (m/min)	<b>55÷75</b>	<b>45÷65</b>	<b>35÷55</b>	<b>35÷55</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
	3.0	0.044	0.046	0.044	0.044		
3.5	0.053	0.056	0.054	0.053			
4.0	0.063	0.067	0.065	0.064			
4.5	0.074	0.079	0.076	0.075			
5.0	0.088	0.091	0.091	0.089			
5.5	0.099	0.105	0.103	0.102			
6.0	0.113	0.119	0.115	0.113			
6.5	0.127	0.133	0.130	0.128			
7.0	0.140	0.148	0.148	0.146			
7.5	0.158	0.165	0.159	0.157			
8.0	0.173	0.183	0.180	0.178			
8.5	0.172	0.184	0.182	0.179			
9.0	0.178	0.184	0.183	0.181			
9.5	0.177	0.185	0.185	0.182			

	Material Group ISO 513	N1	N2	N3 N4		
	Hardness/Rm					
	Vc (m/min)	<b>105÷125</b>	<b>85÷105</b>	<b>75÷95</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
	3.0	0.057	0.055	0.054		
3.5	0.070	0.068	0.066			
4.0	0.083	0.081	0.079			
4.5	0.097	0.095	0.093			
5.0	0.113	0.110	0.108			
5.5	0.129	0.126	0.125			
6.0	0.146	0.143	0.139			
6.5	0.164	0.160	0.157			
7.0	0.184	0.179	0.175			
7.5	0.201	0.198	0.194			
8.0	0.224	0.219	0.216			
8.5	0.229	0.221	0.218			
9.0	0.229	0.224	0.221			
9.5	0.235	0.225	0.225			

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# 3525HL

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL**
- HSD
- C-SD-TA



Material Group ISO 513	S1 S2	S3	S4	S5		
Hardness/Rm	<35 HRC	35÷45 HRC				
Vc (m/min)	<b>24+28</b>	<b>20+25</b>	<b>28+32</b>	<b>25+30</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3.0	0.033	0.026	0.047	0.041		
3.5	0.040	0.033	0.055	0.048		
4.0	0.048	0.040	0.065	0.058		
4.5	0.057	0.044	0.077	0.066		
5.0	0.064	0.050	0.088	0.075		
5.5	0.072	0.057	0.104	0.089		
6.0	0.087	0.064	0.124	0.106		
6.5	0.095	0.069	0.136	0.117		
7.0	0.104	0.075	0.150	0.129		
7.5	0.117	0.086	0.164	0.142		
8.0	0.121	0.100	0.181	0.158		
8.5	0.127	0.095	0.192	0.154		
9.0	0.135	0.100	0.188	0.164		
9.5	0.130	0.100	0.191	0.155		

✚ \*during the exit phase the use of external coolant supply is recommended to keep the tool and the workpiece cooled and lubricated to avoid failures due to overheating.

🇮🇹 \*nella fase di uscita, per evitare il grippaggio causa surriscaldamento, è necessario usare l'adduzione esterna del refrigerante per mantenere raffreddati e lubrificati l'utensile ed il pezzo in lavorazione.

🇩🇪 \*beim Herausfahren des Bohrers aus der Bohrung, muss beachtet werden, um das Einklemmen wegen Überhitzung zu verhindern, dass von Aussen Kühlmittel zugeführt wird um das Werkzeug und das Teil zu kühlen und zu schmieren.

🇫🇷 \*en phase de sortie, pour éviter le grippage dû à une surchauffe, il est nécessaire d'utiliser l'arrosage externe pour maintenir l'outil et la pièce refroidis et lubrifiés.

🇪🇸 \*en la fase de salida, para evitar el bloqueo debido al sobrecalentamiento, es necesario usar la aducción externa del refrigerante para mantener enfriadas y lubricadas la herramienta y la pieza.

🇷🇺 \*на этапе выхода, чтобы избежать заклинивания из-за перегрева, необходимо использовать внешний подвод СОЖ, чтобы инструмент и заготовка охлаждались и смазывались.

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

# 3530HL

4-margin lands, polished flutes

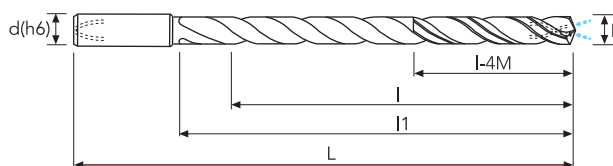


INFO



P	M	K	N	S	H
★	★	★	☆	☆	

★ 1st choice ☆ suitable



D(h7)	D Tol.	d(h6)	l	l1	L	l-4M	drilling length	EDP No.	Stock
3.10*	0/-0.012	4	94	99	135	15.5	30 x D	3530HL0310N	○
3.20	0/-0.012	4	97	102	135	16	30 x D	3530HL0320N	○
3.30	0/-0.012	4	100	105	140	16.5	30 x D	3530HL0330N	○
3.40	0/-0.012	4	103	108	145	17	30 x D	3530HL0340N	○
3.50	0/-0.012	4	106	111	145	17.5	30 x D	3530HL0350N	●
3.60	0/-0.012	4	109	114	150	18	30 x D	3530HL0360N	○
3.70	0/-0.012	4	112	118	155	18.5	30 x D	3530HL0370N	○
3.80	0/-0.012	4	115	121	155	19	30 x D	3530HL0380N	○
3.90	0/-0.012	4	118	124	160	19.5	30 x D	3530HL0390N	○
4.00	0/-0.012	4	121	127	160	20	30 x D	3530HL0400N	●
4.10	0/-0.012	5	124	130	165	20.5	30 x D	3530HL0410N	○
4.20	0/-0.012	5	127	133	170	21	30 x D	3530HL0420N	○
4.30	0/-0.012	5	130	136	175	21.5	30 x D	3530HL0430N	○
4.40	0/-0.012	5	133	140	175	22	30 x D	3530HL0440N	○
4.50	0/-0.012	5	136	143	180	22.5	30 x D	3530HL0450N	●
4.60	0/-0.012	5	139	146	185	23	30 x D	3530HL0460N	○
4.70	0/-0.012	5	142	149	185	23.5	30 x D	3530HL0470N	○
4.80	0/-0.012	5	145	152	190	24	30 x D	3530HL0480N	○
4.90	0/-0.012	5	148	155	190	24.5	30 x D	3530HL0490N	○
5.00	0/-0.012	5	151	159	195	25	30 x D	3530HL0500N	●
5.10	0/-0.012	6	154	162	200	25.5	30 x D	3530HL0510N	○
5.20	0/-0.012	6	157	165	205	26	30 x D	3530HL0520N	○
5.30	0/-0.012	6	160	168	205	26.5	30 x D	3530HL0530N	○
5.40	0/-0.012	6	163	171	210	27	30 x D	3530HL0540N	○
5.50	0/-0.012	6	166	174	215	27.5	30 x D	3530HL0550N	●
5.60	0/-0.012	6	169	177	215	28	30 x D	3530HL0560N	○
5.70	0/-0.012	6	172	181	220	28.5	30 x D	3530HL0570N	○
5.80	0/-0.012	6	175	184	225	29	30 x D	3530HL0580N	○
5.90	0/-0.012	6	178	187	225	29.5	30 x D	3530HL0590N	○
6.00	0/-0.012	6	181	190	230	30	30 x D	3530HL0600N	●
6.10	0/-0.015	8	184	193	230	30.5	30 x D	3530HL0610N	○
6.20	0/-0.015	8	187	196	235	31	30 x D	3530HL0620N	○
6.30	0/-0.015	8	190	199	240	31.5	30 x D	3530HL0630N	○
6.40	0/-0.015	8	193	203	240	32	30 x D	3530HL0640N	○
6.50	0/-0.015	8	196	206	245	32.5	30 x D	3530HL0650N	●
6.60	0/-0.015	8	199	209	250	33	30 x D	3530HL0660N	○
6.70	0/-0.015	8	202	212	250	33.5	30 x D	3530HL0670N	○
6.80	0/-0.015	8	205	215	255	34	30 x D	3530HL0680N	○
6.90	0/-0.015	8	208	218	255	34.5	30 x D	3530HL0690N	○

\* Ø1+Ø3 = 3530 SUH MINI page 160

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL**
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



CUTTING PARAMETERS

INFO

### 3530HL

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
	Vc (m/min)	<b>60+80</b>	<b>45+65</b>	<b>40+55</b>	<b>35+50</b>	<b>35+45</b>	<b>25+35</b>
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
3.0	0.040	0.041	0.042	0.041	0.035	0.037	
3.5	0.049	0.050	0.051	0.050	0.044	0.045	
4.0	0.059	0.060	0.061	0.060	0.053	0.054	
4.5	0.070	0.071	0.072	0.071	0.063	0.062	
5.0	0.082	0.082	0.086	0.084	0.072	0.070	
5.5	0.094	0.094	0.098	0.097	0.081	0.081	
6.0	0.107	0.106	0.109	0.107	0.096	0.095	
6.5	0.120	0.118	0.124	0.122	0.104	0.103	
7.0	0.135	0.132	0.141	0.139	0.119	0.119	
7.5	0.153	0.148	0.152	0.150	0.130	0.130	
8.0	0.169	0.167	0.173	0.170	0.150	0.143	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA

	Material Group ISO 513	M1	M2	M3		
	Hardness/Rm					
	Vc (m/min)	<b>35+45</b>	<b>35+45</b>	<b>25+35</b>		
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3.0	0.035	0.035	0.036			
3.5	0.044	0.043	0.044			
4.0	0.053	0.051	0.052			
4.5	0.063	0.061	0.061			
5.0	0.072	0.071	0.069			
5.5	0.081	0.083	0.083			
6.0	0.096	0.095	0.092			
6.5	0.104	0.103	0.105			
7.0	0.119	0.118	0.114			
7.5	0.130	0.128	0.124			
8.0	0.150	0.141	0.136			

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

\*during the exit phase the use of external coolant supply is recommended to keep the tool and the workpiece cooled and lubricated to avoid failures due to overheating.

\*nella fase di uscita, per evitare il grippaggio causa surriscaldamento, è necessario usare l'adduzione esterna del refrigerante per mantenere raffreddati e lubrificati l'utensile ed il pezzo in lavorazione.

\*beim Herausfahren des Bohrers aus der Bohrung, muss beachtet werden, um das Einklemmen wegen Überhitzung zu verhindern, dass von Aussen Kühlmittel zugeführt wird um das Werkzeug und das Teil zu kühlen und zu schmieren.

\*en phase de sortie, pour éviter le grippage dû à une surchauffe, il est nécessaire d'utiliser l'arrosage externe pour maintenir l'outil et la pièce refroidis et lubrifiés.

\*en la fase de salida, para evitar el bloqueo debido al sobrecalentamiento, es necesario usar la aducción externa del refrigerante para mantener enfriadas y lubricadas la herramienta y la pieza.

\*на этапе выхода, чтобы избежать заклинивания из-за перегрева, необходимо использовать внешний подвод СОЖ, чтобы инструмент и заготовка охлаждались и смазывались.

INFO

### 3530HL

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
**HL**  
HSD  
C-SD-TA



Material Group ISO 513	<b>K1</b>	<b>K2</b>	<b>K3</b>	<b>K4</b>		
Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
Vc (m/min)	<b>55÷75</b>	<b>45÷65</b>	<b>35÷55</b>	<b>35÷55</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
<b>3.0</b>	0.044	0.046	0.044	0.044		
<b>3.5</b>	0.053	0.056	0.054	0.053		
<b>4.0</b>	0.063	0.067	0.065	0.064		
<b>4.5</b>	0.074	0.079	0.076	0.075		
<b>5.0</b>	0.088	0.091	0.091	0.089		
<b>5.5</b>	0.099	0.105	0.103	0.102		
<b>6.0</b>	0.113	0.119	0.115	0.113		
<b>6.5</b>	0.127	0.133	0.130	0.128		
<b>7.0</b>	0.140	0.148	0.148	0.146		
<b>7.5</b>	0.158	0.165	0.159	0.157		
<b>8.0</b>	0.173	0.183	0.180	0.178		

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	<b>N1</b>	<b>N2</b>	<b>N3</b> <b>N4</b>			
Hardness/Rm						
Vc (m/min)	<b>105÷125</b>	<b>85÷105</b>	<b>75÷95</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
<b>3.0</b>	0.057	0.055	0.054			
<b>3.5</b>	0.070	0.068	0.066			
<b>4.0</b>	0.083	0.081	0.079			
<b>4.5</b>	0.097	0.095	0.093			
<b>5.0</b>	0.113	0.110	0.108			
<b>5.5</b>	0.129	0.126	0.125			
<b>6.0</b>	0.146	0.143	0.139			
<b>6.5</b>	0.164	0.160	0.157			
<b>7.0</b>	0.184	0.179	0.175			
<b>7.5</b>	0.201	0.198	0.194			
<b>8.0</b>	0.224	0.219	0.216			

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



### 3530HL

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	<b>24+28</b>	<b>20+25</b>	<b>28+32</b>	<b>25+30</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
3.0	0.033	0.026	0.047	0.041			
3.5	0.040	0.033	0.055	0.048			
4.0	0.048	0.040	0.065	0.058			
4.5	0.057	0.044	0.077	0.066			
5.0	0.064	0.050	0.088	0.075			
5.5	0.072	0.057	0.104	0.089			
6.0	0.087	0.064	0.124	0.106			
6.5	0.095	0.069	0.136	0.117			
7.0	0.104	0.075	0.150	0.129			
7.5	0.117	0.086	0.164	0.142			
8.0	0.121	0.100	0.181	0.158			

\*during the exit phase the use of external coolant supply is recommended to keep the tool and the workpiece cooled and lubricated to avoid failures due to overheating.

\*nella fase di uscita, per evitare il grippaggio causa surriscaldamento, è necessario usare l'adduzione esterna del refrigerante per mantenere raffreddati e lubrificati l'utensile ed il pezzo in lavorazione.

\*beim Herausfahren des Bohrers aus der Bohrung, muss beachtet werden, um das Einklemmen wegen Überhitzung zu verhindern, dass von Aussen Kühlmittel zugeführt wird um das Werkzeug und das Teil zu kühlen und zu schmieren.

\*en phase de sortie, pour éviter le grippage dû à une surchauffe, il est nécessaire d'utiliser l'arrosage externe pour maintenir l'outil et la pièce refroidis et lubrifiés.

\*en la fase de salida, para evitar el bloqueo debido al sobrecalentamiento, es necesario usar la aducción externa del refrigerante para mantener enfriadas y lubricadas la herramienta y la pieza.

\*на этапе выхода, чтобы избежать заклинивания из-за перегрева, необходимо использовать внешний подвод СОЖ, чтобы инструмент и заготовка охлаждались и смазывались.

INFO

CARBIDE DRILLS

PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
**HL**  
 HSD  
 C-SD-TA

HSS DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS

G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS





INFO

**CARBIDE  
DRILLS**

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
**HSD**  
C-SD-TA

**HSS  
DRILLS**

LFTA  
SUTA  
HSS-HSS/CO

**CARBIDE  
END-MILLS**

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

**HSS  
END-MILLS**

**CARBIDE  
BURRS**

## TYPHOON HSD

STEP DRILL FOR 90° CHAMFERING

- ✚ Chamfer drill for universal application ISO P, M, S.
- 🇮🇹 Punta svasatore per applicazione universale ISO P, M, S.
- 🇩🇪 Fasenbohrer für allgemeine Anwendungen auf ISO P, M, S.
- 🇫🇷 Fraise à chanfreiner pour application universelle ISO P, M, S.
- 🇪🇸 Broca de chafflanar universal ISO P, M, S.
- 🇷🇺 Фасочное сверло для универсального применения ISO P, M, S.

**TYPHOON HSD**
**STEP DRILL FOR 90° CHAMFERING**

INFO

**CARBIDE  
DRILLS**

 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
**HSD**  
 C-SD-TA

**HSS  
DRILLS**

 LFTA  
 SUTA  
 HSS-HSS/CO

**CARBIDE  
END-MILLS**

 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

**HSS  
END-MILLS**
**CARBIDE  
BURRS**


- Combined tool: boring and chamfering at the same time
- Straight edge geometry: stable cutting, produces relative small chips
- Flute design: wide flutes for better chip ejection
- Substrate and coating: specifically selected to perform on wide range of workpiece materials



- Outil combiné: alésage et chanfreinage en même temps
- Géométrie de bord droit: coupe stable, produit des copeaux relativement petits
- Conception de gougures: large gougure pour faciliter l'évacuation des copeaux
- Substrat et revêtement: spécialement sélectionnés pour fonctionner sur une large gamme de matière de pièces



- Utensile combinato: foratura e svasatura in un'unica operazione
- Tagliente diritto: garantisce stabilità e produce trucioli più corti
- Design delle gole: ampie per agevolare l'evacuazione dei trucioli
- Substrato e rivestimento: specifici per performare al meglio su una vasta gamma di materiali



- Herramienta mixta: taladrado y chaflanado al mismo tiempo
- Geometría filo recto: corte estable, produce virutas relativamente pequeñas
- Diseño canales: canales anchos para una mejor expulsión de viruta
- Sustrato y revestimiento: específicamente seleccionados para un óptimo rendimiento en una gran variedad de materiales



- Kombiwerkzeug: Bohren und Fasen in einem Arbeitsgang
- Gerade Schnittgeometrie: stabiles schneiden, erzeugt kleine Späne
- Nutenform: breite Nuten um die Späne besser abzuführen
- Substrat und Beschichtung: so ausgewählt um sehr flexibel auf unterschiedlichen Materialgruppen eingesetzt zu werden



- Комбинированное сверло: сверление и снятие фаски
- Прямая режущая кромка: гарантирует стабильность и получение более короткой стружки
- Конструкция канавки: широкая для облегчения удаления стружки
- Исходный материал и покрытие: специально для работы с широким спектром материалов.



INFO

### 372HSD

Material Group ISO 513	P1 P2	P3 P4	P7			
	Hardness/Rm		500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
Vc (m/min)	<b>80÷120</b>	<b>70÷110</b>	<b>40÷80</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
3	0.130	0.130	0.075			
4	0.150	0.150	0.090			
5	0.170	0.170	0.100			
6	0.190	0.190	0.110			
7	0.220	0.220	0.120			
8	0.250	0.250	0.130			
9	0.280	0.280	0.140			
10	0.300	0.300	0.150			
11	0.310	0.310	0.155			
12	0.330	0.330	0.160			
13	0.340	0.340	0.165			
14	0.360	0.360	0.175			
15	0.380	0.380	0.180			
16	0.400	0.400	0.185			
17	0.410	0.410	0.195			
18	0.420	0.420	0.200			
19	0.420	0.420	0.200			
20	0.420	0.420	0.210			



CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD**
- C-SD-TA

HSS  
DRILLS

### 372HSD

Material Group ISO 513	M1	M2	M3			
	Hardness/Rm					
Vc (m/min)	<b>40÷80</b>	<b>40÷80</b>	<b>30÷60</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
3	0.075	0.055	0.055			
4	0.090	0.070	0.070			
5	0.100	0.075	0.075			
6	0.110	0.075	0.075			
7	0.120	0.080	0.080			
8	0.130	0.090	0.090			
9	0.140	0.095	0.095			
10	0.150	0.105	0.105			
11	0.155	0.115	0.115			
12	0.160	0.120	0.120			
13	0.165	0.125	0.125			
14	0.175	0.135	0.135			
15	0.180	0.135	0.135			
16	0.185	0.140	0.140			
17	0.195	0.145	0.145			
18	0.200	0.150	0.150			
19	0.200	0.160	0.160			
20	0.210	0.170	0.170			



CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



CUTTING PARAMETERS

### 372HSD

	Material Group ISO 513	S1 S2	S3	S5			
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	<b>30÷50</b>	<b>30÷50</b>	<b>25÷45</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)				
<b>3</b>	0.030÷0.080	0.030÷0.070	0.030÷0.060				
<b>4</b>	0.040÷0.100	0.040÷0.100	0.040÷0.080				
<b>5</b>	0.050÷0.100	0.050÷0.100	0.040÷0.090				
<b>6</b>	0.050÷0.100	0.050÷0.100	0.050÷0.100				
<b>7</b>	0.050÷0.110	0.050÷0.110	0.050÷0.110				
<b>8</b>	0.060÷0.120	0.060÷0.120	0.060÷0.110				
<b>9</b>	0.060÷0.130	0.060÷0.130	0.060÷0.120				
<b>10</b>	0.070÷0.140	0.070÷0.140	0.070÷0.120				
<b>11</b>	0.080÷0.150	0.080÷0.150	0.080÷0.130				
<b>12</b>	0.080÷0.160	0.080÷0.160	0.080÷0.140				
<b>13</b>	0.080÷0.170	0.080÷0.170	0.080÷0.150				
<b>14</b>	0.090÷0.180	0.090÷0.180	0.090÷0.160				
<b>15</b>	0.090÷0.180	0.090÷0.180	0.090÷0.160				
<b>16</b>	0.100÷0.180	0.100÷0.180	0.100÷0.160				
<b>17</b>	0.100÷0.190	0.100÷0.190	0.100÷0.170				
<b>18</b>	0.100÷0.200	0.100÷0.200	0.100÷0.180				
<b>19</b>	0.110÷0.210	0.110÷0.210	0.110÷0.190				
<b>20</b>	0.120÷0.220	0.120÷0.220	0.120÷0.200				



INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
**HSD**  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

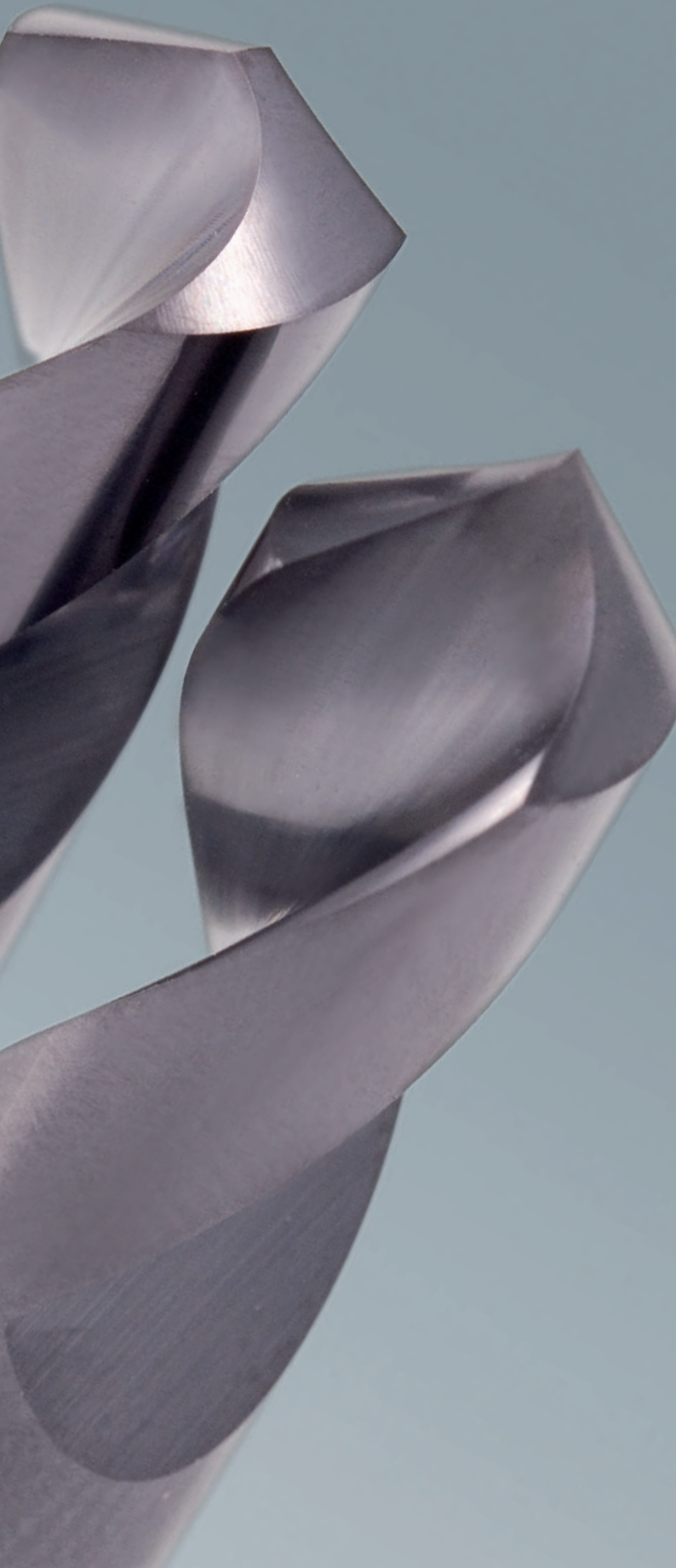
G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS







INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
**C-SD-TA**

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

## C-SD-TA

NC SPOTTING

🇬🇧 90° - 120° starting drills for NC centering and chamfering on a wide range of materials.

🇮🇹 Punte da centri a 90° e 120° per NC. Centatura e svasatura su una vasta gamma di materiali.

🇩🇪 Anbohrer mit Spitzenwinkel 90° und 120° für NC Maschinen. Zentrierung und Ansenkung auf einem sehr breiten Spektrum von Materialien.

🇫🇷 Forets à centrer et chanfreiner 90°-120°, pour une grande variété de matériaux.

🇪🇸 Brocas para puntear y escariar 90°-120° sobre una gran variedad de materiales.

🇷🇺 Центровочные свёрла с углами при вершине 90°-120° для сверления центровых отверстий и зенкования в широкой гамме материалов на станках с ЧПУ.

HSS  
END-MILLS

CARBIDE  
BURRS



CUTTING PARAMETERS

INFO

**C-SD-TA**

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	1200÷1400 N/mm <sup>2</sup>		
Vc (m/min)	<b>90÷110</b>	<b>70÷90</b>	<b>60÷80</b>	<b>50÷70</b>	<b>50÷70</b>	<b>20÷30</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
6	0.140	0.126	0.112	0.098	0.091	0.055	
7	0.160	0.144	0.128	0.112	0.104	0.062	
8	0.180	0.162	0.144	0.126	0.117	0.070	
9	0.200	0.180	0.160	0.140	0.130	0.078	
10	0.220	0.198	0.176	0.154	0.143	0.086	
11	0.240	0.216	0.192	0.168	0.156	0.094	
12	0.260	0.234	0.208	0.182	0.169	0.101	
13	0.280	0.252	0.224	0.196	0.182	0.109	
14	0.300	0.270	0.240	0.210	0.195	0.117	
15	0.320	0.288	0.256	0.224	0.208	0.125	
16	0.340	0.306	0.272	0.238	0.221	0.133	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
**C-SD-TA**

	Material Group ISO 513	M1	M2	M3		
	Hardness/Rm					
Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
6	0.091	0.073	0.064			
7	0.104	0.083	0.073			
8	0.117	0.094	0.082			
9	0.130	0.104	0.091			
10	0.143	0.114	0.100			
11	0.156	0.125	0.109			
12	0.169	0.135	0.118			
13	0.182	0.146	0.127			
14	0.195	0.156	0.137			
15	0.208	0.166	0.146			
16	0.221	0.177	0.155			

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	K1	K2	K3	K4	
	Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB	
Vc (m/min)	<b>90÷110</b>	<b>70÷90</b>	<b>60÷80</b>	<b>50÷70</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
6	0.140	0.126	0.112	0.098		
7	0.160	0.144	0.128	0.112		
8	0.180	0.162	0.144	0.126		
9	0.200	0.180	0.160	0.140		
10	0.220	0.198	0.176	0.154		
11	0.240	0.216	0.192	0.168		
12	0.260	0.234	0.208	0.182		
13	0.280	0.252	0.224	0.196		
14	0.300	0.270	0.240	0.210		
15	0.320	0.288	0.256	0.224		
16	0.340	0.306	0.272	0.238		

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

### C-SD-TA

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA**

Material Group ISO 513	N1	N2	N3 N4	N5		
Hardness/Rm						
Vc (m/min)	<b>160±200</b>	<b>140±180</b>	<b>130±170</b>	<b>160±200</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
<b>6</b>	0.175	0.158	0.140	0.158		
<b>7</b>	0.200	0.180	0.160	0.180		
<b>8</b>	0.225	0.203	0.180	0.203		
<b>9</b>	0.250	0.225	0.200	0.225		
<b>10</b>	0.275	0.248	0.220	0.248		
<b>11</b>	0.300	0.270	0.240	0.270		
<b>12</b>	0.325	0.293	0.260	0.293		
<b>13</b>	0.350	0.315	0.280	0.315		
<b>14</b>	0.375	0.338	0.300	0.338		
<b>15</b>	0.400	0.360	0.320	0.360		
<b>16</b>	0.425	0.383	0.340	0.383		

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

Material Group ISO 513	S1 S2	S3	S4	S5		
Hardness/Rm	<35 HRC	35÷45 HRC				
Vc (m/min)	<b>30±50</b>	<b>20±40</b>	<b>45±65</b>	<b>35±55</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
<b>6</b>	0.063	0.044	0.060	0.050		
<b>7</b>	0.072	0.050	0.068	0.058		
<b>8</b>	0.081	0.057	0.077	0.065		
<b>9</b>	0.090	0.063	0.086	0.072		
<b>10</b>	0.099	0.069	0.094	0.079		
<b>11</b>	0.108	0.076	0.103	0.086		
<b>12</b>	0.117	0.082	0.111	0.094		
<b>13</b>	0.126	0.088	0.120	0.101		
<b>14</b>	0.135	0.095	0.128	0.108		
<b>15</b>	0.144	0.101	0.137	0.115		
<b>16</b>	0.153	0.107	0.145	0.122		

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

## HSS DRILLS


















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🇮🇹 Legenda 🇩🇪 Verzeichnis 🇫🇷 Légende 🇪🇸 Leyenda 🇷🇺 Условные обозначения













STOCK		
●	<ul style="list-style-type: none"> <li>🇩🇪 stock standard</li> <li>🇮🇹 stock standard</li> <li>🇩🇪 Standard Lager</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 stock standard</li> <li>🇪🇸 stock estándar</li> <li>🇷🇺 складская позиция</li> </ul>
○	<ul style="list-style-type: none"> <li>🇩🇪 non-standard stock</li> <li>🇮🇹 stock non standard</li> <li>🇩🇪 nicht Standard Lager</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 stock non standard</li> <li>🇪🇸 stock no estándar</li> <li>🇷🇺 не складская позиция</li> </ul>
▽	<ul style="list-style-type: none"> <li>🇩🇪 stock exhaustion</li> <li>🇮🇹 esaurimento stock</li> <li>🇩🇪 Vorraterschöpfung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 épuisement du stock</li> <li>🇪🇸 agotamiento de stock</li> <li>🇷🇺 складские остатки</li> </ul>




🇩🇪 APPLICATION GUIDELINES 🇮🇹 INDICAZIONI PER L'APPLICAZIONE 🇩🇪 LEITFADEN ZUR ANWENDUNG 🇫🇷 INDICATIONS POUR L'APPLICATION 🇪🇸 INDICACIONES PARA SU APLICACIÓN 🇷🇺 УКАЗАНИЯ ПО ПРИМЕНЕНИЮ		
★	<ul style="list-style-type: none"> <li>🇩🇪 1st choice</li> <li>🇮🇹 1a scelta</li> <li>🇩🇪 1. Wahl</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 1er choix</li> <li>🇪🇸 1ª elección</li> <li>🇷🇺 1-й выбор</li> </ul>
☆	<ul style="list-style-type: none"> <li>🇩🇪 suitable</li> <li>🇮🇹 adatto</li> <li>🇩🇪 geeignet</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 adapté</li> <li>🇪🇸 adecuado</li> <li>🇷🇺 пригоден</li> </ul>

🇩🇪 SHANK 🇮🇹 ATTACCO 🇩🇪 SCHAFT 🇫🇷 QUEUE 🇪🇸 MANGO 🇷🇺 ХВОСТОВИК		
	<ul style="list-style-type: none"> <li>🇩🇪 cylindrical shank</li> <li>🇮🇹 attacco cilindrico</li> <li>🇩🇪 zylindrischer Schaft</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 queue cylindrique</li> <li>🇪🇸 mango cilíndrico</li> <li>🇷🇺 цилиндрическое крепление</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 Morse Taper shank</li> <li>🇮🇹 attacco Cono Morse</li> <li>🇩🇪 MK Schaft</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 queue conique</li> <li>🇪🇸 mango Cono Morse</li> <li>🇷🇺 конус Морзе</li> </ul>

🇩🇪 GEOMETRY 🇮🇹 GEOMETRIA 🇩🇪 GEOMETRIE 🇫🇷 GÉOMÉTRIE 🇪🇸 GEOMETRÍA 🇷🇺 ГЕОМЕТРИЯ		
  	<ul style="list-style-type: none"> <li>🇩🇪 high performance, selfcentering</li> <li>🇮🇹 alto rendimento, autocentrante</li> <li>🇩🇪 hochleistung, selbstzentrierende</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 haute performance, auto centreur</li> <li>🇪🇸 alto rendimiento, autocentrante</li> <li>🇷🇺 высокопроизводительные, самоцентрирующиеся</li> </ul>
  	<ul style="list-style-type: none"> <li>🇩🇪 for stainless steel and general application</li> <li>🇮🇹 per acciaio inossidabile e applicazioni generiche</li> <li>🇩🇪 für rostfreien Stahl und allgemeine Anwendung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 pour acier inoxydable et applications génériques</li> <li>🇪🇸 para acero inoxidable y aplicaciones genéricas</li> <li>🇷🇺 для нержавеющей сталей и общего назначения</li> </ul>
  	<ul style="list-style-type: none"> <li>🇩🇪 HSS general purpose</li> <li>🇮🇹 HSS uso generico</li> <li>🇩🇪 HSS allgemeine Anwendung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 HSS applications génériques</li> <li>🇪🇸 HSS uso genérico</li> <li>🇷🇺 HSS общего назначения</li> </ul>
  	HSS Tin Pointed	
  	HSS/Co Tin Pointed	

🇮🇹 Legenda 🇩🇪 Verzeichnis 🇫🇷 Légende 🇪🇸 Leyenda 🇷🇺 Условные обозначения

🇩🇪 GEOMETRY 🇮🇹 GEOMETRIA 🇪🇸 GEOMETRIE 🇫🇷 GÉOMÉTRIE 🇪🇸 GEOMETRÍA 🇷🇺 ГЕОМЕТРИЯ			
			🇩🇪 for stainless steel and general application 🇮🇹 per acciaio inossidabile e applicazioni generiche 🇪🇸 für rostfreien Stahl und allgemeine Anwendung 🇫🇷 pour acier inoxydable et applications génériques 🇪🇸 para acero inoxidable y aplicaciones genéricas 🇷🇺 для нержавеющей сталей и общего назначения
			🇩🇪 for deep holes 🇮🇹 per fori profondi 🇪🇸 für tiefe Löcher 🇫🇷 pour trous profonds 🇪🇸 para agujeros profundos 🇷🇺 для глубоких отверстий
			🇩🇪 for brass 🇮🇹 per ottone 🇪🇸 für Messing 🇫🇷 pour laiton 🇪🇸 para latón 🇷🇺 для латуни
			🇩🇪 for aluminium 🇮🇹 per alluminio 🇪🇸 für Aluminium 🇫🇷 pour aluminium 🇪🇸 para aluminio 🇷🇺 для алюминия

🇩🇪 MATERIAL 🇮🇹 MATERIALE 🇪🇸 WERKSTOFF 🇫🇷 MATIÈRE 🇪🇸 MATERIAL 🇷🇺 МАТЕРИАЛ		
	🇩🇪 high speed steel 🇮🇹 acciaio super rapido 🇪🇸 Hochleistungsschnellschnittstahl 🇫🇷 acier rapide 🇪🇸 acero súper rápido 🇷🇺 быстрорежущая сталь	
	🇩🇪 high speed steel - 5% + 8% Co 🇮🇹 acciaio super rapido - 5% + 8% Co 🇪🇸 Hochleistungsschnellschnittstahl - 5% + 8% Co 🇫🇷 acier rapide - 5% + 8% Co 🇪🇸 acero súper rápido - 5% + 8% Co 🇷🇺 быстрорежущая сталь - 5% + 8% Co	
	HSS/Co + EV	


























🇩🇪 SURFACE TREATMENT 🇮🇹 TRATTAMENTO SUPERFICIALE 🇪🇸 OBERFLÄCHENBEHANDLUNG 🇫🇷 TRAITMENT DE SURFACE 🇪🇸 TRATAMIENTO SUPERFICIAL 🇷🇺 ОБРАБОТКА ПОВЕРХНОСТИ		
	🇩🇪 uncoated 🇮🇹 non rivestito 🇪🇸 unbeschichtet 🇫🇷 non revêtu 🇪🇸 no revestido 🇷🇺 без покрытия	
	🇩🇪 vaporization 🇮🇹 vaporizzazione 🇪🇸 Dämpfung 🇫🇷 traitement vapeur 🇪🇸 vaporización 🇷🇺 окисление	
	🇩🇪 heat treatment 🇮🇹 trattamento termico 🇪🇸 thermische Behandlung 🇫🇷 traitement thermique 🇪🇸 tratamiento térmico 🇷🇺 термическая обработка	

🇮🇹 Legenda 🇩🇪 Verzeichnis 🇫🇷 Légende 🇪🇸 Leyenda 🇷🇺 Условные обозначения

* COATINGS 🇮🇹 RIVESTIMENTI 🇩🇪 BESCHICHTUNGEN 🇫🇷 REVÊTEMENTS 🇪🇸 RECUBRIMIENTOS 🇷🇺 ПОКРЫТИЕ		TiN	PV10	PV15
* hardness (HV) 🇮🇹 durezza (HV) 🇩🇪 Härte (HV)	🇫🇷 dureté (HV) 🇪🇸 dureza (HV) 🇷🇺 твёрдость (HV)	2300	3300	TiAlN + WC/C
* friction coefficient 🇮🇹 coefficiente d'attrito 🇩🇪 Reibungskoeffizient	🇫🇷 coefficient de frottement 🇪🇸 coeficiente de rozamiento 🇷🇺 коэффициент трения	0.4	0.35	0.2
* thickness (μ) 🇮🇹 spessore (μ) 🇩🇪 dicke (μ)	🇫🇷 épaisseur (μ) 🇪🇸 espesor (μ) 🇷🇺 толщина (мкм)	1÷4	1÷5	2÷5
* max working temperature (°C) 🇮🇹 temperatura max (°C) 🇩🇪 höchste Temperatur (°C)	🇫🇷 température maximale (°C) 🇪🇸 temperatura máx (°C) 🇷🇺 макс. температура (°C)	600°	900°	1000°



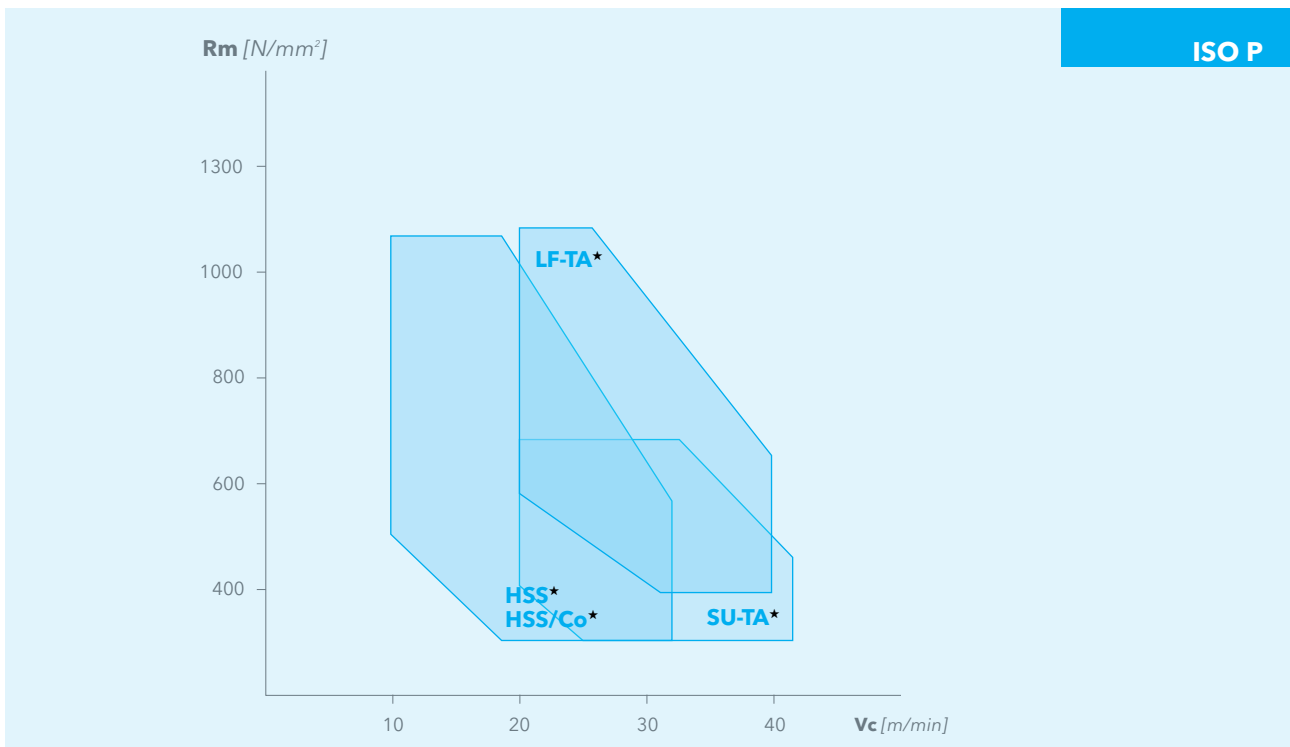


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RANGE	DRILLING DEPTH	NORM	TYPE	MATERIAL / COATING	HRC	POINT ANGLE	HELIX ANGLE	CHAMFER	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H
2-20	extra short	DIN1897	LF	HSS/Co PV10		130°	35°-40°		★	☆	★	☆		
2-20	short	DIN338	LF	HSS/Co PV10		130°	35°-40°		★	☆	★	☆		
2-13	extra short	OSAWA	SU	HSSE PV10		120°	38°		★	★		★	☆	
2-20	short	OSAWA	SU	HSSE PV10		120°	38°		★	★		★	☆	
1-16	extra short	DIN1897	N	HSS OX		118°	25°-30°		★		☆	☆		
1-20	extra short	DIN1897	NH	HSS/Co HT		130°	30°		★	★	☆	☆	☆	
1-13	short	DIN338	SPLIT POINT	HSS TiN		118°	30°		★	☆	★	☆	☆	
0.2-20	short	DIN338	N	HSS OX		118°	25°-30°		★		☆	☆		
1-16	short	DIN338	N	HSS TiN		118°	25°-30°		★		☆	☆		
1.5-10	short	DIN338	H	HSS BR		118°	12°-15°					★		
1.5-10	short	DIN338	W	HSS BR		130°	35°-40°					★		
1-13	short	DIN338	SPLIT POINT	HSS/Co TiN		135°	33°		★	★	★	☆	☆	
1-20	short	DIN338	NH	HSS/Co HT		130°	30°		★	★	☆	☆	☆	
0.5-12	long	DIN340	NH	HSS/Co HT		130°	30°		★	★	☆	☆	☆	
2-13	long	DIN340	LS	HSS/Co OX		130°	35°-40°		★	☆	★			
2-13	long	DIN340	LS	HSS/Co PV15		130°	35°-40°		★	☆	★			
2-13	extra long	DIN1869/1	LS	HSS/Co BR		130°	35°-40°		★	☆	★			
2-13	extra long	DIN1869/1	LS	HSS/Co PV15		130°	35°-40°		★	☆	★			
3-12	extra long	DIN1869/2	LS	HSS BR		130°	35°-40°		★		★			
3.5-12	extra long	DIN1869/3	LS	HSS BR		130°	35°-40°		★		★			
5-60	short	DIN345	N	HSS OX		118°	25°-30°		★		☆	☆		
13-30	short	DIN345	N	HSS TiN		118°	25°-30°		★		☆	☆		
13-30	short	DIN345	NH	HSS/Co OX		118°	30°		★	★	☆	☆	☆	
13-30	long	DIN341	LS	HSS/Co OX		130°	35°-40°		★	☆	★			
13-30	extra long	DIN1870/1	LS	HSS/Co OX		130°	35°-40°		★	☆	★			
13-30	extra long	DIN1870/2	LS	HSS/Co OX		130°	35°-40°		★	☆	★			

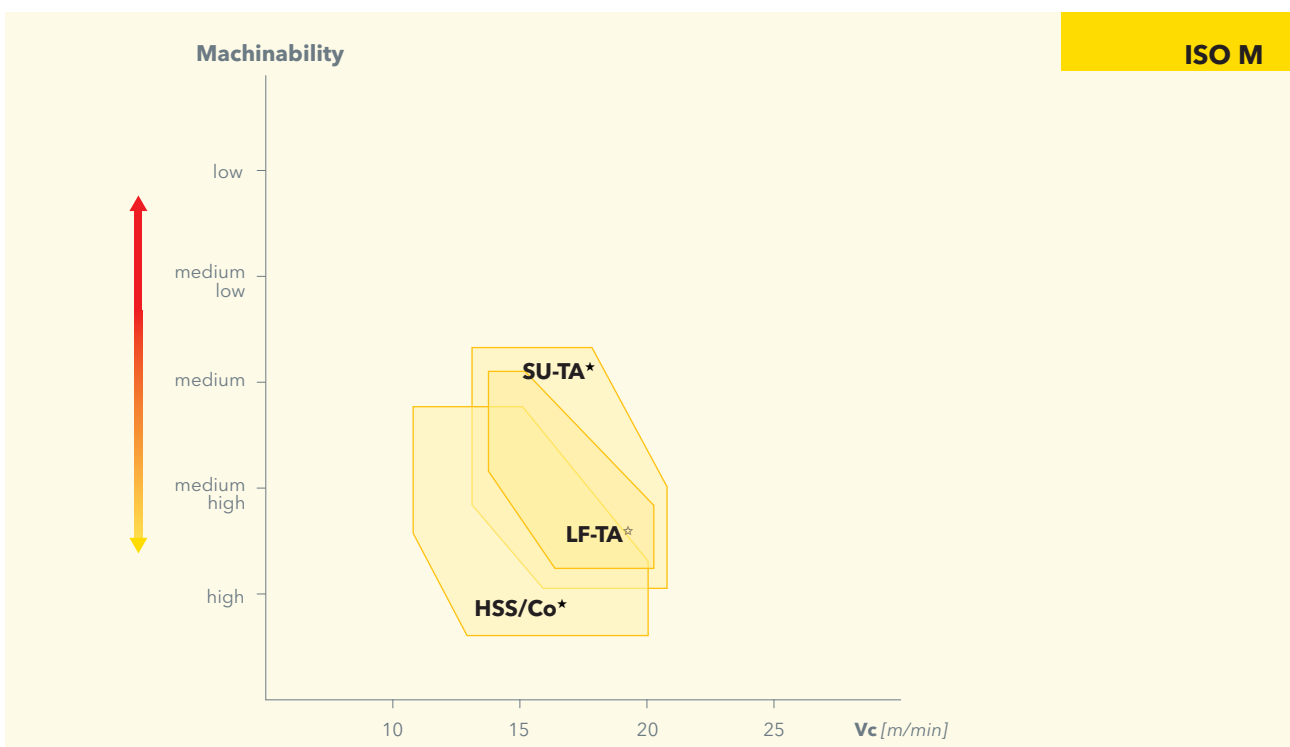
★ 1st choice ☆ suitable

STEEL APPLICATION



★ 1st choice ☆ suitable

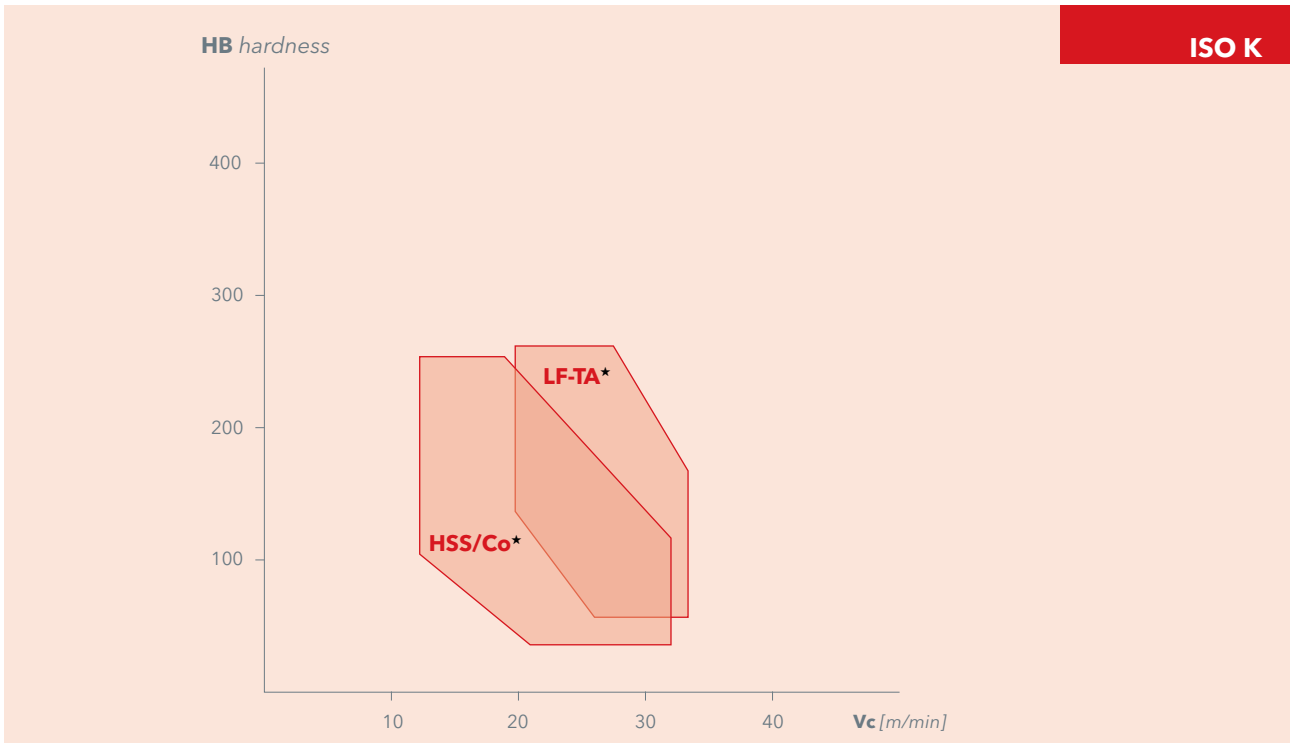
STAINLESS STEEL APPLICATION



★ 1st choice ☆ suitable

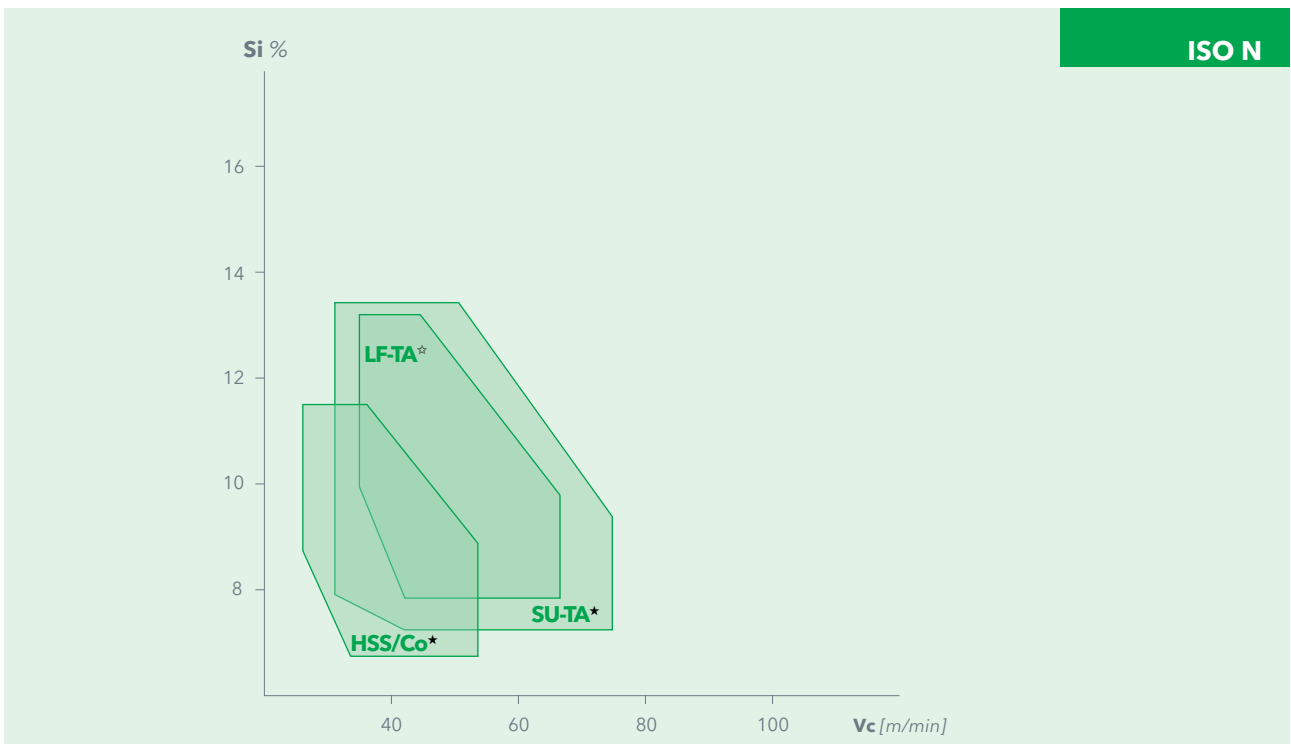
LFTA : high performance (page 194)  
 SUTA : high performance (page 204)  
 HSS-HSS/Co : general purpose (page 214)

CAST IRON APPLICATION



★ 1st choice ☆ suitable

NON-FERROUS MATERIALS APPLICATION



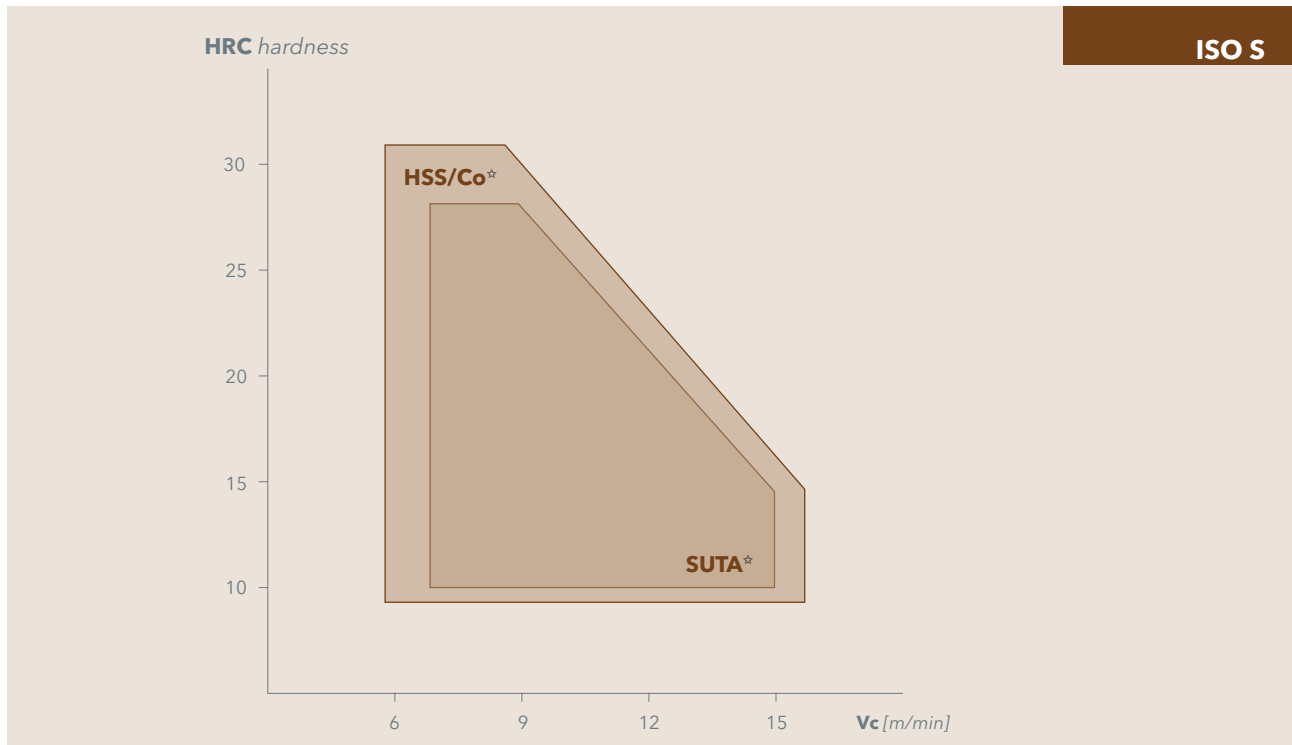
★ 1st choice ☆ suitable

LFTA : high performance (page 194)

SUTA : high performance (page 204)

HSS-HSS/Co : general purpose (page 214)

SUPER ALLOYS APPLICATION



SUTA : high performance (page 204)  
 HSS-HSS/Co : general purpose (page 214)

★ 1st choice ☆ suitable



INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

**LFTA**  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

## LFTA HIGH PERFORMANCE

✚ High performance and self-centering geometry. Featuring top quality HSS/Co+PV10 and very versatile cutting geometry, enables outstanding performance on a wide range of materials.

🇮🇹 Alto rendimento e affilatura autocentrante. Costruita con HSS/Co+PV10 di alta qualità e caratterizzata da una geometria di taglio molto versatile, garantisce elevate prestazioni su una vasta gamma di materiali.

🇩🇪 Hohe Leistungen und selbstzentrierende Schnittgeometrie. Aus hervorragendem HSS/Co mit PV10 Beschichtung. Dank der vielseitigen Geometrie, sind hohe Leistungen auf einem sehr breiten Spektrum von Materialien möglich.

🇫🇷 Haute performance et affûtage auto-centré. Fabriquée en HSS/Co+PV10 de la plus haute qualité et caractérisée par une géométrie de coupe très polyvalente, elle garantit des performances excellentes dans une grande variété de matériaux.

🇪🇸 Broca de alto rendimiento con afilado autocentrante. Fabricada en HSS/Co con recubrimiento PV10, gracias a su geometría de corte muy versátil, permite lograr un altísimo rendimiento en una gama muy amplia de materiales.

🇷🇺 Высокопроизводительная и самоцентрирующаяся геометрия. Использование HSS/Co высочайшего качества с покрытием PV10 и универсальная геометрия, позволяет получить повышенную производительность на широком спектре обрабатываемых материалов.

INFO

# 218LFTA

self-centering, general purpose, extra-short

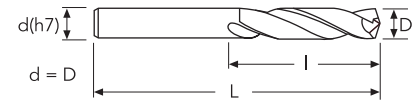


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D(h8)	D Tol.	d(h7)	I	L	PACKAGING	EDP No.	Stock
2.00	0/-0.014	2	12	38	5	P218LFTA0200	●
2.10	0/-0.014	2.1	12	38	5	P218LFTA0210	●
2.20	0/-0.014	2.2	13	40	5	P218LFTA0220	●
2.30	0/-0.014	2.3	13	40	5	P218LFTA0230	●
2.40	0/-0.014	2.4	14	43	5	P218LFTA0240	●
2.50	0/-0.014	2.5	14	43	5	P218LFTA0250	●
2.60	0/-0.014	2.6	14	43	5	P218LFTA0260	●
2.70	0/-0.014	2.7	16	46	5	P218LFTA0270	●
2.80	0/-0.014	2.8	16	46	5	P218LFTA0280	●
2.90	0/-0.014	2.9	16	46	5	P218LFTA0290	●
3.00	0/-0.014	3	16	46	5	P218LFTA0300	●
3.10	0/-0.018	3.1	18	49	5	P218LFTA0310	●
3.20	0/-0.018	3.2	18	49	5	P218LFTA0320	●
3.30	0/-0.018	3.3	18	49	5	P218LFTA0330	●
3.40	0/-0.018	3.4	20	52	5	P218LFTA0340	●
3.50	0/-0.018	3.5	20	52	5	P218LFTA0350	●
3.60	0/-0.018	3.6	20	52	5	P218LFTA0360	●
3.70	0/-0.018	3.7	20	52	5	P218LFTA0370	●
3.80	0/-0.018	3.8	22	55	5	P218LFTA0380	●
3.90	0/-0.018	3.9	22	55	5	P218LFTA0390	●
4.00	0/-0.018	4	22	55	5	P218LFTA0400	●
4.10	0/-0.018	4.1	22	55	5	P218LFTA0410	●
4.20	0/-0.018	4.2	22	55	5	P218LFTA0420	●
4.30	0/-0.018	4.3	24	58	5	P218LFTA0430	●
4.40	0/-0.018	4.4	24	58	5	P218LFTA0440	●
4.50	0/-0.018	4.5	24	58	5	P218LFTA0450	●
4.60	0/-0.018	4.6	24	58	5	P218LFTA0460	●
4.70	0/-0.018	4.7	24	58	5	P218LFTA0470	●
4.80	0/-0.018	4.8	26	62	5	P218LFTA0480	●
4.90	0/-0.018	4.9	26	62	5	P218LFTA0490	●
5.00	0/-0.018	5	26	62	5	P218LFTA0500	●
5.10	0/-0.018	5.1	26	62	5	P218LFTA0510	●
5.20	0/-0.018	5.2	26	62	5	P218LFTA0520	●
5.30	0/-0.018	5.3	26	62	5	P218LFTA0530	●
5.40	0/-0.018	5.4	28	66	5	P218LFTA0540	●
5.50	0/-0.018	5.5	28	66	5	P218LFTA0550	●
5.60	0/-0.018	5.6	28	66	5	P218LFTA0560	●
5.70	0/-0.018	5.7	28	66	5	P218LFTA0570	●
5.80	0/-0.018	5.8	28	66	5	P218LFTA0580	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



# 218LFTA

self-centering, general purpose, extra-short



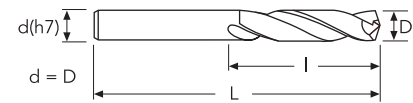
INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



★ 1st choice ☆ suitable



D(h8)	D Tol.	d(h7)	I	L	PACKAGING	EDP No.	Stock
5.90	0/-0.018	5.9	28	66	5	P218LFTA0590	●
6.00	0/-0.018	6	28	66	5	P218LFTA0600	●
6.10	0/-0.022	6.1	31	70	5	P218LFTA0610	●
6.20	0/-0.022	6.2	31	70	5	P218LFTA0620	●
6.30	0/-0.022	6.3	31	70	5	P218LFTA0630	●
6.40	0/-0.022	6.4	31	70	5	P218LFTA0640	●
6.50	0/-0.022	6.5	31	70	5	P218LFTA0650	●
6.60	0/-0.022	6.6	31	70	5	P218LFTA0660	●
6.70	0/-0.022	6.7	31	70	5	P218LFTA0670	●
6.80	0/-0.022	6.8	34	74	5	P218LFTA0680	●
6.90	0/-0.022	6.9	34	74	5	P218LFTA0690	●
7.00	0/-0.022	7	34	74	5	P218LFTA0700	●
7.10	0/-0.022	7.1	34	74	5	P218LFTA0710	●
7.20	0/-0.022	7.2	34	74	5	P218LFTA0720	●
7.30	0/-0.022	7.3	34	74	5	P218LFTA0730	●
7.40	0/-0.022	7.4	34	74	5	P218LFTA0740	●
7.50	0/-0.022	7.5	34	74	5	P218LFTA0750	●
7.60	0/-0.022	7.6	37	79	5	P218LFTA0760	●
7.70	0/-0.022	7.7	37	79	5	P218LFTA0770	●
7.80	0/-0.022	7.8	37	79	5	P218LFTA0780	●
7.90	0/-0.022	7.9	37	79	5	P218LFTA0790	●
8.00	0/-0.022	8	37	79	5	P218LFTA0800	●
8.10	0/-0.022	8.1	37	79	5	P218LFTA0810	●
8.20	0/-0.022	8.2	37	79	5	P218LFTA0820	●
8.30	0/-0.022	8.3	37	79	5	P218LFTA0830	●
8.40	0/-0.022	8.4	37	79	5	P218LFTA0840	●
8.50	0/-0.022	8.5	37	79	5	P218LFTA0850	●
8.60	0/-0.022	8.6	40	84	5	P218LFTA0860	●
8.70	0/-0.022	8.7	40	84	5	P218LFTA0870	●
8.80	0/-0.022	8.8	40	84	5	P218LFTA0880	●
8.90	0/-0.022	8.9	40	84	5	P218LFTA0890	●
9.00	0/-0.022	9	40	84	5	P218LFTA0900	●
9.10	0/-0.022	9.1	40	84	5	P218LFTA0910	●
9.20	0/-0.022	9.2	40	84	5	P218LFTA0920	●
9.30	0/-0.022	9.3	40	84	5	P218LFTA0930	●
9.40	0/-0.022	9.4	40	84	5	P218LFTA0940	●
9.50	0/-0.022	9.5	40	84	5	P218LFTA0950	●
9.60	0/-0.022	9.6	43	89	5	P218LFTA0960	●
9.70	0/-0.022	9.7	43	89	5	P218LFTA0970	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 218LFTA

self-centering, general purpose, extra-short

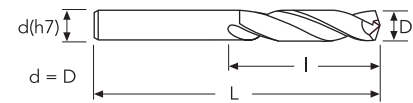


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D(h8)	D Tol.	d(h7)	I	L	PACKAGING	EDP No.	Stock
9.80	0/-0.022	9.8	43	89	5	P218LFTA0980	●
9.90	0/-0.022	9.9	43	89	5	P218LFTA0990	●
10.00	0/-0.022	10	43	89	5	P218LFTA1000	●
10.20	0/-0.027	10.2	43	89	1	P218LFTA1020	●
10.30	0/-0.027	10.3	43	89	1	P218LFTA1030	●
10.50	0/-0.027	10.5	43	89	1	P218LFTA1050	●
10.80	0/-0.027	10.8	47	95	1	P218LFTA1080	●
11.00	0/-0.027	11	47	95	1	P218LFTA1100	●
11.20	0/-0.027	11.2	47	95	1	P218LFTA1120	●
11.30	0/-0.027	11.3	47	95	1	P218LFTA1130	●
11.50	0/-0.027	11.5	47	95	1	P218LFTA1150	●
11.80	0/-0.027	11.8	47	95	1	P218LFTA1180	●
12.00	0/-0.027	12	51	102	1	P218LFTA1200	●
12.20	0/-0.027	12.2	51	102	1	P218LFTA1220	●
12.50	0/-0.027	12.5	51	102	1	P218LFTA1250	●
12.80	0/-0.027	12.8	51	102	1	P218LFTA1280	●
13.00	0/-0.027	13	51	102	1	P218LFTA1300	●
13.30	0/-0.027	13.3	54	107	1	P218LFTA1330	●
13.50	0/-0.027	13.5	54	107	1	P218LFTA1350	●
13.80	0/-0.027	13.8	54	107	1	P218LFTA1380	●
14.00	0/-0.027	14	54	107	1	P218LFTA1400	●
14.50	0/-0.027	14.5	56	111	1	P218LFTA1450	●
14.80	0/-0.027	14.8	56	111	1	P218LFTA1480	●
15.00	0/-0.027	15	56	111	1	P218LFTA1500	●
15.30	0/-0.027	15.3	56	111	1	P218LFTA1530	●
15.50	0/-0.027	15.5	58	115	1	P218LFTA1550	●
15.80	0/-0.027	15.8	58	115	1	P218LFTA1580	●
16.00	0/-0.027	16	58	115	1	P218LFTA1600	●
16.50	0/-0.027	16.5	60	119	1	P218LFTA1650	●
17.00	0/-0.027	17	60	119	1	P218LFTA1700	●
17.50	0/-0.027	17.5	62	123	1	P218LFTA1750	●
18.00	0/-0.027	18	62	123	1	P218LFTA1800	●
18.50	0/-0.033	18.5	64	127	1	P218LFTA1850	●
19.00	0/-0.033	19	64	127	1	P218LFTA1900	●
19.50	0/-0.033	19.5	66	131	1	P218LFTA1950	●
20.00	0/-0.033	20	66	131	1	P218LFTA2000	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

## 218LFTA

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	N1 N2	N3 N4	
Hardness/Rm	500÷700 N/mm <sup>2</sup>		600÷1000 N/mm <sup>2</sup>		150÷350 HB			
Vc (m/min)	<b>40÷50</b>	<b>30÷40</b>	<b>18÷22</b>	<b>18÷22</b>	<b>30÷40</b>	<b>65÷75</b>	<b>45÷55</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
2	0.060	0.051	0.042	0.042	0.057	0.066	0.060	
3	0.084	0.071	0.059	0.059	0.080	0.092	0.084	
4	0.108	0.092	0.076	0.076	0.103	0.119	0.108	
5	0.132	0.112	0.092	0.092	0.125	0.145	0.132	
6	0.156	0.133	0.109	0.109	0.148	0.172	0.156	
7	0.180	0.153	0.126	0.126	0.171	0.198	0.180	
8	0.204	0.173	0.143	0.143	0.194	0.224	0.204	
9	0.228	0.194	0.160	0.160	0.217	0.251	0.228	
10	0.252	0.214	0.176	0.176	0.239	0.277	0.252	
11	0.276	0.235	0.179	0.179	0.262	0.304	0.276	
12	0.300	0.255	0.195	0.195	0.285	0.330	0.300	
13	0.324	0.275	0.204	0.204	0.308	0.356	0.324	
14	0.348	0.296	0.219	0.219	0.331	0.383	0.348	
15	0.372	0.316	0.223	0.223	0.353	0.409	0.372	
16	0.396	0.337	0.238	0.238	0.376	0.436	0.396	
17	0.420	0.357	0.252	0.252	0.399	0.462	0.420	
18	0.444	0.377	0.266	0.266	0.422	0.488	0.444	
19	0.468	0.398	0.281	0.281	0.445	0.515	0.468	
20	0.492	0.418	0.295	0.295	0.467	0.541	0.492	

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

**LFTA**  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

# 238LFTA

self-centering, general purpose, short

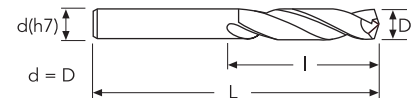


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D(h8)	D Tol.	d(h7)	I	L	PACKAGING	EDP No.	Stock
2.00	0/-0.014	2	24	49	5	P238LFTA0200	●
2.10	0/-0.014	2.1	24	49	5	P238LFTA0210	●
2.20	0/-0.014	2.2	27	53	5	P238LFTA0220	●
2.30	0/-0.014	2.3	27	53	5	P238LFTA0230	●
2.40	0/-0.014	2.4	30	57	5	P238LFTA0240	●
2.50	0/-0.014	2.5	30	57	5	P238LFTA0250	●
2.60	0/-0.014	2.6	30	57	5	P238LFTA0260	●
2.70	0/-0.014	2.7	33	61	5	P238LFTA0270	●
2.80	0/-0.014	2.8	33	61	5	P238LFTA0280	●
2.90	0/-0.014	2.9	33	61	5	P238LFTA0290	●
3.00	0/-0.014	3	33	61	5	P238LFTA0300	●
3.10	0/-0.018	3.1	36	65	5	P238LFTA0310	●
3.20	0/-0.018	3.2	36	65	5	P238LFTA0320	●
3.30	0/-0.018	3.3	36	65	5	P238LFTA0330	●
3.40	0/-0.018	3.4	39	70	5	P238LFTA0340	●
3.50	0/-0.018	3.5	39	70	5	P238LFTA0350	●
3.60	0/-0.018	3.6	39	70	5	P238LFTA0360	●
3.70	0/-0.018	3.7	39	70	5	P238LFTA0370	●
3.80	0/-0.018	3.8	43	75	5	P238LFTA0380	●
3.90	0/-0.018	3.9	43	75	5	P238LFTA0390	●
4.00	0/-0.018	4	43	75	5	P238LFTA0400	●
4.10	0/-0.018	4.1	43	75	5	P238LFTA0410	●
4.20	0/-0.018	4.2	43	75	5	P238LFTA0420	●
4.30	0/-0.018	4.3	47	80	5	P238LFTA0430	●
4.40	0/-0.018	4.4	47	80	5	P238LFTA0440	●
4.50	0/-0.018	4.5	47	80	5	P238LFTA0450	●
4.60	0/-0.018	4.6	47	80	5	P238LFTA0460	●
4.70	0/-0.018	4.7	47	80	5	P238LFTA0470	●
4.80	0/-0.018	4.8	52	86	5	P238LFTA0480	●
4.90	0/-0.018	4.9	52	86	5	P238LFTA0490	●
5.00	0/-0.018	5	52	86	5	P238LFTA0500	●
5.10	0/-0.018	5.1	52	86	5	P238LFTA0510	●
5.20	0/-0.018	5.2	52	86	5	P238LFTA0520	●
5.30	0/-0.018	5.3	52	86	5	P238LFTA0530	●
5.40	0/-0.018	5.4	57	93	5	P238LFTA0540	●
5.50	0/-0.018	5.5	57	93	5	P238LFTA0550	●
5.60	0/-0.018	5.6	57	93	5	P238LFTA0560	●
5.70	0/-0.018	5.7	57	93	5	P238LFTA0570	●
5.80	0/-0.018	5.8	57	93	5	P238LFTA0580	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

# 238LFTA

self-centering, general purpose, short



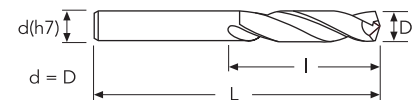
INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D(h8)	D Tol.	d(h7)	I	L	PACKAGING	EDP No.	Stock
5.90	0/-0.018	5.9	57	93	5	P238LFTA0590	●
6.00	0/-0.018	6	57	93	5	P238LFTA0600	●
6.10	0/-0.022	6.1	63	101	1	P238LFTA0610	●
6.20	0/-0.022	6.2	63	101	1	P238LFTA0620	●
6.30	0/-0.022	6.3	63	101	1	P238LFTA0630	●
6.40	0/-0.022	6.4	63	101	1	P238LFTA0640	●
6.50	0/-0.022	6.5	63	101	1	P238LFTA0650	●
6.60	0/-0.022	6.6	63	101	1	P238LFTA0660	●
6.70	0/-0.022	6.7	63	101	1	P238LFTA0670	●
6.80	0/-0.022	6.8	69	109	1	P238LFTA0680	●
6.90	0/-0.022	6.9	69	109	1	P238LFTA0690	●
7.00	0/-0.022	7	69	109	1	P238LFTA0700	●
7.10	0/-0.022	7.1	69	109	1	P238LFTA0710	●
7.20	0/-0.022	7.2	69	109	1	P238LFTA0720	●
7.30	0/-0.022	7.3	69	109	1	P238LFTA0730	●
7.40	0/-0.022	7.4	69	109	1	P238LFTA0740	●
7.50	0/-0.022	7.5	69	109	1	P238LFTA0750	●
7.60	0/-0.022	7.6	75	117	1	P238LFTA0760	●
7.70	0/-0.022	7.7	75	117	1	P238LFTA0770	●
7.80	0/-0.022	7.8	75	117	1	P238LFTA0780	●
7.90	0/-0.022	7.9	75	117	1	P238LFTA0790	●
8.00	0/-0.022	8	75	117	1	P238LFTA0800	●
8.10	0/-0.022	8.1	75	117	1	P238LFTA0810	●
8.20	0/-0.022	8.2	75	117	1	P238LFTA0820	●
8.30	0/-0.022	8.3	75	117	1	P238LFTA0830	●
8.40	0/-0.022	8.4	75	117	1	P238LFTA0840	●
8.50	0/-0.022	8.5	75	117	1	P238LFTA0850	●
8.60	0/-0.022	8.6	81	125	1	P238LFTA0860	●
8.70	0/-0.022	8.7	81	125	1	P238LFTA0870	●
8.80	0/-0.022	8.8	81	125	1	P238LFTA0880	●
8.90	0/-0.022	8.9	81	125	1	P238LFTA0890	●
9.00	0/-0.022	9	81	125	1	P238LFTA0900	●
9.10	0/-0.022	9.1	81	125	1	P238LFTA0910	●
9.20	0/-0.022	9.2	81	125	1	P238LFTA0920	●
9.30	0/-0.022	9.3	81	125	1	P238LFTA0930	●
9.40	0/-0.022	9.4	81	125	1	P238LFTA0940	●
9.50	0/-0.022	9.5	81	125	1	P238LFTA0950	●
9.60	0/-0.022	9.6	87	133	1	P238LFTA0960	●
9.70	0/-0.022	9.7	87	133	1	P238LFTA0970	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 238LFTA

self-centering, general purpose, short

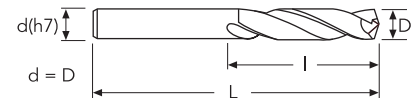


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D(h8)	D Tol.	d(h7)	I	L	PACKAGING	EDP No.	Stock
9.80	0/-0.022	9.8	87	133	1	P238LFTA0980	●
9.90	0/-0.022	9.9	87	133	1	P238LFTA0990	●
10.00	0/-0.022	10	87	133	1	P238LFTA1000	●
10.20	0/-0.027	10.2	87	133	1	P238LFTA1020	●
10.30	0/-0.027	10.3	87	133	1	P238LFTA1030	●
10.50	0/-0.027	10.5	87	133	1	P238LFTA1050	●
10.80	0/-0.027	10.8	94	142	1	P238LFTA1080	●
11.00	0/-0.027	11	94	142	1	P238LFTA1100	●
11.20	0/-0.027	11.2	94	142	1	P238LFTA1120	●
11.30	0/-0.027	11.3	94	142	1	P238LFTA1130	●
11.50	0/-0.027	11.5	94	142	1	P238LFTA1150	●
11.80	0/-0.027	11.8	94	142	1	P238LFTA1180	●
12.00	0/-0.027	12	101	151	1	P238LFTA1200	●
12.20	0/-0.027	12.2	101	151	1	P238LFTA1220	●
12.50	0/-0.027	12.5	101	151	1	P238LFTA1250	●
12.80	0/-0.027	12.8	101	151	1	P238LFTA1280	●
13.00	0/-0.027	13	101	151	1	P238LFTA1300	●
13.30	0/-0.027	13.3	108	160	1	P238LFTA1330	●
13.50	0/-0.027	13.5	108	160	1	P238LFTA1350	●
13.80	0/-0.027	13.8	108	160	1	P238LFTA1380	●
14.00	0/-0.027	14	108	160	1	P238LFTA1400	●
14.50	0/-0.027	14.5	114	169	1	P238LFTA1450	●
14.80	0/-0.027	14.8	114	169	1	P238LFTA1480	●
15.00	0/-0.027	15	114	169	1	P238LFTA1500	●
15.30	0/-0.027	15.3	120	178	1	P238LFTA1530	●
15.50	0/-0.027	15.5	120	178	1	P238LFTA1550	●
15.80	0/-0.027	15.8	120	178	1	P238LFTA1580	●
16.00	0/-0.027	16	120	178	1	P238LFTA1600	●
16.50	0/-0.027	16.5	125	184	1	P238LFTA1650	●
17.00	0/-0.027	17	125	184	1	P238LFTA1700	●
17.50	0/-0.027	17.5	130	191	1	P238LFTA1750	●
18.00	0/-0.027	18	130	191	1	P238LFTA1800	●
18.50	0/-0.033	18.5	135	198	1	P238LFTA1850	●
19.00	0/-0.033	19	135	198	1	P238LFTA1900	●
19.50	0/-0.033	19.5	140	205	1	P238LFTA1950	●
20.00	0/-0.033	20	140	205	1	P238LFTA2000	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

## 238LFTA

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	N1 N2	N3 N4	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>			150÷350 HB			
Vc (m/min)	<b>30÷40</b>	<b>20÷30</b>	<b>14÷18</b>	<b>14÷18</b>	<b>25÷35</b>	<b>50÷60</b>	<b>35÷45</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
2	0.054	0.046	0.038	0.038	0.051	0.059	0.054	
3	0.076	0.064	0.053	0.053	0.072	0.083	0.076	
4	0.097	0.083	0.068	0.068	0.092	0.107	0.097	
5	0.119	0.101	0.083	0.083	0.113	0.131	0.119	
6	0.140	0.119	0.098	0.098	0.133	0.154	0.140	
7	0.162	0.138	0.113	0.113	0.154	0.178	0.162	
8	0.184	0.156	0.129	0.129	0.174	0.202	0.184	
9	0.205	0.174	0.144	0.144	0.195	0.226	0.205	
10	0.227	0.193	0.159	0.159	0.215	0.249	0.227	
11	0.248	0.211	0.161	0.161	0.236	0.273	0.248	
12	0.270	0.230	0.176	0.176	0.257	0.297	0.270	
13	0.292	0.248	0.184	0.184	0.277	0.321	0.292	
14	0.313	0.266	0.197	0.197	0.298	0.345	0.313	
15	0.335	0.285	0.201	0.201	0.318	0.368	0.335	
16	0.356	0.303	0.214	0.214	0.339	0.392	0.356	
17	0.378	0.321	0.227	0.227	0.359	0.416	0.378	
18	0.400	0.340	0.240	0.240	0.380	0.440	0.400	
19	0.421	0.358	0.253	0.253	0.400	0.463	0.421	
20	0.443	0.376	0.266	0.266	0.421	0.487	0.443	

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

**LFTA**  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS







INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
**SUTA**  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

## SUTA HIGH PERFORMANCE

✚ High performance and self-centering geometry. Featuring premium HSSE+PV10 coating and special edge design, enables very low cutting pressure and outstanding performance on stainless steel, steel and non-ferrous materials.

🇮🇹 Alto rendimento e affilatura autocentrante. Costruita con i migliori HSSE+PV10 e speciale geometria del tagliente, garantisce un bassissimo sforzo di taglio e prestazioni eccezionali nella foratura di acciaio inossidabile, acciaio e materiali non ferrosi.

🇩🇪 Hohe Leistungen und selbstzentrierende Schnittgeometrie. Aus hervorragendem HSSE mit PV10 Beschichtung. Dank des sehr geringen Schneiddrucks, sind unschlagbare Leistungen auf rostfreien Stählen, Stählen und NE-Metall-Werkstoffe möglich.

🇫🇷 Haute performance et affûtage autocentré. Fabriquée avec les meilleurs HSSE+PV10 et une géométrie spécifique de l'arête, elle permet de minimiser les efforts de coupe en garantissant des performances exceptionnelles dans le perçage des aciers inoxydables, des aciers et des matériaux non ferreux.

🇪🇸 Broca de alto rendimiento con afilado autocentrante. Fabricada en HSSE Premium con recubrimiento PV10 y geometría especial, minimiza el esfuerzo de corte y permite lograr un altísimo rendimiento en aceros inoxidable, aceros y materiales no ferrosos.

🇷🇺 Высокопроизводительная и самоцентрирующаяся геометрия. Высококачественная быстрорежущая сталь с покрытием PV10 и специальная геометрия режущих кромок обеспечивает низкие силы резания и непревзойденную производительность при работе по нержавеющей стали, конструкционной стали и цветным металлам.

INFO

# 980SUTA

self centering, stainless steel, extra-short



CARBIDE DRILLS

PU-HPU

TA-4HTA

SUH

ALH

HRC

SUH MINI

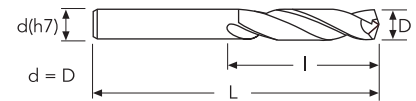
HL

HSD

C-SD-TA

P	M	K	N	S	H
★	★		★	☆	

★ 1st choice ☆ suitable



HSS DRILLS

LFTA

SUTA

HSS-HSS/CO

CARBIDE END-MILLS

G2

MDTA

HFVH/UP

MEF

ALU

MEX/MH

UH/MH

HSS END-MILLS

CARBIDE BURRS

D(h8)	D Tol.	d(h7)	l	L	PACKAGING	EDP No.	Stock
2.00	0/-0.014	2	12	44	1	P980SUTA0200	●
2.10	0/-0.014	2.1	12	44	1	P980SUTA0210	●
2.20	0/-0.014	2.2	13	45	1	P980SUTA0220	●
2.30	0/-0.014	2.3	13	45	1	P980SUTA0230	●
2.40	0/-0.014	2.4	14	46	1	P980SUTA0240	●
2.50	0/-0.014	2.5	14	46	1	P980SUTA0250	●
2.60	0/-0.014	2.6	14	46	1	P980SUTA0260	●
2.70	0/-0.014	2.7	16	48	1	P980SUTA0270	●
2.80	0/-0.014	2.8	16	48	1	P980SUTA0280	●
2.90	0/-0.014	2.9	16	48	1	P980SUTA0290	●
3.00	0/-0.014	3	16	48	1	P980SUTA0300	●
3.10	0/-0.018	3.1	18	50	1	P980SUTA0310	●
3.20	0/-0.018	3.2	18	50	1	P980SUTA0320	●
3.30	0/-0.018	3.3	18	50	1	P980SUTA0330	●
3.40	0/-0.018	3.4	20	52	1	P980SUTA0340	●
3.50	0/-0.018	3.5	20	52	1	P980SUTA0350	●
3.60	0/-0.018	3.6	20	52	1	P980SUTA0360	●
3.70	0/-0.018	3.7	20	52	1	P980SUTA0370	●
3.80	0/-0.018	3.8	22	54	1	P980SUTA0380	●
3.90	0/-0.018	3.9	22	54	1	P980SUTA0390	●
4.00	0/-0.018	4	22	54	1	P980SUTA0400	●
4.10	0/-0.018	4.1	22	66	1	P980SUTA0410	●
4.20	0/-0.018	4.2	22	66	1	P980SUTA0420	●
4.30	0/-0.018	4.3	24	68	1	P980SUTA0430	●
4.40	0/-0.018	4.4	24	68	1	P980SUTA0440	●
4.50	0/-0.018	4.5	24	68	1	P980SUTA0450	●
4.60	0/-0.018	4.6	24	68	1	P980SUTA0460	●
4.70	0/-0.018	4.7	24	68	1	P980SUTA0470	●
4.80	0/-0.018	4.8	26	70	1	P980SUTA0480	●
4.90	0/-0.018	4.9	26	70	1	P980SUTA0490	●
5.00	0/-0.018	5	26	70	1	P980SUTA0500	●
5.10	0/-0.018	5.1	26	70	1	P980SUTA0510	●
5.20	0/-0.018	5.2	26	70	1	P980SUTA0520	●
5.30	0/-0.018	5.3	26	70	1	P980SUTA0530	●
5.40	0/-0.018	5.4	28	72	1	P980SUTA0540	●
5.50	0/-0.018	5.5	28	72	1	P980SUTA0550	●
5.60	0/-0.018	5.6	28	72	1	P980SUTA0560	●
5.70	0/-0.018	5.7	28	72	1	P980SUTA0570	●
5.80	0/-0.018	5.8	28	72	1	P980SUTA0580	●

● stock standard ○ non-standard stock ▽ stock exhaustion

# 980SUTA

self centering, stainless steel, extra-short



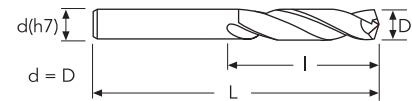
INFO



★ 1st choice ☆ suitable

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



D(h8)	D Tol.	d(h7)	I	L	PACKAGING	EDP No.	Stock
5.90	0/-0.018	5.9	28	72	1	P980SUTA0590	●
6.00	0/-0.018	6	28	72	1	P980SUTA0600	●
6.10	0/-0.022	6.1	31	75	1	P980SUTA0610	●
6.20	0/-0.022	6.2	31	75	1	P980SUTA0620	●
6.30	0/-0.022	6.3	31	75	1	P980SUTA0630	●
6.40	0/-0.022	6.4	31	75	1	P980SUTA0640	●
6.50	0/-0.022	6.5	31	75	1	P980SUTA0650	●
6.60	0/-0.022	6.6	31	75	1	P980SUTA0660	●
6.70	0/-0.022	6.7	31	75	1	P980SUTA0670	●
6.80	0/-0.022	6.8	34	78	1	P980SUTA0680	●
6.90	0/-0.022	6.9	34	78	1	P980SUTA0690	●
7.00	0/-0.022	7	34	78	1	P980SUTA0700	●
7.10	0/-0.022	7.1	34	78	1	P980SUTA0710	●
7.20	0/-0.022	7.2	34	78	1	P980SUTA0720	●
7.30	0/-0.022	7.3	34	78	1	P980SUTA0730	●
7.40	0/-0.022	7.4	34	78	1	P980SUTA0740	●
7.50	0/-0.022	7.5	34	78	1	P980SUTA0750	●
7.60	0/-0.022	7.6	37	81	1	P980SUTA0760	●
7.70	0/-0.022	7.7	37	81	1	P980SUTA0770	●
7.80	0/-0.022	7.8	37	81	1	P980SUTA0780	●
7.90	0/-0.022	7.9	37	81	1	P980SUTA0790	●
8.00	0/-0.022	8	37	81	1	P980SUTA0800	●
8.10	0/-0.022	8.1	37	87	1	P980SUTA0810	●
8.20	0/-0.022	8.2	37	87	1	P980SUTA0820	●
8.30	0/-0.022	8.3	37	87	1	P980SUTA0830	●
8.40	0/-0.022	8.4	37	87	1	P980SUTA0840	●
8.50	0/-0.022	8.5	37	87	1	P980SUTA0850	●
8.60	0/-0.022	8.6	40	90	1	P980SUTA0860	●
8.70	0/-0.022	8.7	40	90	1	P980SUTA0870	●
8.80	0/-0.022	8.8	40	90	1	P980SUTA0880	●
8.90	0/-0.022	8.9	40	90	1	P980SUTA0890	●
9.00	0/-0.022	9	40	90	1	P980SUTA0900	●
9.10	0/-0.022	9.1	40	90	1	P980SUTA0910	●
9.20	0/-0.022	9.2	40	90	1	P980SUTA0920	●
9.30	0/-0.022	9.3	40	90	1	P980SUTA0930	●
9.40	0/-0.022	9.4	40	90	1	P980SUTA0940	●
9.50	0/-0.022	9.5	40	90	1	P980SUTA0950	●
9.60	0/-0.022	9.6	43	93	1	P980SUTA0960	●
9.70	0/-0.022	9.7	43	93	1	P980SUTA0970	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



CUTTING PARAMETERS

980SUTA

Material Group ISO 513	P1 P2	P7	M1	M2	N1 N2 N4	N3	S1 S2	S4
Hardness/Rm	500÷700 N/mm <sup>2</sup>		400÷700 N/mm <sup>2</sup>				<30 HRC	
Vc (m/min)	<b>35÷45</b>	<b>18÷22</b>	<b>18÷22</b>	<b>12÷16</b>	<b>60÷80</b>	<b>30÷40</b>	<b>8÷12</b>	<b>12÷16</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
2	0.060	0.060	0.060	0.042	0.066	0.051	0.024	0.042
3	0.080	0.080	0.080	0.056	0.088	0.068	0.032	0.056
4	0.100	0.100	0.100	0.070	0.120	0.085	0.040	0.070
5	0.120	0.120	0.120	0.084	0.144	0.102	0.060	0.084
6	0.140	0.140	0.140	0.098	0.182	0.119	0.070	0.098
7	0.160	0.160	0.160	0.112	0.208	0.136	0.096	0.128
8	0.180	0.180	0.180	0.126	0.252	0.153	0.108	0.144
9	0.200	0.200	0.200	0.140	0.280	0.170	0.120	0.160
10	0.230	0.230	0.230	0.161	0.322	0.196	0.138	0.184
11	0.260	0.260	0.260	0.169	0.364	0.221	0.156	0.208
12	0.300	0.300	0.300	0.195	0.420	0.255	0.180	0.240
13	0.340	0.340	0.340	0.221	0.476	0.289	0.204	0.272
14	0.360	0.360	0.360	0.234	0.504	0.306	0.216	0.288
15	0.380	0.380	0.380	0.247	0.532	0.323	0.228	0.304
16	0.400	0.400	0.400	0.260	0.560	0.340	0.240	0.320
17	0.425	0.425	0.425	0.276	0.595	0.361	0.255	0.340
18	0.450	0.450	0.450	0.293	0.630	0.383	0.270	0.360
19	0.460	0.460	0.460	0.299	0.644	0.391	0.276	0.368
20	0.470	0.470	0.470	0.306	0.658	0.400	0.282	0.376

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

# 990SUTA

self centering, stainless steel, short

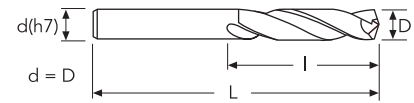


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★		★	☆	

★ 1st choice ☆ suitable



D(h8)	D Tol.	d(h7)	I	L	PACKAGING	EDP No.	Stock
2.00	0/-0.014	2	24	56	1	P990SUTA0200	●
2.10	0/-0.014	2.1	24	56	1	P990SUTA0210	●
2.20	0/-0.014	2.2	27	59	1	P990SUTA0220	●
2.30	0/-0.014	2.3	27	59	1	P990SUTA0230	●
2.40	0/-0.014	2.4	30	62	1	P990SUTA0240	●
2.50	0/-0.014	2.5	30	62	1	P990SUTA0250	●
2.60	0/-0.014	2.6	30	62	1	P990SUTA0260	●
2.70	0/-0.014	2.7	33	65	1	P990SUTA0270	●
2.80	0/-0.014	2.8	33	65	1	P990SUTA0280	●
2.90	0/-0.014	2.9	33	65	1	P990SUTA0290	●
3.00	0/-0.014	3	33	65	1	P990SUTA0300	●
3.10	0/-0.018	3.1	36	68	1	P990SUTA0310	●
3.20	0/-0.018	3.2	36	68	1	P990SUTA0320	●
3.30	0/-0.018	3.3	36	68	1	P990SUTA0330	●
3.40	0/-0.018	3.4	39	71	1	P990SUTA0340	●
3.50	0/-0.018	3.5	39	71	1	P990SUTA0350	●
3.60	0/-0.018	3.6	39	71	1	P990SUTA0360	●
3.70	0/-0.018	3.7	39	71	1	P990SUTA0370	●
3.80	0/-0.018	3.8	43	75	1	P990SUTA0380	●
3.90	0/-0.018	3.9	43	75	1	P990SUTA0390	●
4.00	0/-0.018	4	43	75	1	P990SUTA0400	●
4.10	0/-0.018	4.1	43	87	1	P990SUTA0410	●
4.20	0/-0.018	4.2	43	87	1	P990SUTA0420	●
4.30	0/-0.018	4.3	47	91	1	P990SUTA0430	●
4.40	0/-0.018	4.4	47	91	1	P990SUTA0440	●
4.50	0/-0.018	4.5	47	91	1	P990SUTA0450	●
4.60	0/-0.018	4.6	47	91	1	P990SUTA0460	●
4.70	0/-0.018	4.7	47	91	1	P990SUTA0470	●
4.80	0/-0.018	4.8	52	96	1	P990SUTA0480	●
4.90	0/-0.018	4.9	52	96	1	P990SUTA0490	●
5.00	0/-0.018	5	52	96	1	P990SUTA0500	●
5.10	0/-0.018	5.1	52	96	1	P990SUTA0510	●
5.20	0/-0.018	5.2	52	96	1	P990SUTA0520	●
5.30	0/-0.018	5.3	52	96	1	P990SUTA0530	●
5.40	0/-0.018	5.4	57	101	1	P990SUTA0540	●
5.50	0/-0.018	5.5	57	101	1	P990SUTA0550	●
5.60	0/-0.018	5.6	57	101	1	P990SUTA0560	●
5.70	0/-0.018	5.7	57	101	1	P990SUTA0570	●
5.80	0/-0.018	5.8	57	101	1	P990SUTA0580	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

# 990SUTA

self centering, stainless steel, short



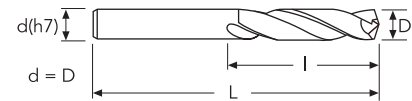
INFO

P	M	K	N	S	H
★	★		★	☆	

★ 1st choice ☆ suitable

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



D(h8)	D Tol.	d(h7)	I	L	PACKAGING	EDP No.	Stock
5.90	0/-0.018	5.9	57	101	1	P990SUTA0590	●
6.00	0/-0.018	6	57	101	1	P990SUTA0600	●
6.10	0/-0.022	6.1	63	107	1	P990SUTA0610	●
6.20	0/-0.022	6.2	63	107	1	P990SUTA0620	●
6.30	0/-0.022	6.3	63	107	1	P990SUTA0630	●
6.40	0/-0.022	6.4	63	107	1	P990SUTA0640	●
6.50	0/-0.022	6.5	63	107	1	P990SUTA0650	●
6.60	0/-0.022	6.6	63	107	1	P990SUTA0660	●
6.70	0/-0.022	6.7	63	107	1	P990SUTA0670	●
6.80	0/-0.022	6.8	69	113	1	P990SUTA0680	●
6.90	0/-0.022	6.9	69	113	1	P990SUTA0690	●
7.00	0/-0.022	7	69	113	1	P990SUTA0700	●
7.10	0/-0.022	7.1	69	113	1	P990SUTA0710	●
7.20	0/-0.022	7.2	69	113	1	P990SUTA0720	●
7.30	0/-0.022	7.3	69	113	1	P990SUTA0730	●
7.40	0/-0.022	7.4	69	113	1	P990SUTA0740	●
7.50	0/-0.022	7.5	69	113	1	P990SUTA0750	●
7.60	0/-0.022	7.6	75	119	1	P990SUTA0760	●
7.70	0/-0.022	7.7	75	119	1	P990SUTA0770	●
7.80	0/-0.022	7.8	75	119	1	P990SUTA0780	●
7.90	0/-0.022	7.9	75	119	1	P990SUTA0790	●
8.00	0/-0.022	8	75	119	1	P990SUTA0800	●
8.10	0/-0.022	8.1	75	125	1	P990SUTA0810	●
8.20	0/-0.022	8.2	75	125	1	P990SUTA0820	●
8.30	0/-0.022	8.3	75	125	1	P990SUTA0830	●
8.40	0/-0.022	8.4	75	125	1	P990SUTA0840	●
8.50	0/-0.022	8.5	75	125	1	P990SUTA0850	●
8.60	0/-0.022	8.6	81	131	1	P990SUTA0860	●
8.70	0/-0.022	8.7	81	131	1	P990SUTA0870	●
8.80	0/-0.022	8.8	81	131	1	P990SUTA0880	●
8.90	0/-0.022	8.9	81	131	1	P990SUTA0890	●
9.00	0/-0.022	9	81	131	1	P990SUTA0900	●
9.10	0/-0.022	9.1	81	131	1	P990SUTA0910	●
9.20	0/-0.022	9.2	81	131	1	P990SUTA0920	●
9.30	0/-0.022	9.3	81	131	1	P990SUTA0930	●
9.40	0/-0.022	9.4	81	131	1	P990SUTA0940	●
9.50	0/-0.022	9.5	81	131	1	P990SUTA0950	●
9.60	0/-0.022	9.6	87	137	1	P990SUTA0960	●
9.70	0/-0.022	9.7	87	137	1	P990SUTA0970	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



INFO

# 990SUTA

self centering, stainless steel, short

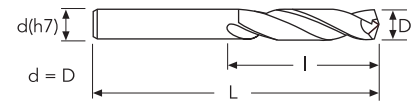


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★		★	☆	

★ 1st choice ☆ suitable



D(h8)	D Tol.	d(h7)	l	L	PACKAGING	EDP No.	Stock
9.80	0/-0.022	9.8	87	137	1	P990SUTA0980	●
9.90	0/-0.022	9.9	87	137	1	P990SUTA0990	●
10.00	0/-0.022	10	87	137	1	P990SUTA1000	●
10.10	0/-0.027	10.1	87	144	1	P990SUTA1010	●
10.20	0/-0.027	10.2	87	144	1	P990SUTA1020	●
10.30	0/-0.027	10.3	87	144	1	P990SUTA1030	●
10.40	0/-0.027	10.4	87	144	1	P990SUTA1040	●
10.50	0/-0.027	10.5	87	144	1	P990SUTA1050	●
10.60	0/-0.027	10.6	87	144	1	P990SUTA1060	●
10.70	0/-0.027	10.7	94	151	1	P990SUTA1070	●
10.80	0/-0.027	10.8	94	151	1	P990SUTA1080	●
10.90	0/-0.027	10.9	94	151	1	P990SUTA1090	●
11.00	0/-0.027	11	94	151	1	P990SUTA1100	●
11.10	0/-0.027	11.1	94	151	1	P990SUTA1110	●
11.20	0/-0.027	11.2	94	151	1	P990SUTA1120	●
11.30	0/-0.027	11.3	94	151	1	P990SUTA1130	●
11.40	0/-0.027	11.4	94	151	1	P990SUTA1140	●
11.50	0/-0.027	11.5	94	151	1	P990SUTA1150	●
11.60	0/-0.027	11.6	94	151	1	P990SUTA1160	●
11.70	0/-0.027	11.7	94	151	1	P990SUTA1170	●
11.80	0/-0.027	11.8	94	151	1	P990SUTA1180	●
11.90	0/-0.027	11.9	101	158	1	P990SUTA1190	●
12.00	0/-0.027	12	101	158	1	P990SUTA1200	●
12.10	0/-0.027	12.1	101	158	1	P990SUTA1210	●
12.20	0/-0.027	12.2	101	158	1	P990SUTA1220	●
12.30	0/-0.027	12.3	101	158	1	P990SUTA1230	●
12.40	0/-0.027	12.4	101	158	1	P990SUTA1240	●
12.50	0/-0.027	12.5	101	158	1	P990SUTA1250	●
12.60	0/-0.027	12.6	101	158	1	P990SUTA1260	●
12.70	0/-0.027	12.7	101	158	1	P990SUTA1270	●
12.80	0/-0.027	12.8	101	158	1	P990SUTA1280	●
12.90	0/-0.027	12.9	101	158	1	P990SUTA1290	●
13.00	0/-0.027	13	101	158	1	P990SUTA1300	●
13.50	0/-0.027	13.5	106	166	1	P990SUTA1350	●
14.00	0/-0.027	14	106	166	1	P990SUTA1400	●
14.10	0/-0.027	14.1	109	169	1	P990SUTA1410	●
14.50	0/-0.027	14.5	109	169	1	P990SUTA1450	●
15.00	0/-0.027	15	109	169	1	P990SUTA1500	●
15.50	0/-0.027	15.5	112	172	1	P990SUTA1550	●

HSS DRILLS  
LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS  
G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion





INFO

# 990SUTA

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
**SUTA**  
HSS-HSS/CO

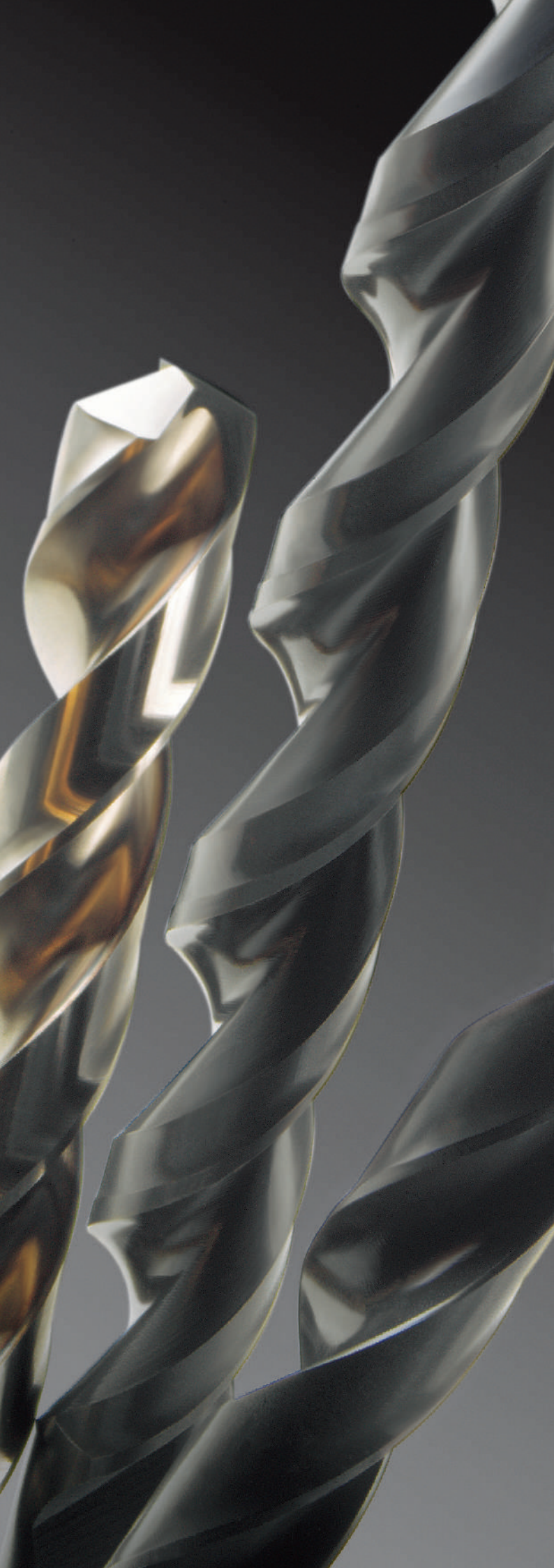
CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

Material Group ISO 513	P1 P2	P7	M1	M2	N1 N2 N4	N3	S1 S2	S4
Hardness/Rm	500÷700 N/mm <sup>2</sup>	400÷700 N/mm <sup>2</sup>					<30 HRC	
Vc (m/min)	<b>35÷45</b>	<b>18÷22</b>	<b>18÷22</b>	<b>12÷16</b>	<b>60÷80</b>	<b>30÷40</b>	<b>8÷12</b>	<b>12÷16</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
2	0.057	0.057	0.057	0.040	0.063	0.048	0.023	0.040
3	0.076	0.076	0.076	0.053	0.084	0.065	0.030	0.053
4	0.095	0.095	0.095	0.067	0.105	0.081	0.038	0.067
5	0.114	0.114	0.114	0.080	0.125	0.097	0.057	0.080
6	0.133	0.133	0.133	0.093	0.146	0.113	0.067	0.093
7	0.152	0.152	0.152	0.106	0.167	0.129	0.091	0.122
8	0.171	0.171	0.171	0.120	0.188	0.145	0.103	0.137
9	0.190	0.190	0.190	0.133	0.209	0.162	0.114	0.152
10	0.219	0.219	0.219	0.153	0.240	0.186	0.131	0.175
11	0.247	0.247	0.247	0.161	0.272	0.210	0.148	0.198
12	0.285	0.285	0.285	0.185	0.314	0.242	0.171	0.228
13	0.323	0.323	0.323	0.203	0.355	0.275	0.194	0.258
14	0.342	0.342	0.342	0.215	0.376	0.291	0.205	0.274
15	0.361	0.361	0.361	0.217	0.397	0.307	0.217	0.289
16	0.380	0.380	0.380	0.228	0.418	0.323	0.228	0.304
17	0.404	0.404	0.404	0.242	0.444	0.343	0.242	0.323
18	0.428	0.428	0.428	0.257	0.470	0.363	0.257	0.342
19	0.437	0.437	0.437	0.262	0.481	0.371	0.262	0.350
20	0.447	0.447	0.447	0.268	0.491	0.380	0.268	0.357



INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
**HSS-HSS/CO**

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

## HSS-HSS/CO

GENERAL PURPOSE

🇬🇧 A wide variety of geometries and standards, as well as a profitable mix of performance and price.

🇮🇹 Un'ampia varietà di geometrie e standard costruttivi, con una vantaggiosa combinazione di rendimento e convenienza, sono i punti di forza delle punte in HSS e HSS/Co Osawa.

🇩🇪 Die breite Palette an Geometrien und genormten Baumaßen bieten eine außergewöhnlich vorteilhafte Verbindung von Preis und Leistung: unschlagbare Stärken der Osawa Bohrer aus HSS und HSS/Co.

🇫🇷 La gamme de forets HSS et HSS/Co Osawa offre une grande variété de géométries standards permettant une combinaison très rentable de performance et de prix.

🇪🇸 Una amplia variedad de geometrías y estándares de fabricación, y una ventajosa combinación de rendimiento y conveniencia, son los puntos de fuerza de las brocas HSS y HSS/Co Osawa.

🇷🇺 Исходный материал наивысшего качества в комбинации с современным покрытием и специальной геометрией. Отличное сочетание производительности и стоимости.

INFO

# 118N

N type for general purpose, extra-short



\* <math>\varnothing 2\text{ mm}</math> = BR

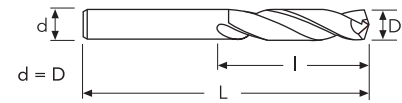


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★		☆	☆		

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
1.00	0/-0.014	1	6	26	10	P118NB0100	●
1.10	0/-0.014	1.1	7	28	10	P118NB0110	●
1.20	0/-0.014	1.2	8	30	10	P118NB0120	●
1.25	0/-0.014	1.25	8	30	10	P118NB0125	●
1.30	0/-0.014	1.3	8	30	10	P118NB0130	●
1.40	0/-0.014	1.4	9	32	10	P118NB0140	●
1.50	0/-0.014	1.5	9	32	10	P118NB0150	●
1.60	0/-0.014	1.6	10	34	10	P118NB0160	●
1.70	0/-0.014	1.7	10	34	10	P118NB0170	●
1.75	0/-0.014	1.75	11	36	10	P118NB0175	●
1.80	0/-0.014	1.8	11	36	10	P118NB0180	●
1.90	0/-0.014	1.9	11	36	10	P118NB0190	●
2.00	0/-0.014	2	12	38	10	P118N0200	●
2.10	0/-0.014	2.1	12	38	10	P118N0210	●
2.20	0/-0.014	2.2	13	40	10	P118N0220	●
2.25	0/-0.014	2.25	13	40	10	P118N0225	●
2.30	0/-0.014	2.3	13	40	10	P118N0230	●
2.40	0/-0.014	2.4	14	43	10	P118N0240	●
2.50	0/-0.014	2.5	14	43	10	P118N0250	●
2.60	0/-0.014	2.6	14	43	10	P118N0260	●
2.70	0/-0.014	2.7	16	46	10	P118N0270	●
2.75	0/-0.014	2.75	16	46	10	P118N0275	●
2.80	0/-0.014	2.8	16	46	10	P118N0280	●
2.90	0/-0.014	2.9	16	46	10	P118N0290	●
3.00	0/-0.014	3	16	46	10	P118N0300	●
3.10	0/-0.018	3.1	18	49	10	P118N0310	●
3.20	0/-0.018	3.2	18	49	10	P118N0320	●
3.25	0/-0.018	3.25	18	49	10	P118N0325	●
3.30	0/-0.018	3.3	18	49	10	P118N0330	●
3.40	0/-0.018	3.4	20	52	10	P118N0340	●
3.50	0/-0.018	3.5	20	52	10	P118N0350	●
3.60	0/-0.018	3.6	20	52	10	P118N0360	●
3.70	0/-0.018	3.7	20	52	10	P118N0370	●
3.75	0/-0.018	3.75	20	52	10	P118N0375	●
3.80	0/-0.018	3.8	22	55	10	P118N0380	●
3.90	0/-0.018	3.9	22	55	10	P118N0390	●
4.00	0/-0.018	4	22	55	10	P118N0400	●
4.10	0/-0.018	4.1	22	55	10	P118N0410	●
4.20	0/-0.018	4.2	22	55	10	P118N0420	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

# 118N

N type for general purpose, extra-short



INFO

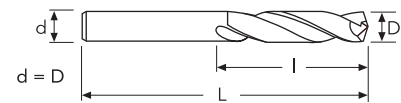


P	M	K	N	S	H
★		☆	☆		

★ 1st choice ☆ suitable

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
4.25	0/-0.018	4.25	22	55	10	P118N0425	●
4.30	0/-0.018	4.3	24	58	10	P118N0430	●
4.40	0/-0.018	4.4	24	58	10	P118N0440	○
4.50	0/-0.018	4.5	24	58	10	P118N0450	●
4.60	0/-0.018	4.6	24	58	10	P118N0460	●
4.70	0/-0.018	4.7	24	58	10	P118N0470	●
4.75	0/-0.018	4.75	24	58	10	P118N0475	●
4.80	0/-0.018	4.8	26	62	10	P118N0480	●
4.90	0/-0.018	4.9	26	62	10	P118N0490	●
5.00	0/-0.018	5	26	62	10	P118N0500	●
5.10	0/-0.018	5.1	26	62	10	P118N0510	●
5.20	0/-0.018	5.2	26	62	10	P118N0520	●
5.25	0/-0.018	5.25	26	62	10	P118N0525	●
5.30	0/-0.018	5.3	26	62	10	P118N0530	●
5.40	0/-0.018	5.4	28	66	10	P118N0540	●
5.50	0/-0.018	5.5	28	66	10	P118N0550	●
5.60	0/-0.018	5.6	28	66	10	P118N0560	●
5.70	0/-0.018	5.7	28	66	10	P118N0570	●
5.75	0/-0.018	5.75	28	66	10	P118N0575	●
5.80	0/-0.018	5.8	28	66	10	P118N0580	●
5.90	0/-0.018	5.9	28	66	10	P118N0590	○
6.00	0/-0.018	6	28	66	10	P118N0600	●
6.10	0/-0.022	6.1	31	70	10	P118N0610	●
6.20	0/-0.022	6.2	31	70	10	P118N0620	●
6.25	0/-0.022	6.25	31	70	10	P118N0625	●
6.30	0/-0.022	6.3	31	70	10	P118N0630	●
6.40	0/-0.022	6.4	31	70	10	P118N0640	●
6.50	0/-0.022	6.5	31	70	10	P118N0650	●
6.60	0/-0.022	6.6	31	70	5	P118N0660	○
6.70	0/-0.022	6.7	31	70	5	P118N0670	●
6.75	0/-0.022	6.75	34	74	5	P118N0675	●
6.80	0/-0.022	6.8	34	74	5	P118N0680	●
6.90	0/-0.022	6.9	34	74	5	P118N0690	●
7.00	0/-0.022	7	34	74	5	P118N0700	●
7.10	0/-0.022	7.1	34	74	5	P118N0710	●
7.20	0/-0.022	7.2	34	74	5	P118N0720	●
7.25	0/-0.022	7.25	34	74	5	P118N0725	●
7.30	0/-0.022	7.3	34	74	5	P118N0730	●
7.40	0/-0.022	7.4	34	74	5	P118N0740	○

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 118N

N type for general purpose, extra-short

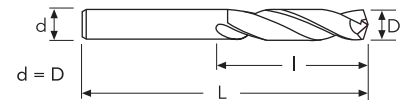


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★		☆	☆		

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	I	L	PACKAGING	EDP No.	Stock
7.50	0/-0.022	7.5	34	74	5	P118N0750	●
7.60	0/-0.022	7.6	37	79	5	P118N0760	●
7.70	0/-0.022	7.7	37	79	5	P118N0770	○
7.75	0/-0.022	7.75	37	79	5	P118N0775	●
7.80	0/-0.022	7.8	37	79	5	P118N0780	●
7.90	0/-0.022	7.9	37	79	5	P118N0790	○
8.00	0/-0.022	8	37	79	5	P118N0800	●
8.10	0/-0.022	8.1	37	79	5	P118N0810	●
8.20	0/-0.022	8.2	37	79	5	P118N0820	●
8.25	0/-0.022	8.25	37	79	5	P118N0825	●
8.30	0/-0.022	8.3	37	79	5	P118N0830	○
8.40	0/-0.022	8.4	37	79	5	P118N0840	○
8.50	0/-0.022	8.5	37	79	5	P118N0850	●
8.60	0/-0.022	8.6	40	84	5	P118N0860	●
8.70	0/-0.022	8.7	40	84	5	P118N0870	○
8.75	0/-0.022	8.75	40	84	5	P118N0875	●
8.80	0/-0.022	8.8	40	84	5	P118N0880	○
8.90	0/-0.022	8.9	40	84	5	P118N0890	●
9.00	0/-0.022	9	40	84	5	P118N0900	●
9.10	0/-0.022	9.1	40	84	5	P118N0910	●
9.20	0/-0.022	9.2	40	84	5	P118N0920	○
9.25	0/-0.022	9.25	40	84	5	P118N0925	○
9.30	0/-0.022	9.3	40	84	5	P118N0930	○
9.40	0/-0.022	9.4	40	84	5	P118N0940	○
9.50	0/-0.022	9.5	40	84	5	P118N0950	●
9.60	0/-0.022	9.6	43	89	5	P118N0960	○
9.70	0/-0.022	9.7	43	89	5	P118N0970	○
9.75	0/-0.022	9.75	43	89	5	P118N0975	○
9.80	0/-0.022	9.8	43	89	5	P118N0980	○
9.90	0/-0.022	9.9	43	89	5	P118N0990	○
10.00	0/-0.022	10	43	89	5	P118N1000	●
10.25	0/-0.027	10.25	43	89	5	P118N1025	●
10.50	0/-0.027	10.5	43	89	5	P118N1050	●
10.75	0/-0.027	10.75	47	95	5	P118N1075	●
11.00	0/-0.027	11	47	95	5	P118N1100	●
11.25	0/-0.027	11.25	47	95	5	P118N1125	●
11.50	0/-0.027	11.5	47	95	5	P118N1150	●
11.75	0/-0.027	11.75	47	95	5	P118N1175	●
12.00	0/-0.027	12	51	102	5	P118N1200	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



INFO

# 118N

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

Material Group ISO 513	P1 P2	P3 P4	K1 K2	N1 N5	N2 N3 N4	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	150÷350 HB			
Vc (m/min)	<b>25÷35</b>	<b>20÷30</b>	<b>25÷35</b>	<b>50÷70</b>	<b>40÷60</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
1	0.017	0.014	0.019	0.024	0.017	
1.5	0.035	0.030	0.039	0.049	0.035	
2	0.050	0.043	0.055	0.070	0.050	
2.5	0.070	0.060	0.077	0.098	0.070	
3	0.080	0.068	0.088	0.112	0.080	
3.5	0.090	0.077	0.099	0.126	0.090	
4	0.100	0.085	0.110	0.140	0.100	
5	0.110	0.094	0.121	0.154	0.110	
6	0.120	0.102	0.132	0.168	0.120	
7	0.130	0.111	0.143	0.182	0.130	
8	0.140	0.119	0.154	0.196	0.140	
9	0.160	0.136	0.176	0.224	0.160	
10	0.170	0.145	0.187	0.238	0.170	
11	0.180	0.153	0.198	0.252	0.180	
12	0.190	0.162	0.209	0.266	0.190	
13	0.200	0.170	0.220	0.280	0.200	
14	0.210	0.179	0.231	0.294	0.210	
15	0.220	0.187	0.242	0.308	0.220	
16	0.240	0.204	0.264	0.336	0.240	



# 218NVA

NVA type for tough materials, extra-short



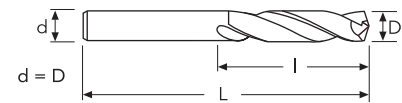
INFO

P	M	K	N	S	H
★	★	☆	☆	☆	

★ 1st choice ☆ suitable

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
1.00	0/-0.014	1	6	26	10	P218NVA0100	●
1.10	0/-0.014	1.1	7	28	10	P218NVA0110	●
1.20	0/-0.014	1.2	8	30	10	P218NVA0120	●
1.30	0/-0.014	1.3	8	30	10	P218NVA0130	●
1.40	0/-0.014	1.4	9	32	10	P218NVA0140	●
1.50	0/-0.014	1.5	9	32	10	P218NVA0150	●
1.60	0/-0.014	1.6	10	34	10	P218NVA0160	●
1.70	0/-0.014	1.7	10	34	10	P218NVA0170	●
1.80	0/-0.014	1.8	11	36	10	P218NVA0180	●
1.90	0/-0.014	1.9	11	36	10	P218NVA0190	●
2.00	0/-0.014	2	12	38	10	P218NVA0200	●
2.10	0/-0.014	2.1	12	38	10	P218NVA0210	●
2.20	0/-0.014	2.2	13	40	10	P218NVA0220	●
2.30	0/-0.014	2.3	13	40	10	P218NVA0230	●
2.40	0/-0.014	2.4	14	43	10	P218NVA0240	●
2.50	0/-0.014	2.5	14	43	10	P218NVA0250	●
2.60	0/-0.014	2.6	14	43	10	P218NVA0260	●
2.70	0/-0.014	2.7	16	46	10	P218NVA0270	●
2.80	0/-0.014	2.8	16	46	10	P218NVA0280	●
2.90	0/-0.014	2.9	16	46	10	P218NVA0290	●
3.00	0/-0.014	3	16	46	10	P218NVA0300	●
3.10	0/-0.018	3.1	18	49	10	P218NVA0310	●
3.20	0/-0.018	3.2	18	49	10	P218NVA0320	●
3.30	0/-0.018	3.3	18	49	10	P218NVA0330	●
3.40	0/-0.018	3.4	20	52	10	P218NVA0340	●
3.50	0/-0.018	3.5	20	52	10	P218NVA0350	●
3.60	0/-0.018	3.6	20	52	10	P218NVA0360	●
3.70	0/-0.018	3.7	20	52	10	P218NVA0370	●
3.80	0/-0.018	3.8	22	55	10	P218NVA0380	●
3.90	0/-0.018	3.9	22	55	10	P218NVA0390	●
4.00	0/-0.018	4	22	55	10	P218NVA0400	●
4.10	0/-0.018	4.1	22	55	10	P218NVA0410	●
4.20	0/-0.018	4.2	22	55	10	P218NVA0420	●
4.30	0/-0.018	4.3	24	58	10	P218NVA0430	●
4.40	0/-0.018	4.4	24	58	10	P218NVA0440	●
4.50	0/-0.018	4.5	24	58	10	P218NVA0450	●
4.60	0/-0.018	4.6	24	58	10	P218NVA0460	●
4.70	0/-0.018	4.7	24	58	10	P218NVA0470	●
4.80	0/-0.018	4.8	26	62	10	P218NVA0480	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 218NVA

NVA type for tough materials, extra-short

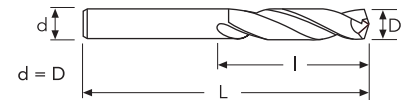


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	☆	☆	☆	☆

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
4.90	0/-0.018	4.9	26	62	10	P218NVA0490	●
5.00	0/-0.018	5	26	62	10	P218NVA0500	●
5.10	0/-0.018	5.1	26	62	10	P218NVA0510	●
5.20	0/-0.018	5.2	26	62	10	P218NVA0520	●
5.30	0/-0.018	5.3	26	62	10	P218NVA0530	●
5.40	0/-0.018	5.4	28	66	10	P218NVA0540	●
5.50	0/-0.018	5.5	28	66	10	P218NVA0550	●
5.60	0/-0.018	5.6	28	66	10	P218NVA0560	●
5.70	0/-0.018	5.7	28	66	10	P218NVA0570	●
5.80	0/-0.018	5.8	28	66	10	P218NVA0580	●
5.90	0/-0.018	5.9	28	66	10	P218NVA0590	●
6.00	0/-0.018	6	28	66	10	P218NVA0600	●
6.10	0/-0.022	6.1	31	70	10	P218NVA0610	●
6.20	0/-0.022	6.2	31	70	10	P218NVA0620	●
6.30	0/-0.022	6.3	31	70	10	P218NVA0630	●
6.40	0/-0.022	6.4	31	70	10	P218NVA0640	●
6.50	0/-0.022	6.5	31	70	10	P218NVA0650	●
6.60	0/-0.022	6.6	31	70	5	P218NVA0660	●
6.70	0/-0.022	6.7	31	70	5	P218NVA0670	●
6.80	0/-0.022	6.8	34	74	5	P218NVA0680	●
6.90	0/-0.022	6.9	34	74	5	P218NVA0690	●
7.00	0/-0.022	7	34	74	5	P218NVA0700	●
7.10	0/-0.022	7.1	34	74	5	P218NVA0710	●
7.20	0/-0.022	7.2	34	74	5	P218NVA0720	●
7.30	0/-0.022	7.3	34	74	5	P218NVA0730	●
7.40	0/-0.022	7.4	34	74	5	P218NVA0740	●
7.50	0/-0.022	7.5	34	74	5	P218NVA0750	●
7.60	0/-0.022	7.6	37	79	5	P218NVA0760	●
7.70	0/-0.022	7.7	37	79	5	P218NVA0770	●
7.80	0/-0.022	7.8	37	79	5	P218NVA0780	●
7.90	0/-0.022	7.9	37	79	5	P218NVA0790	●
8.00	0/-0.022	8	37	79	5	P218NVA0800	●
8.10	0/-0.022	8.1	37	79	5	P218NVA0810	●
8.20	0/-0.022	8.2	37	79	5	P218NVA0820	●
8.30	0/-0.022	8.3	37	79	5	P218NVA0830	●
8.40	0/-0.022	8.4	37	79	5	P218NVA0840	●
8.50	0/-0.022	8.5	37	79	5	P218NVA0850	●
8.60	0/-0.022	8.6	40	84	5	P218NVA0860	●
8.70	0/-0.022	8.7	40	84	5	P218NVA0870	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

# 218NVA

NVA type for tough materials, extra-short



INFO

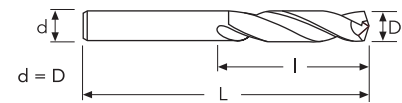


P	M	K	N	S	H
★	★	☆	☆	☆	

★ 1st choice ☆ suitable

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
8.80	0/-0.022	8.8	40	84	5	P218NVA0880	●
8.90	0/-0.022	8.9	40	84	5	P218NVA0890	●
9.00	0/-0.022	9	40	84	5	P218NVA0900	●
9.10	0/-0.022	9.1	40	84	5	P218NVA0910	●
9.20	0/-0.022	9.2	40	84	5	P218NVA0920	●
9.30	0/-0.022	9.3	40	84	5	P218NVA0930	●
9.40	0/-0.022	9.4	40	84	5	P218NVA0940	●
9.50	0/-0.022	9.5	40	84	5	P218NVA0950	●
9.60	0/-0.022	9.6	43	89	5	P218NVA0960	●
9.70	0/-0.022	9.7	43	89	5	P218NVA0970	●
9.80	0/-0.022	9.8	43	89	5	P218NVA0980	●
9.90	0/-0.022	9.9	43	89	5	P218NVA0990	●
10.00	0/-0.022	10	43	89	5	P218NVA1000	●
10.20	0/-0.027	10.2	43	89	5	P218NVA1020	●
10.25	0/-0.027	10.25	43	89	5	P218NVA1025	●
10.50	0/-0.027	10.5	43	89	5	P218NVA1050	●
11.00	0/-0.027	11	47	95	5	P218NVA1100	●
11.50	0/-0.027	11.5	47	95	5	P218NVA1150	●
12.00	0/-0.027	12	51	102	5	P218NVA1200	●
12.50	0/-0.027	12.5	51	102	5	P218NVA1250	●
13.00	0/-0.027	13	51	102	5	P218NVA1300	●
13.50	0/-0.027	13.5	54	107	1	P218NVA1350	●
14.00	0/-0.027	14	54	107	1	P218NVA1400	●
14.50	0/-0.027	14.5	56	111	1	P218NVA1450	●
15.00	0/-0.027	15	56	111	1	P218NVA1500	●
15.50	0/-0.027	15.5	58	115	1	P218NVA1550	●
16.00	0/-0.027	16	58	115	1	P218NVA1600	●
16.50	0/-0.027	16.5	60	119	1	P218NVA1650	●
17.00	0/-0.027	17	60	119	1	P218NVA1700	●
17.50	0/-0.027	17.5	62	123	1	P218NVA1750	●
18.00	0/-0.027	18	62	123	1	P218NVA1800	●
18.50	0/-0.033	18.5	64	127	1	P218NVA1850	●
19.00	0/-0.033	19	64	127	1	P218NVA1900	●
19.50	0/-0.033	19.5	66	131	1	P218NVA1950	●
20.00	0/-0.033	20	66	131	1	P218NVA2000	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

## 218NVA

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA

HSS-HSS/CO

Material Group ISO 513	P1 P2	P3 P4	P7	M1 M2	M3	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>				
Vc (m/min)	<b>25+35</b>	<b>20+30</b>	<b>12+18</b>	<b>12+18</b>	<b>8+12</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
1	0.017	0.014	0.012	0.012	0.009	
1.5	0.035	0.030	0.025	0.025	0.018	
2	0.050	0.043	0.035	0.035	0.025	
2.5	0.070	0.060	0.049	0.049	0.035	
3	0.080	0.068	0.056	0.056	0.040	
3.5	0.090	0.077	0.063	0.063	0.045	
4	0.100	0.085	0.070	0.070	0.050	
5	0.110	0.094	0.077	0.077	0.055	
6	0.120	0.102	0.084	0.084	0.060	
7	0.130	0.111	0.091	0.091	0.065	
8	0.140	0.119	0.098	0.098	0.070	
9	0.160	0.136	0.112	0.112	0.080	
10	0.170	0.145	0.119	0.119	0.085	
11	0.180	0.153	0.126	0.126	0.090	
12	0.190	0.162	0.133	0.133	0.095	
13	0.200	0.170	0.140	0.140	0.100	
14	0.210	0.179	0.147	0.147	0.105	
15	0.220	0.187	0.154	0.154	0.110	
16	0.240	0.204	0.168	0.168	0.120	
17	0.260	0.221	0.182	0.182	0.130	
18	0.280	0.238	0.196	0.196	0.140	
19	0.300	0.255	0.210	0.210	0.150	
20	0.320	0.272	0.224	0.224	0.160	

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

Material Group ISO 513	K1	K3	N1 N5	N2 N3 N4	S1 S2 S4	
Hardness/Rm	150÷350 HB	<350 HB				<35 HRC
Vc (m/min)	<b>25+35</b>	<b>20+30</b>	<b>50+70</b>	<b>40+60</b>	<b>8+12</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
1	0.019	0.013	0.024	0.017	0.007	
1.5	0.039	0.026	0.049	0.035	0.014	
2	0.055	0.038	0.070	0.050	0.020	
2.5	0.077	0.053	0.098	0.070	0.028	
3	0.088	0.060	0.112	0.080	0.032	
3.5	0.099	0.068	0.126	0.090	0.036	
4	0.110	0.075	0.140	0.100	0.040	
5	0.121	0.083	0.154	0.110	0.044	
6	0.132	0.090	0.168	0.120	0.048	
7	0.143	0.098	0.182	0.130	0.052	
8	0.154	0.105	0.196	0.140	0.056	
9	0.176	0.120	0.224	0.160	0.064	
10	0.187	0.128	0.238	0.170	0.068	
11	0.198	0.135	0.252	0.180	0.072	
12	0.209	0.143	0.266	0.190	0.076	
13	0.220	0.150	0.280	0.200	0.080	
14	0.231	0.158	0.294	0.210	0.084	
15	0.242	0.165	0.308	0.220	0.088	
16	0.264	0.180	0.336	0.240	0.096	
17	0.286	0.195	0.364	0.260	0.104	
18	0.308	0.210	0.392	0.280	0.112	
19	0.330	0.225	0.420	0.300	0.120	
20	0.352	0.240	0.448	0.320	0.128	

# 1386STI

STI type for general purpose, split point, TiN pointed, short



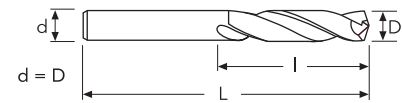
INFO

P	M	K	N	S	H
★	☆	★	☆	☆	

★ 1st choice ☆ suitable

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
1.00	0/-0.014	1	12	34	10	P1385NTI0100	●
1.10	0/-0.014	1.1	14	36	10	P1385NTI0110	●
1.20	0/-0.014	1.2	16	38	10	P1385NTI0120	●
1.30	0/-0.014	1.3	16	38	10	P1385NTI0130	●
1.40	0/-0.014	1.4	18	40	10	P1385NTI0140	●
1.50	0/-0.014	1.5	18	40	10	P1385NTI0150	●
1.60	0/-0.014	1.6	20	43	10	P1386STI0160	●
1.70	0/-0.014	1.7	20	43	10	P1386STI0170	●
1.80	0/-0.014	1.8	22	46	10	P1386STI0180	●
1.90	0/-0.014	1.9	22	46	10	P1386STI0190	●
2.00	0/-0.014	2	24	49	10	P1386STI0200	●
2.10	0/-0.014	2.1	24	49	10	P1386STI0210	●
2.20	0/-0.014	2.2	27	53	10	P1386STI0220	●
2.30	0/-0.014	2.3	27	53	10	P1386STI0230	●
2.40	0/-0.014	2.4	30	57	10	P1386STI0240	●
2.50	0/-0.014	2.5	30	57	10	P1386STI0250	●
2.60	0/-0.014	2.6	30	57	10	P1386STI0260	●
2.70	0/-0.014	2.7	33	61	10	P1386STI0270	●
2.80	0/-0.014	2.8	33	61	10	P1386STI0280	●
2.90	0/-0.014	2.9	33	61	10	P1386STI0290	●
3.00	0/-0.014	3	33	61	10	P1386STI0300	●
3.10	0/-0.018	3.1	36	65	10	P1386STI0310	●
3.20	0/-0.018	3.2	36	65	10	P1386STI0320	●
3.30	0/-0.018	3.3	36	65	10	P1386STI0330	●
3.40	0/-0.018	3.4	39	70	10	P1386STI0340	●
3.50	0/-0.018	3.5	39	70	10	P1386STI0350	●
3.60	0/-0.018	3.6	39	70	10	P1386STI0360	●
3.70	0/-0.018	3.7	39	70	10	P1386STI0370	●
3.80	0/-0.018	3.8	43	75	10	P1386STI0380	●
3.90	0/-0.018	3.9	43	75	10	P1386STI0390	●
4.00	0/-0.018	4	43	75	10	P1386STI0400	●
4.10	0/-0.018	4.1	43	75	10	P1386STI0410	●
4.20	0/-0.018	4.2	43	75	10	P1386STI0420	●
4.30	0/-0.018	4.3	47	80	10	P1386STI0430	●
4.40	0/-0.018	4.4	47	80	10	P1386STI0440	●
4.50	0/-0.018	4.5	47	80	10	P1386STI0450	●
4.60	0/-0.018	4.6	47	80	10	P1386STI0460	●
4.70	0/-0.018	4.7	47	80	10	P1386STI0470	●
4.80	0/-0.018	4.8	52	86	10	P1386STI0480	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 1386STI

STI type for general purpose, split point, TiN pointed, short

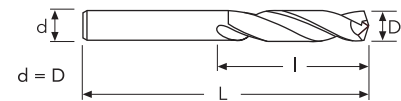


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	☆	★	☆	☆	☆

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
4.90	0/-0.018	4.9	52	86	10	P1386STI0490	●
5.00	0/-0.018	5	52	86	10	P1386STI0500	●
5.10	0/-0.018	5.1	52	86	10	P1386STI0510	●
5.20	0/-0.018	5.2	52	86	10	P1386STI0520	●
5.30	0/-0.018	5.3	52	86	10	P1386STI0530	●
5.40	0/-0.018	5.4	57	93	10	P1386STI0540	●
5.50	0/-0.018	5.5	57	93	10	P1386STI0550	●
5.60	0/-0.018	5.6	57	93	10	P1386STI0560	●
5.70	0/-0.018	5.7	57	93	10	P1386STI0570	●
5.80	0/-0.018	5.8	57	93	10	P1386STI0580	●
5.90	0/-0.018	5.9	57	93	10	P1386STI0590	●
6.00	0/-0.018	6	57	93	10	P1386STI0600	●
6.10	0/-0.022	6.1	63	101	10	P1386STI0610	●
6.20	0/-0.022	6.2	63	101	10	P1386STI0620	●
6.30	0/-0.022	6.3	63	101	10	P1386STI0630	●
6.40	0/-0.022	6.4	63	101	10	P1386STI0640	●
6.50	0/-0.022	6.5	63	101	10	P1386STI0650	●
6.60	0/-0.022	6.6	63	101	5	P1386STI0660	●
6.70	0/-0.022	6.7	63	101	5	P1386STI0670	●
6.80	0/-0.022	6.8	69	109	5	P1386STI0680	●
6.90	0/-0.022	6.9	69	109	5	P1386STI0690	●
7.00	0/-0.022	7	69	109	5	P1386STI0700	●
7.10	0/-0.022	7.1	69	109	5	P1386STI0710	●
7.20	0/-0.022	7.2	69	109	5	P1386STI0720	●
7.30	0/-0.022	7.3	69	109	5	P1386STI0730	●
7.40	0/-0.022	7.4	69	109	5	P1386STI0740	●
7.50	0/-0.022	7.5	69	109	5	P1386STI0750	●
7.60	0/-0.022	7.6	75	117	5	P1386STI0760	●
7.70	0/-0.022	7.7	75	117	5	P1386STI0770	●
7.80	0/-0.022	7.8	75	117	5	P1386STI0780	●
7.90	0/-0.022	7.9	75	117	5	P1386STI0790	●
8.00	0/-0.022	8	75	117	5	P1386STI0800	●
8.10	0/-0.022	8.1	75	117	5	P1386STI0810	●
8.20	0/-0.022	8.2	75	117	5	P1386STI0820	●
8.30	0/-0.022	8.3	75	117	5	P1386STI0830	●
8.40	0/-0.022	8.4	75	117	5	P1386STI0840	●
8.50	0/-0.022	8.5	75	117	5	P1386STI0850	●
8.60	0/-0.022	8.6	81	125	5	P1386STI0860	●
8.70	0/-0.022	8.7	81	125	5	P1386STI0870	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

# 1386STI

STI type for general purpose, split point, TiN pointed, short



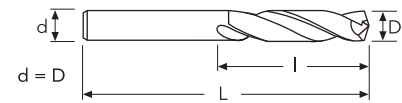
INFO

P	M	K	N	S	H
★	☆	★	☆	☆	

★ 1st choice ☆ suitable

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
8.80	0/-0.022	8.8	81	125	5	P1386STI0880	●
8.90	0/-0.022	8.9	81	125	5	P1386STI0890	●
9.00	0/-0.022	9	81	125	5	P1386STI0900	●
9.10	0/-0.022	9.1	81	125	5	P1386STI0910	●
9.20	0/-0.022	9.2	81	125	5	P1386STI0920	●
9.30	0/-0.022	9.3	81	125	5	P1386STI0930	●
9.40	0/-0.022	9.4	81	125	5	P1386STI0940	●
9.50	0/-0.022	9.5	81	125	5	P1386STI0950	●
9.60	0/-0.022	9.6	87	133	5	P1386STI0960	●
9.70	0/-0.022	9.7	87	133	5	P1386STI0970	●
9.80	0/-0.022	9.8	87	133	5	P1386STI0980	●
9.90	0/-0.022	9.9	87	133	5	P1386STI0990	●
10.00	0/-0.022	10	87	133	5	P1386STI1000	●
10.10	0/-0.027	10.1	87	133	5	P1386STI1010	●
10.20	0/-0.027	10.2	87	133	5	P1386STI1020	●
10.30	0/-0.027	10.3	87	133	5	P1386STI1030	●
10.40	0/-0.027	10.4	87	133	5	P1386STI1040	●
10.50	0/-0.027	10.5	87	133	5	P1386STI1050	●
10.60	0/-0.027	10.6	87	133	5	P1386STI1060	●
10.70	0/-0.027	10.7	94	142	5	P1386STI1070	●
10.80	0/-0.027	10.8	94	142	5	P1386STI1080	●
10.90	0/-0.027	10.9	94	142	5	P1386STI1090	●
11.00	0/-0.027	11	94	142	5	P1386STI1100	●
11.10	0/-0.027	11.1	94	142	5	P1386STI1110	●
11.20	0/-0.027	11.2	94	142	5	P1386STI1120	●
11.30	0/-0.027	11.3	94	142	5	P1386STI1130	●
11.40	0/-0.027	11.4	94	142	5	P1386STI1140	●
11.50	0/-0.027	11.5	94	142	5	P1386STI1150	●
11.60	0/-0.027	11.6	94	142	5	P1386STI1160	●
11.70	0/-0.027	11.7	94	142	5	P1386STI1170	●
11.80	0/-0.027	11.8	94	142	5	P1386STI1180	●
11.90	0/-0.027	11.9	101	151	5	P1386STI1190	●
12.00	0/-0.027	12	101	151	5	P1386STI1200	●
12.10	0/-0.027	12.1	101	151	5	P1386STI1210	●
12.20	0/-0.027	12.2	101	151	5	P1386STI1220	●
12.30	0/-0.027	12.3	101	151	5	P1386STI1230	●
12.40	0/-0.027	12.4	101	151	5	P1386STI1240	●
12.50	0/-0.027	12.5	101	151	5	P1386STI1250	●
12.60	0/-0.027	12.6	101	151	5	P1386STI1260	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion





## CUTTING PARAMETERS

## 1386STI

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	N1 N5	N2 N3 N4	S1 S2 S4
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>			150÷350 HB			<35 HRC
Vc (m/min)	<b>30÷40</b>	<b>25÷35</b>	<b>15÷25</b>	<b>15÷25</b>	<b>30÷40</b>	<b>60÷80</b>	<b>50÷70</b>	<b>12÷18</b>
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)
<b>1</b>	0.017	0.014	0.012	0.012	0.019	0.024	0.017	0.007
<b>1.5</b>	0.035	0.030	0.025	0.025	0.039	0.049	0.035	0.014
<b>2</b>	0.050	0.043	0.035	0.035	0.055	0.070	0.050	0.020
<b>2.5</b>	0.075	0.064	0.053	0.053	0.083	0.105	0.075	0.030
<b>3</b>	0.090	0.077	0.063	0.063	0.099	0.126	0.090	0.036
<b>3.5</b>	0.105	0.089	0.074	0.074	0.116	0.147	0.105	0.042
<b>4</b>	0.110	0.094	0.077	0.077	0.121	0.154	0.110	0.044
<b>5</b>	0.125	0.106	0.088	0.088	0.138	0.175	0.125	0.050
<b>6</b>	0.160	0.136	0.112	0.112	0.176	0.224	0.160	0.064
<b>7</b>	0.175	0.149	0.123	0.123	0.193	0.245	0.175	0.070
<b>8</b>	0.200	0.170	0.140	0.140	0.220	0.280	0.200	0.080
<b>9</b>	0.210	0.179	0.147	0.147	0.231	0.294	0.210	0.084
<b>10</b>	0.220	0.187	0.154	0.154	0.242	0.308	0.220	0.088
<b>11</b>	0.235	0.200	0.165	0.165	0.259	0.329	0.235	0.094
<b>12</b>	0.250	0.213	0.175	0.175	0.275	0.350	0.250	0.100
<b>13</b>	0.265	0.225	0.186	0.186	0.292	0.371	0.265	0.106

INFO

CARBIDE  
DRILLSPU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TAHSS  
DRILLSLFTA  
SUTA  
HSS-HSS/COCARBIDE  
END-MILLSG2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MHHSS  
END-MILLSCARBIDE  
BURRS

INFO

# 138N-138NTI

N type for general purpose, short (138N),  
N type for general purpose, TiN coated, short (138NTI)



138N 138NTI  
\* < Ø2 mm = BR



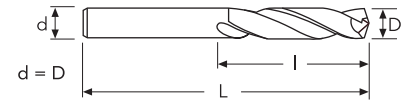
138NTI will be gradually replaced by 1386STI (page 233)

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★		☆	☆		

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	l	L	PACKAGING	138N		138NTI	
						EDP No.	Stock	EDP No.	Stock
0.20	0/-0.014	0.2	2.5	19	10	P138NB0020	●		
0.30	0/-0.014	0.3	3	19	10	P138NB0030	●		
0.40	0/-0.014	0.4	5	20	10	P138NB0040	●		
0.50	0/-0.014	0.5	6	22	10	P138NB0050	●		
0.60	0/-0.014	0.6	7	24	10	P138NB0060	●		
0.70	0/-0.014	0.7	9	28	10	P138NB0070	●		
0.80	0/-0.014	0.8	10	30	10	P138NB0080	●		
0.90	0/-0.014	0.9	11	32	10	P138NB0090	●		
1.00	0/-0.014	1	12	34	10	P138NB0100	●	P138NTI0100	▽
1.10	0/-0.014	1.1	14	36	10	P138NB0110	●	P138NTI0110	▽
1.20	0/-0.014	1.2	16	38	10	P138NB0120	●	P138NTI0120	▽
1.25	0/-0.014	1.25	16	38	10	P138NB0125	●		
1.30	0/-0.014	1.3	16	38	10	P138NB0130	●	P138NTI0130	▽
1.40	0/-0.014	1.4	18	40	10	P138NB0140	●	P138NTI0140	▽
1.50	0/-0.014	1.5	18	40	10	P138NB0150	●	P138NTI0150	▽
1.60	0/-0.014	1.6	20	43	10	P138NB0160	●	P138NTI0160	▽
1.70	0/-0.014	1.7	20	43	10	P138NB0170	●	P138NTI0170	▽
1.75	0/-0.014	1.75	22	46	10	P138NB0175	●		
1.80	0/-0.014	1.8	22	46	10	P138NB0180	●	P138NTI0180	▽
1.90	0/-0.014	1.9	22	46	10	P138NB0190	●	P138NTI0190	▽
2.00	0/-0.014	2	24	49	10	P138N0200	●	P138NTI0200	▽
2.10	0/-0.014	2.1	24	49	10	P138N0210	●	P138NTI0210	▽
2.20	0/-0.014	2.2	27	53	10	P138N0220	●	P138NTI0220	▽
2.25	0/-0.014	2.25	27	53	10	P138N0225	●		
2.30	0/-0.014	2.3	27	53	10	P138N0230	●	P138NTI0230	▽
2.40	0/-0.014	2.4	30	57	10	P138N0240	●	P138NTI0240	▽
2.50	0/-0.014	2.5	30	57	10	P138N0250	●	P138NTI0250	▽
2.60	0/-0.014	2.6	30	57	10	P138N0260	●	P138NTI0260	▽
2.70	0/-0.014	2.7	33	61	10	P138N0270	●	P138NTI0270	▽
2.75	0/-0.014	2.75	33	61	10	P138N0275	●		
2.80	0/-0.014	2.8	33	61	10	P138N0280	●	P138NTI0280	▽
2.90	0/-0.014	2.9	33	61	10	P138N0290	●	P138NTI0290	▽
3.00	0/-0.014	3	33	61	10	P138N0300	●	P138NTI0300	▽
3.10	0/-0.018	3.1	36	65	10	P138N0310	●	P138NTI0310	▽
3.20	0/-0.018	3.2	36	65	10	P138N0320	●	P138NTI0320	▽
3.25	0/-0.018	3.25	36	65	10	P138N0325	●		
3.30	0/-0.018	3.3	36	65	10	P138N0330	●	P138NTI0330	▽
3.40	0/-0.018	3.4	39	70	10	P138N0340	●	P138NTI0340	▽
3.50	0/-0.018	3.5	39	70	10	P138N0350	●	P138NTI0350	▽

● stock standard ○ non-standard stock ▽ stock exhaustion

# 138N-138NTI

N type for general purpose, short (138N),  
N type for general purpose, TiN coated, short (138NTI)

DIN  
338

N

HSS  
OX

HSS  
TiN

118°

25-30°

**138N    138NTI**

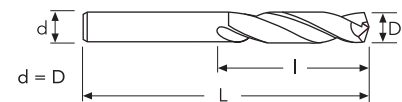
INFO



**138NTI will be gradually replaced by 1386STI (page 233)**

P	M	K	N	S	H
★		☆	☆		

★ 1st choice    ☆ suitable



CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

D(h8)	D Tol.	d	I	L	PACKAGING	138N		138NTI	
						EDP No.	Stock	EDP No.	Stock
3.60	0/-0.018	3.6	39	70	10	P138N0360	●	P138NTI0360	▽
3.70	0/-0.018	3.7	39	70	10	P138N0370	●	P138NTI0370	▽
3.75	0/-0.018	3.75	39	70	10	P138N0375	●		
3.80	0/-0.018	3.8	43	75	10	P138N0380	●	P138NTI0380	▽
3.90	0/-0.018	3.9	43	75	10	P138N0390	●	P138NTI0390	▽
4.00	0/-0.018	4	43	75	10	P138N0400	●	P138NTI0400	▽
4.10	0/-0.018	4.1	43	75	10	P138N0410	●	P138NTI0410	▽
4.20	0/-0.018	4.2	43	75	10	P138N0420	●	P138NTI0420	▽
4.25	0/-0.018	4.25	43	75	10	P138N0425	●		
4.30	0/-0.018	4.3	47	80	10	P138N0430	●	P138NTI0430	▽
4.40	0/-0.018	4.4	47	80	10	P138N0440	●	P138NTI0440	▽
4.50	0/-0.018	4.5	47	80	10	P138N0450	●	P138NTI0450	▽
4.60	0/-0.018	4.6	47	80	10	P138N0460	●	P138NTI0460	▽
4.70	0/-0.018	4.7	47	80	10	P138N0470	●	P138NTI0470	▽
4.75	0/-0.018	4.75	47	80	10	P138N0475	●		
4.80	0/-0.018	4.8	52	86	10	P138N0480	●	P138NTI0480	▽
4.90	0/-0.018	4.9	52	86	10	P138N0490	●	P138NTI0490	▽
5.00	0/-0.018	5	52	86	10	P138N0500	●	P138NTI0500	▽
5.10	0/-0.018	5.1	52	86	10	P138N0510	●	P138NTI0510	▽
5.20	0/-0.018	5.2	52	86	10	P138N0520	●	P138NTI0520	▽
5.25	0/-0.018	5.25	52	86	10	P138N0525	●		
5.30	0/-0.018	5.3	52	86	10	P138N0530	●	P138NTI0530	▽
5.40	0/-0.018	5.4	57	93	10	P138N0540	●	P138NTI0540	▽
5.50	0/-0.018	5.5	57	93	10	P138N0550	●	P138NTI0550	▽
5.60	0/-0.018	5.6	57	93	10	P138N0560	●	P138NTI0560	▽
5.70	0/-0.018	5.7	57	93	10	P138N0570	●	P138NTI0570	▽
5.75	0/-0.018	5.75	57	93	10	P138N0575	●		
5.80	0/-0.018	5.8	57	93	10	P138N0580	●	P138NTI0580	▽
5.90	0/-0.018	5.9	57	93	10	P138N0590	●	P138NTI0590	▽
6.00	0/-0.018	6	57	93	10	P138N0600	●	P138NTI0600	▽
6.10	0/-0.022	6.1	63	101	10	P138N0610	●	P138NTI0610	▽
6.20	0/-0.022	6.2	63	101	10	P138N0620	●	P138NTI0620	▽
6.25	0/-0.022	6.25	63	101	10	P138N0625	●		
6.30	0/-0.022	6.3	63	101	10	P138N0630	●	P138NTI0630	▽
6.40	0/-0.022	6.4	63	101	10	P138N0640	●	P138NTI0640	▽
6.50	0/-0.022	6.5	63	101	10	P138N0650	●	P138NTI0650	▽
6.60	0/-0.022	6.6	63	101	5	P138N0660	●	P138NTI0660	▽
6.70	0/-0.022	6.7	63	101	5	P138N0670	●	P138NTI0670	▽
6.75	0/-0.022	6.75	69	109	5	P138N0675	●		

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard    ○ non-standard stock    ▽ stock exhaustion

INFO

# 138N-138NTI

N type for general purpose, short (138N),  
N type for general purpose, TiN coated, short (138NTI)

DIN  
338

N

HSS  
OX

HSS  
TiN

118°

25-30°

**138N    138NTI**



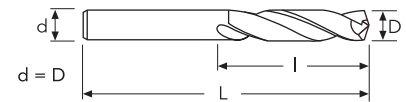
**138NTI will be gradually replaced by 1386STI (page 233)**

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★		☆	☆		

★ 1st choice    ☆ suitable



						138N		138NTI	
D(h8)	D Tol.	d	I	L	PACKAGING	EDP No.	Stock	EDP No.	Stock
6.80	0/-0.022	6.8	69	109	5	P138N0680	●	P138NTI0680	▽
6.90	0/-0.022	6.9	69	109	5	P138N0690	●	P138NTI0690	▽
7.00	0/-0.022	7	69	109	5	P138N0700	●	P138NTI0700	▽
7.10	0/-0.022	7.1	69	109	5	P138N0710	●	P138NTI0710	▽
7.20	0/-0.022	7.2	69	109	5	P138N0720	●	P138NTI0720	▽
7.25	0/-0.022	7.25	69	109	5	P138N0725	●		
7.30	0/-0.022	7.3	69	109	5	P138N0730	●	P138NTI0730	▽
7.40	0/-0.022	7.4	69	109	5	P138N0740	●	P138NTI0740	▽
7.50	0/-0.022	7.5	69	109	5	P138N0750	●	P138NTI0750	▽
7.60	0/-0.022	7.6	75	117	5	P138N0760	●	P138NTI0760	▽
7.70	0/-0.022	7.7	75	117	5	P138N0770	●	P138NTI0770	▽
7.75	0/-0.022	7.75	75	117	5	P138N0775	●		
7.80	0/-0.022	7.8	75	117	5	P138N0780	●	P138NTI0780	▽
7.90	0/-0.022	7.9	75	117	5	P138N0790	●	P138NTI0790	▽
8.00	0/-0.022	8	75	117	5	P138N0800	●	P138NTI0800	▽
8.10	0/-0.022	8.1	75	117	5	P138N0810	●	P138NTI0810	▽
8.20	0/-0.022	8.2	75	117	5	P138N0820	●	P138NTI0820	▽
8.25	0/-0.022	8.25	75	117	5	P138N0825	●		
8.30	0/-0.022	8.3	75	117	5	P138N0830	●	P138NTI0830	▽
8.40	0/-0.022	8.4	75	117	5	P138N0840	●	P138NTI0840	▽
8.50	0/-0.022	8.5	75	117	5	P138N0850	●	P138NTI0850	▽
8.60	0/-0.022	8.6	81	125	5	P138N0860	●	P138NTI0860	▽
8.70	0/-0.022	8.7	81	125	5	P138N0870	●	P138NTI0870	▽
8.75	0/-0.022	8.75	81	125	5	P138N0875	●		
8.80	0/-0.022	8.8	81	125	5	P138N0880	●	P138NTI0880	▽
8.90	0/-0.022	8.9	81	125	5	P138N0890	●	P138NTI0890	▽
9.00	0/-0.022	9	81	125	5	P138N0900	●	P138NTI0900	▽
9.10	0/-0.022	9.1	81	125	5	P138N0910	●	P138NTI0910	▽
9.20	0/-0.022	9.2	81	125	5	P138N0920	●	P138NTI0920	▽
9.25	0/-0.022	9.25	81	125	5	P138N0925	●		
9.30	0/-0.022	9.3	81	125	5	P138N0930	●	P138NTI0930	▽
9.40	0/-0.022	9.4	81	125	5	P138N0940	●	P138NTI0940	▽
9.50	0/-0.022	9.5	81	125	5	P138N0950	●	P138NTI0950	▽
9.60	0/-0.022	9.6	87	133	5	P138N0960	●	P138NTI0960	▽
9.70	0/-0.022	9.7	87	133	5	P138N0970	●	P138NTI0970	▽
9.75	0/-0.022	9.75	87	133	5	P138N0975	●		
9.80	0/-0.022	9.8	87	133	5	P138N0980	●	P138NTI0980	▽
9.90	0/-0.022	9.9	87	133	5	P138N0990	●	P138NTI0990	▽
10.00	0/-0.022	10	87	133	5	P138N1000	●	P138NTI1000	▽

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard    ○ non-standard stock    ▽ stock exhaustion

# 138N-138NTI

N type for general purpose, short (138N),  
N type for general purpose, TiN coated, short (138NTI)

DIN  
338

N

HSS  
OX  
138N

HSS  
TIN  
138NTI

118°

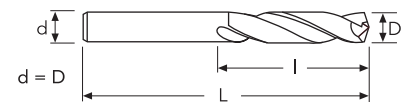
25-30°

INFO



P	M	K	N	S	H
★		☆	☆		

★ 1st choice    ☆ suitable



CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

D(h8)	D Tol.	d	I	L	PACKAGING	138N		138NTI	
						EDP No.	Stock	EDP No.	Stock
10.10	0/-0.027	10.1	87	133	5	P138N1010	●		
10.20	0/-0.027	10.2	87	133	5	P138N1020	●	P138NTI1020	▽
10.25	0/-0.027	10.25	87	133	5	P138N1025	●		
10.30	0/-0.027	10.3	87	133	5	P138N1030	●		
10.40	0/-0.027	10.4	87	133	5	P138N1040	●		
10.50	0/-0.027	10.5	87	133	5	P138N1050	●	P138NTI1050	▽
10.60	0/-0.027	10.6	87	133	5	P138N1060	●		
10.70	0/-0.027	10.7	94	142	5	P138N1070	●		
10.75	0/-0.027	10.75	94	142	5	P138N1075	●		
10.80	0/-0.027	10.8	94	142	5	P138N1080	●		
10.90	0/-0.027	10.9	94	142	5	P138N1090	●		
11.00	0/-0.027	11	94	142	5	P138N1100	●	P138NTI1100	▽
11.10	0/-0.027	11.1	94	142	5	P138N1110	●		
11.20	0/-0.027	11.2	94	142	5	P138N1120	●		
11.25	0/-0.027	11.25	94	142	5	P138N1125	●		
11.30	0/-0.027	11.3	94	142	5	P138N1130	●		
11.40	0/-0.027	11.4	94	142	5	P138N1140	●		
11.50	0/-0.027	11.5	94	142	5	P138N1150	●	P138NTI1150	▽
11.60	0/-0.027	11.6	94	142	5	P138N1160	●		
11.70	0/-0.027	11.7	94	142	5	P138N1170	●		
11.75	0/-0.027	11.75	94	142	5	P138N1175	●		
11.80	0/-0.027	11.8	94	142	5	P138N1180	●		
11.90	0/-0.027	11.9	101	151	5	P138N1190	●		
12.00	0/-0.027	12	101	151	5	P138N1200	●	P138NTI1200	▽
12.10	0/-0.027	12.1	101	151	5	P138N1210	●		
12.20	0/-0.027	12.2	101	151	5	P138N1220	●		
12.25	0/-0.027	12.25	101	151	5	P138N1225	●		
12.30	0/-0.027	12.3	101	151	5	P138N1230	●		
12.40	0/-0.027	12.4	101	151	5	P138N1240	●		
12.50	0/-0.027	12.5	101	151	5	P138N1250	●	P138NTI1250	▽
12.60	0/-0.027	12.6	101	151	5	P138N1260	●		
12.70	0/-0.027	12.7	101	151	5	P138N1270	●		
12.75	0/-0.027	12.75	101	151	5	P138N1275	●		
12.80	0/-0.027	12.8	101	151	5	P138N1280	●		
12.90	0/-0.027	12.9	101	151	5	P138N1290	●		
13.00	0/-0.027	13	101	151	5	P138N1300	●	P138NTI1300	▽
13.25	0/-0.027	13.25	108	160	1	P138N1325	●		
13.50	0/-0.027	13.5	108	160	1	P138N1350	●	P138NTI1350	▽
13.75	0/-0.027	13.75	108	160	1	P138N1375	●		

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard    ○ non-standard stock    ▽ stock exhaustion

INFO

# 138N-138NTI

N type for general purpose, short (138N),  
N type for general purpose, TiN coated, short (138NTI)

DIN 338	N	HSS OX	HSS TIN	118°	25-30°
		138N	138NTI		



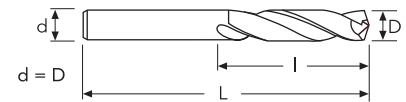
138NTI will be gradually replaced by 1386STI (page 239)

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

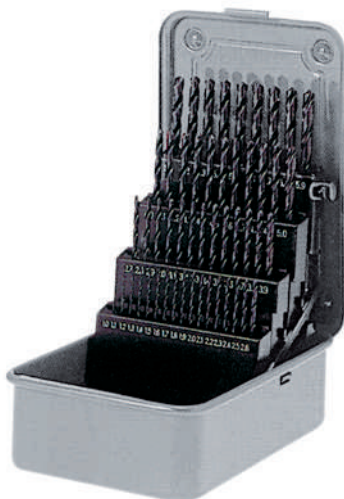
P	M	K	N	S	H
★		☆	☆		

★ 1st choice ☆ suitable

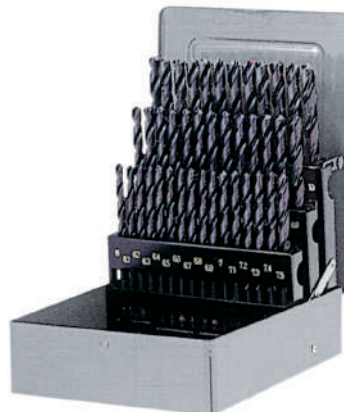


D(h8)	D Tol.	d	I	L	PACKAGING	138N		138NTI	
						EDP No.	Stock	EDP No.	Stock
14.00	0/-0.027	14	108	160	1	P138N1400	●	P138NTI1400	▽
14.25	0/-0.027	14.25	114	169	1	P138N1425	●		
14.50	0/-0.027	14.5	114	169	1	P138N1450	●	P138NTI1450	▽
14.75	0/-0.027	14.75	114	169	1	P138N1475	●		
15.00	0/-0.027	15	114	169	1	P138N1500	●	P138NTI1500	▽
15.25	0/-0.027	15.25	120	178	1	P138N1525	●		
15.50	0/-0.027	15.5	120	178	1	P138N1550	●	P138NTI1550	▽
15.75	0/-0.027	15.75	120	178	1	P138N1575	●		
16.00	0/-0.027	16	120	178	1	P138N1600	●	P138NTI1600	▽
16.25	0/-0.027	16.25	125	184	1	P138N1625	●		
16.50	0/-0.027	16.5	125	184	1	P138N1650	●		
16.75	0/-0.027	16.75	125	184	1	P138N1675	●		
17.00	0/-0.027	17	125	184	1	P138N1700	●		
17.50	0/-0.027	17.5	130	191	1	P138N1750	●		
18.00	0/-0.027	18	130	191	1	P138N1800	●		
18.50	0/-0.033	18.5	135	198	1	P138N1850	●		
19.00	0/-0.033	19	135	198	1	P138N1900	●		
19.50	0/-0.033	19.5	140	205	1	P138N1950	●		
20.00	0/-0.033	20	140	205	1	P138N2000	●		

● stock standard ○ non-standard stock ▽ stock exhaustion



**138NA01A**  
Set 50 pcs.  
138N DIN338 HSS  
Ø1 mm+Ø5.9 mm x 0.1 mm



**138NA01B**  
Set 41 pcs.  
138N DIN338 HSS  
Ø6 mm+Ø10 mm x 0.1 mm



**138NA05C**  
Set 25 pcs.  
138N DIN338 HSS  
Ø1 mm+Ø13 mm x 0.5 mm

HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

INFO

### 138N

Material Group ISO 513	P1 P2	P3 P4	K1 K2	N1 N5	N2 N3 N4	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	150÷350 HB			
Vc (m/min)	<b>25÷35</b>	<b>20÷30</b>	<b>25÷35</b>	<b>50÷70</b>	<b>40÷60</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
0.2	0.007	0.006	0.008	0.010	0.007	
0.5	0.011	0.009	0.012	0.015	0.011	
0.8	0.013	0.011	0.014	0.018	0.013	
1	0.017	0.014	0.019	0.024	0.017	
1.5	0.035	0.030	0.039	0.049	0.035	
2	0.050	0.043	0.055	0.070	0.050	
2.5	0.060	0.051	0.066	0.084	0.060	
3	0.070	0.060	0.077	0.098	0.070	
3.5	0.080	0.068	0.088	0.112	0.080	
4	0.090	0.077	0.099	0.126	0.090	
5	0.100	0.085	0.110	0.140	0.100	
6	0.110	0.094	0.121	0.154	0.110	
7	0.120	0.102	0.132	0.168	0.120	
8	0.130	0.111	0.143	0.182	0.130	
9	0.140	0.119	0.154	0.196	0.140	
10	0.160	0.136	0.176	0.224	0.160	
11	0.170	0.145	0.187	0.238	0.170	
12	0.180	0.153	0.198	0.252	0.180	
13	0.190	0.162	0.209	0.266	0.190	
14	0.200	0.170	0.220	0.280	0.200	
15	0.210	0.179	0.231	0.294	0.210	
16	0.220	0.187	0.242	0.308	0.220	
17	0.230	0.196	0.253	0.322	0.230	
18	0.240	0.204	0.264	0.336	0.240	
19	0.250	0.213	0.275	0.350	0.250	
20	0.260	0.221	0.286	0.364	0.260	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

### 138NTI

Material Group ISO 513	P1 P2	P3 P4	K1 K2	N1 N5	N2 N3 N4	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	150÷350 HB			
Vc (m/min)	<b>30÷40</b>	<b>25÷35</b>	<b>30÷40</b>	<b>60÷80</b>	<b>50÷70</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
1	0.017	0.014	0.019	0.024	0.017	
1.5	0.035	0.030	0.039	0.049	0.035	
2	0.050	0.043	0.055	0.070	0.050	
2.5	0.060	0.051	0.066	0.084	0.060	
3	0.070	0.060	0.077	0.098	0.070	
3.5	0.080	0.068	0.088	0.112	0.080	
4	0.090	0.077	0.099	0.126	0.090	
5	0.100	0.085	0.110	0.140	0.100	
6	0.110	0.094	0.121	0.154	0.110	
7	0.120	0.102	0.132	0.168	0.120	
8	0.130	0.111	0.143	0.182	0.130	
9	0.140	0.119	0.154	0.196	0.140	
10	0.160	0.136	0.176	0.224	0.160	
11	0.170	0.145	0.187	0.238	0.170	
12	0.180	0.153	0.198	0.252	0.180	
13	0.190	0.162	0.209	0.266	0.190	
14	0.200	0.170	0.220	0.280	0.200	
15	0.210	0.179	0.231	0.294	0.210	
16	0.220	0.187	0.242	0.308	0.220	

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

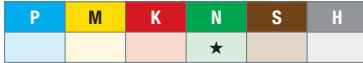
# 138HB

HB type for brass, short

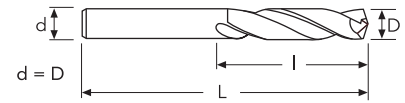


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



★ 1st choice ☆ suitable



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
1.50	0/-0.014	1.5	18	40	10	P138HB0150	●
1.60	0/-0.014	1.6	20	43	10	P138HB0160	●
1.70	0/-0.014	1.7	20	43	10	P138HB0170	●
1.80	0/-0.014	1.8	22	46	10	P138HB0180	●
1.90	0/-0.014	1.9	22	46	10	P138HB0190	●
2.00	0/-0.014	2	24	49	10	P138HB0200	●
2.10	0/-0.014	2.1	24	49	10	P138HB0210	●
2.20	0/-0.014	2.2	27	53	10	P138HB0220	●
2.30	0/-0.014	2.3	27	53	10	P138HB0230	●
2.40	0/-0.014	2.4	30	57	10	P138HB0240	●
2.50	0/-0.014	2.5	30	57	10	P138HB0250	●
2.60	0/-0.014	2.6	30	57	10	P138HB0260	●
2.70	0/-0.014	2.7	33	61	10	P138HB0270	●
2.80	0/-0.014	2.8	33	61	10	P138HB0280	●
2.90	0/-0.014	2.9	33	61	10	P138HB0290	●
3.00	0/-0.014	3	33	61	10	P138HB0300	●
3.10	0/-0.018	3.1	36	65	10	P138HB0310	●
3.20	0/-0.018	3.2	36	65	10	P138HB0320	●
3.30	0/-0.018	3.3	36	65	10	P138HB0330	●
3.40	0/-0.018	3.4	39	70	10	P138HB0340	●
3.50	0/-0.018	3.5	39	70	10	P138HB0350	●
3.60	0/-0.018	3.6	39	70	10	P138HB0360	●
3.70	0/-0.018	3.7	39	70	10	P138HB0370	●
3.80	0/-0.018	3.8	43	75	10	P138HB0380	●
3.90	0/-0.018	3.9	43	75	10	P138HB0390	●
4.00	0/-0.018	4	43	75	10	P138HB0400	●
4.10	0/-0.018	4.1	43	75	10	P138HB0410	●
4.20	0/-0.018	4.2	43	75	10	P138HB0420	●
4.30	0/-0.018	4.3	47	80	10	P138HB0430	●
4.40	0/-0.018	4.4	47	80	10	P138HB0440	○
4.50	0/-0.018	4.5	47	80	10	P138HB0450	●
4.60	0/-0.018	4.6	47	80	10	P138HB0460	●
4.70	0/-0.018	4.7	47	80	10	P138HB0470	●
4.80	0/-0.018	4.8	52	86	10	P138HB0480	●
4.90	0/-0.018	4.9	52	86	10	P138HB0490	○
5.00	0/-0.018	5	52	86	10	P138HB0500	●
5.10	0/-0.018	5.1	52	86	10	P138HB0510	○
5.20	0/-0.018	5.2	52	86	10	P138HB0520	○
5.30	0/-0.018	5.3	52	86	10	P138HB0530	○

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



# 138HB

HB type for brass, short



DIN  
338

H

HSS  
BR

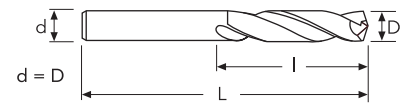
118°

12-15°

INFO

P	M	K	N	S	H
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★ 1st choice ☆ suitable



CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D(h8)	D Tol.	d	I	L	PACKAGING	EDP No.	Stock
5.40	0/-0.018	5.4	57	93	10	P138HB0540	○
5.50	0/-0.018	5.5	57	93	10	P138HB0550	●
5.60	0/-0.018	5.6	57	93	10	P138HB0560	○
5.70	0/-0.018	5.7	57	93	10	P138HB0570	○
5.80	0/-0.018	5.8	57	93	10	P138HB0580	○
5.90	0/-0.018	5.9	57	93	10	P138HB0590	○
6.00	0/-0.018	6	57	93	10	P138HB0600	●
6.10	0/-0.022	6.1	63	101	10	P138HB0610	○
6.20	0/-0.022	6.2	63	101	10	P138HB0620	○
6.30	0/-0.022	6.3	63	101	10	P138HB0630	○
6.40	0/-0.022	6.4	63	101	10	P138HB0640	○
6.50	0/-0.022	6.5	63	101	10	P138HB0650	●
6.60	0/-0.022	6.6	63	101	5	P138HB0660	○
6.70	0/-0.022	6.7	63	101	5	P138HB0670	○
6.80	0/-0.022	6.8	69	109	5	P138HB0680	○
6.90	0/-0.022	6.9	69	109	5	P138HB0690	○
7.00	0/-0.022	7	69	109	5	P138HB0700	●
7.10	0/-0.022	7.1	69	109	5	P138HB0710	○
7.20	0/-0.022	7.2	69	109	5	P138HB0720	○
7.30	0/-0.022	7.3	69	109	5	P138HB0730	○
7.40	0/-0.022	7.4	69	109	5	P138HB0740	○
7.50	0/-0.022	7.5	69	109	5	P138HB0750	●
7.60	0/-0.022	7.6	75	117	5	P138HB0760	○
7.70	0/-0.022	7.7	75	117	5	P138HB0770	○
7.80	0/-0.022	7.8	75	117	5	P138HB0780	●
7.90	0/-0.022	7.9	75	117	5	P138HB0790	○
8.00	0/-0.022	8	75	117	5	P138HB0800	●
8.10	0/-0.022	8.1	75	117	5	P138HB0810	○
8.20	0/-0.022	8.2	75	117	5	P138HB0820	○
8.30	0/-0.022	8.3	75	117	5	P138HB0830	○
8.40	0/-0.022	8.4	75	117	5	P138HB0840	○
8.50	0/-0.022	8.5	75	117	5	P138HB0850	●
8.60	0/-0.022	8.6	81	125	5	P138HB0860	○
8.70	0/-0.022	8.7	81	125	5	P138HB0870	○
8.80	0/-0.022	8.8	81	125	5	P138HB0880	○
8.90	0/-0.022	8.9	81	125	5	P138HB0890	○
9.00	0/-0.022	9	81	125	5	P138HB0900	●
9.10	0/-0.022	9.1	81	125	5	P138HB0910	○
9.20	0/-0.022	9.2	81	125	5	P138HB0920	○

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO**

CARBIDE  
END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



CUTTING PARAMETERS

# 138HB

	<b>Material Group ISO 513</b>	<b>N4</b>					
	<b>Hardness/Rm</b>						
	<b>Vc (m/min)</b>	<b>40÷60</b>					
	<b>D (mm)</b>	<b>fn (mm/rev)</b>					
	<b>1.5</b>	0.065					
	<b>2</b>	0.080					
	<b>2.5</b>	0.090					
	<b>3</b>	0.100					
	<b>3.5</b>	0.110					
	<b>4</b>	0.120					
	<b>4.5</b>	0.130					
	<b>5</b>	0.140					
	<b>6</b>	0.160					
	<b>7</b>	0.180					
<b>8</b>	0.200						
<b>9</b>	0.220						
<b>10</b>	0.250						

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
**HSS-HSS/CO**

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# 138WB

WB type for aluminium, short

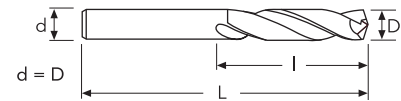


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



★ 1st choice ☆ suitable



D(h8)	D Tol.	d	I	L	PACKAGING	EDP No.	Stock
1.50	0/-0.014	1.5	18	40	10	P138WB0150	●
1.60	0/-0.014	1.6	20	43	10	P138WB0160	○
1.70	0/-0.014	1.7	20	43	10	P138WB0170	○
1.80	0/-0.014	1.8	22	46	10	P138WB0180	○
1.90	0/-0.014	1.9	22	46	10	P138WB0190	○
2.00	0/-0.014	2	24	49	10	P138WB0200	●
2.10	0/-0.014	2.1	24	49	10	P138WB0210	○
2.20	0/-0.014	2.2	27	53	10	P138WB0220	●
2.30	0/-0.014	2.3	27	53	10	P138WB0230	○
2.40	0/-0.014	2.4	30	57	10	P138WB0240	●
2.50	0/-0.014	2.5	30	57	10	P138WB0250	●
2.60	0/-0.014	2.6	30	57	10	P138WB0260	●
2.70	0/-0.014	2.7	33	61	10	P138WB0270	○
2.80	0/-0.014	2.8	33	61	10	P138WB0280	●
2.90	0/-0.014	2.9	33	61	10	P138WB0290	○
3.00	0/-0.014	3	33	61	10	P138WB0300	●
3.10	0/-0.018	3.1	36	65	10	P138WB0310	●
3.20	0/-0.018	3.2	36	65	10	P138WB0320	●
3.30	0/-0.018	3.3	36	65	10	P138WB0330	●
3.40	0/-0.018	3.4	39	70	10	P138WB0340	●
3.50	0/-0.018	3.5	39	70	10	P138WB0350	●
3.60	0/-0.018	3.6	39	70	10	P138WB0360	●
3.70	0/-0.018	3.7	39	70	10	P138WB0370	●
3.80	0/-0.018	3.8	43	75	10	P138WB0380	●
3.90	0/-0.018	3.9	43	75	10	P138WB0390	●
4.00	0/-0.018	4	43	75	10	P138WB0400	●
4.10	0/-0.018	4.1	43	75	10	P138WB0410	●
4.20	0/-0.018	4.2	43	75	10	P138WB0420	●
4.30	0/-0.018	4.3	47	80	10	P138WB0430	○
4.40	0/-0.018	4.4	47	80	10	P138WB0440	○
4.50	0/-0.018	4.5	47	80	10	P138WB0450	●
4.60	0/-0.018	4.6	47	80	10	P138WB0460	●
4.70	0/-0.018	4.7	47	80	10	P138WB0470	○
4.80	0/-0.018	4.8	52	86	10	P138WB0480	●
4.90	0/-0.018	4.9	52	86	10	P138WB0490	●
5.00	0/-0.018	5	52	86	10	P138WB0500	●
5.10	0/-0.018	5.1	52	86	10	P138WB0510	○
5.20	0/-0.018	5.2	52	86	10	P138WB0520	●
5.30	0/-0.018	5.3	52	86	10	P138WB0530	○

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

# 138WB

WB type for aluminium, short



DIN  
338

W

HSS  
BR

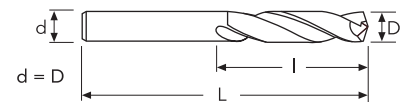
130°

35-40°

INFO

P	M	K	N	S	H
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★ 1st choice ☆ suitable



CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
5.40	0/-0.018	5.4	57	93	10	P138WB0540	○
5.50	0/-0.018	5.5	57	93	10	P138WB0550	●
5.60	0/-0.018	5.6	57	93	10	P138WB0560	●
5.70	0/-0.018	5.7	57	93	10	P138WB0570	○
5.80	0/-0.018	5.8	57	93	10	P138WB0580	○
5.90	0/-0.018	5.9	57	93	10	P138WB0590	○
6.00	0/-0.018	6	57	93	10	P138WB0600	●
6.10	0/-0.022	6.1	63	101	10	P138WB0610	○
6.20	0/-0.022	6.2	63	101	10	P138WB0620	○
6.30	0/-0.022	6.3	63	101	10	P138WB0630	○
6.40	0/-0.022	6.4	63	101	10	P138WB0640	○
6.50	0/-0.022	6.5	63	101	10	P138WB0650	●
6.60	0/-0.022	6.6	63	101	5	P138WB0660	○
6.70	0/-0.022	6.7	63	101	5	P138WB0670	○
6.80	0/-0.022	6.8	69	109	5	P138WB0680	●
6.90	0/-0.022	6.9	69	109	5	P138WB0690	○
7.00	0/-0.022	7	69	109	5	P138WB0700	●
7.10	0/-0.022	7.1	69	109	5	P138WB0710	○
7.20	0/-0.022	7.2	69	109	5	P138WB0720	○
7.30	0/-0.022	7.3	69	109	5	P138WB0730	○
7.40	0/-0.022	7.4	69	109	5	P138WB0740	○
7.50	0/-0.022	7.5	69	109	5	P138WB0750	●
7.60	0/-0.022	7.6	75	117	5	P138WB0760	○
7.70	0/-0.022	7.7	75	117	5	P138WB0770	○
7.80	0/-0.022	7.8	75	117	5	P138WB0780	○
7.90	0/-0.022	7.9	75	117	5	P138WB0790	○
8.00	0/-0.022	8	75	117	5	P138WB0800	●
8.10	0/-0.022	8.1	75	117	5	P138WB0810	○
8.20	0/-0.022	8.2	75	117	5	P138WB0820	●
8.30	0/-0.022	8.3	75	117	5	P138WB0830	○
8.40	0/-0.022	8.4	75	117	5	P138WB0840	○
8.50	0/-0.022	8.5	75	117	5	P138WB0850	●
8.60	0/-0.022	8.6	81	125	5	P138WB0860	○
8.70	0/-0.022	8.7	81	125	5	P138WB0870	○
8.80	0/-0.022	8.8	81	125	5	P138WB0880	○
8.90	0/-0.022	8.9	81	125	5	P138WB0890	○
9.00	0/-0.022	9	81	125	5	P138WB0900	●
9.10	0/-0.022	9.1	81	125	5	P138WB0910	○
9.20	0/-0.022	9.2	81	125	5	P138WB0920	○

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



CUTTING PARAMETERS

# 138WB

Material Group ISO 513	N1	N2	N3			
Hardness/Rm						
Vc (m/min)	<b>40÷60</b>	<b>30÷50</b>	<b>25÷45</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
1.5	0.070	0.063	0.060			
2	0.080	0.072	0.068			
2.5	0.090	0.081	0.077			
3	0.100	0.090	0.085			
3.5	0.110	0.099	0.094			
4	0.120	0.108	0.102			
4.5	0.130	0.117	0.111			
5	0.140	0.126	0.119			
6	0.160	0.144	0.136			
7	0.180	0.162	0.153			
8	0.200	0.180	0.170			
9	0.220	0.198	0.187			
10	0.250	0.225	0.213			

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
**HSS-HSS/CO**

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

# 2386STI

STI type for tough materials, split point, TiN pointed, short

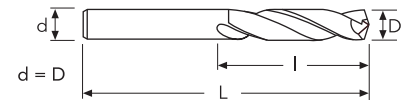


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	★	☆	☆	

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
1.00	0/-0.014	1	12	34	10	P2385NTI0100	●
1.10	0/-0.014	1.1	14	36	10	P2385NTI0110	●
1.20	0/-0.014	1.2	16	38	10	P2385NTI0120	●
1.30	0/-0.014	1.3	16	38	10	P2385NTI0130	●
1.40	0/-0.014	1.4	18	40	10	P2385NTI0140	●
1.50	0/-0.014	1.5	18	40	10	P2385NTI0150	●
1.60	0/-0.014	1.6	20	43	10	P2386STI0160	●
1.70	0/-0.014	1.7	20	43	10	P2386STI0170	●
1.80	0/-0.014	1.8	22	46	10	P2386STI0180	●
1.90	0/-0.014	1.9	22	46	10	P2386STI0190	●
2.00	0/-0.014	2	24	49	10	P2386STI0200	●
2.10	0/-0.014	2.1	24	49	10	P2386STI0210	●
2.20	0/-0.014	2.2	27	53	10	P2386STI0220	●
2.30	0/-0.014	2.3	27	53	10	P2386STI0230	●
2.40	0/-0.014	2.4	30	57	10	P2386STI0240	●
2.50	0/-0.014	2.5	30	57	10	P2386STI0250	●
2.60	0/-0.014	2.6	30	57	10	P2386STI0260	●
2.70	0/-0.014	2.7	33	61	10	P2386STI0270	●
2.80	0/-0.014	2.8	33	61	10	P2386STI0280	●
2.90	0/-0.014	2.9	33	61	10	P2386STI0290	●
3.00	0/-0.014	3	33	61	10	P2386STI0300	●
3.10	0/-0.018	3.1	36	65	10	P2386STI0310	●
3.20	0/-0.018	3.2	36	65	10	P2386STI0320	●
3.30	0/-0.018	3.3	36	65	10	P2386STI0330	●
3.40	0/-0.018	3.4	39	70	10	P2386STI0340	●
3.50	0/-0.018	3.5	39	70	10	P2386STI0350	●
3.60	0/-0.018	3.6	39	70	10	P2386STI0360	●
3.70	0/-0.018	3.7	39	70	10	P2386STI0370	●
3.80	0/-0.018	3.8	43	75	10	P2386STI0380	●
3.90	0/-0.018	3.9	43	75	10	P2386STI0390	●
4.00	0/-0.018	4	43	75	10	P2386STI0400	●
4.10	0/-0.018	4.1	43	75	10	P2386STI0410	●
4.20	0/-0.018	4.2	43	75	10	P2386STI0420	●
4.30	0/-0.018	4.3	47	80	10	P2386STI0430	●
4.40	0/-0.018	4.4	47	80	10	P2386STI0440	●
4.50	0/-0.018	4.5	47	80	10	P2386STI0450	●
4.60	0/-0.018	4.6	47	80	10	P2386STI0460	●
4.70	0/-0.018	4.7	47	80	10	P2386STI0470	●
4.80	0/-0.018	4.8	52	86	10	P2386STI0480	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



# 2386STI

STI type for tough materials, split point, TiN pointed, short



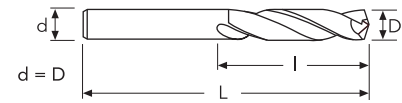
INFO

P	M	K	N	S	H
★	★	★	☆	☆	

★ 1st choice ☆ suitable

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
4.90	0/-0.018	4.9	52	86	10	P2386STI0490	●
5.00	0/-0.018	5	52	86	10	P2386STI0500	●
5.10	0/-0.018	5.1	52	86	10	P2386STI0510	●
5.20	0/-0.018	5.2	52	86	10	P2386STI0520	●
5.30	0/-0.018	5.3	52	86	10	P2386STI0530	●
5.40	0/-0.018	5.4	57	93	10	P2386STI0540	●
5.50	0/-0.018	5.5	57	93	10	P2386STI0550	●
5.60	0/-0.018	5.6	57	93	10	P2386STI0560	●
5.70	0/-0.018	5.7	57	93	10	P2386STI0570	●
5.80	0/-0.018	5.8	57	93	10	P2386STI0580	●
5.90	0/-0.018	5.9	57	93	10	P2386STI0590	●
6.00	0/-0.018	6	57	93	10	P2386STI0600	●
6.10	0/-0.022	6.1	63	101	10	P2386STI0610	●
6.20	0/-0.022	6.2	63	101	10	P2386STI0620	●
6.30	0/-0.022	6.3	63	101	10	P2386STI0630	●
6.40	0/-0.022	6.4	63	101	10	P2386STI0640	●
6.50	0/-0.022	6.5	63	101	10	P2386STI0650	●
6.60	0/-0.022	6.6	63	101	5	P2386STI0660	●
6.70	0/-0.022	6.7	63	101	5	P2386STI0670	●
6.80	0/-0.022	6.8	69	109	5	P2386STI0680	●
6.90	0/-0.022	6.9	69	109	5	P2386STI0690	●
7.00	0/-0.022	7	69	109	5	P2386STI0700	●
7.10	0/-0.022	7.1	69	109	5	P2386STI0710	●
7.20	0/-0.022	7.2	69	109	5	P2386STI0720	●
7.30	0/-0.022	7.3	69	109	5	P2386STI0730	●
7.40	0/-0.022	7.4	69	109	5	P2386STI0740	●
7.50	0/-0.022	7.5	69	109	5	P2386STI0750	●
7.60	0/-0.022	7.6	75	117	5	P2386STI0760	●
7.70	0/-0.022	7.7	75	117	5	P2386STI0770	●
7.80	0/-0.022	7.8	75	117	5	P2386STI0780	●
7.90	0/-0.022	7.9	75	117	5	P2386STI0790	●
8.00	0/-0.022	8	75	117	5	P2386STI0800	●
8.10	0/-0.022	8.1	75	117	5	P2386STI0810	●
8.20	0/-0.022	8.2	75	117	5	P2386STI0820	●
8.30	0/-0.022	8.3	75	117	5	P2386STI0830	●
8.40	0/-0.022	8.4	75	117	5	P2386STI0840	●
8.50	0/-0.022	8.5	75	117	5	P2386STI0850	●
8.60	0/-0.022	8.6	81	125	5	P2386STI0860	●
8.70	0/-0.022	8.7	81	125	5	P2386STI0870	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 2386STI

STI type for tough materials, split point, TiN pointed, short

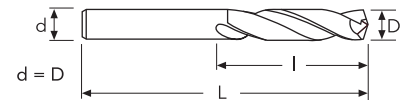


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	★	☆	☆	

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	I	L	PACKAGING	EDP No.	Stock
8.80	0/-0.022	8.8	81	125	5	P2386STI0880	●
8.90	0/-0.022	8.9	81	125	5	P2386STI0890	●
9.00	0/-0.022	9	81	125	5	P2386STI0900	●
9.10	0/-0.022	9.1	81	125	5	P2386STI0910	●
9.20	0/-0.022	9.2	81	125	5	P2386STI0920	●
9.30	0/-0.022	9.3	81	125	5	P2386STI0930	●
9.40	0/-0.022	9.4	81	125	5	P2386STI0940	●
9.50	0/-0.022	9.5	81	125	5	P2386STI0950	●
9.60	0/-0.022	9.6	87	133	5	P2386STI0960	●
9.70	0/-0.022	9.7	87	133	5	P2386STI0970	●
9.80	0/-0.022	9.8	87	133	5	P2386STI0980	●
9.90	0/-0.022	9.9	87	133	5	P2386STI0990	●
10.00	0/-0.022	10	87	133	5	P2386STI1000	●
10.10	0/-0.027	10.1	87	133	5	P2386STI1010	●
10.20	0/-0.027	10.2	87	133	5	P2386STI1020	●
10.30	0/-0.027	10.3	87	133	5	P2386STI1030	●
10.40	0/-0.027	10.4	87	133	5	P2386STI1040	●
10.50	0/-0.027	10.5	87	133	5	P2386STI1050	●
10.60	0/-0.027	10.6	87	133	5	P2386STI1060	●
10.70	0/-0.027	10.7	94	142	5	P2386STI1070	●
10.80	0/-0.027	10.8	94	142	5	P2386STI1080	●
10.90	0/-0.027	10.9	94	142	5	P2386STI1090	●
11.00	0/-0.027	11	94	142	5	P2386STI1100	●
11.10	0/-0.027	11.1	94	142	5	P2386STI1110	●
11.20	0/-0.027	11.2	94	142	5	P2386STI1120	●
11.30	0/-0.027	11.3	94	142	5	P2386STI1130	●
11.40	0/-0.027	11.4	94	142	5	P2386STI1140	●
11.50	0/-0.027	11.5	94	142	5	P2386STI1150	●
11.60	0/-0.027	11.6	94	142	5	P2386STI1160	●
11.70	0/-0.027	11.7	94	142	5	P2386STI1170	●
11.80	0/-0.027	11.8	94	142	5	P2386STI1180	●
11.90	0/-0.027	11.9	101	151	5	P2386STI1190	●
12.00	0/-0.027	12	101	151	5	P2386STI1200	●
12.10	0/-0.027	12.1	101	151	5	P2386STI1210	●
12.20	0/-0.027	12.2	101	151	5	P2386STI1220	●
12.30	0/-0.027	12.3	101	151	5	P2386STI1230	●
12.40	0/-0.027	12.4	101	151	5	P2386STI1240	●
12.50	0/-0.027	12.5	101	151	5	P2386STI1250	●
12.60	0/-0.027	12.6	101	151	5	P2386STI1260	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



INFO

## 2386STI

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

Material Group ISO 513	P1 P2	P3 P4	P7	M1	M2	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>				
Vc (m/min)	<b>30÷40</b>	<b>25÷35</b>	<b>15÷25</b>	<b>15÷25</b>	<b>12÷18</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
1	0.017	0.014	0.012	0.012	0.009	
1.5	0.035	0.030	0.025	0.025	0.018	
2	0.050	0.043	0.035	0.035	0.025	
2.5	0.075	0.064	0.053	0.053	0.038	
3	0.090	0.077	0.063	0.063	0.045	
3.5	0.105	0.089	0.074	0.074	0.053	
4	0.110	0.094	0.077	0.077	0.055	
5	0.125	0.106	0.088	0.088	0.063	
6	0.160	0.136	0.112	0.112	0.080	
7	0.175	0.149	0.123	0.123	0.088	
8	0.200	0.170	0.140	0.140	0.100	
9	0.210	0.179	0.147	0.147	0.105	
10	0.220	0.187	0.154	0.154	0.110	
11	0.235	0.200	0.165	0.165	0.118	
12	0.250	0.213	0.175	0.175	0.125	
13	0.265	0.225	0.186	0.186	0.133	

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

Material Group ISO 513	K1 K2	K3 K4	N1 N5	N2 N3 N4	S1 S2 S4	
Hardness/Rm	150÷350 HB	<350 HB			<35 HRC	
Vc (m/min)	<b>30÷40</b>	<b>25÷35</b>	<b>60÷80</b>	<b>50÷70</b>	<b>12÷18</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
1	0.019	0.013	0.024	0.017	0.007	
1.5	0.039	0.026	0.049	0.035	0.014	
2	0.055	0.038	0.070	0.050	0.020	
2.5	0.083	0.056	0.105	0.075	0.030	
3	0.099	0.068	0.126	0.090	0.036	
3.5	0.116	0.079	0.147	0.105	0.042	
4	0.121	0.083	0.154	0.110	0.044	
5	0.138	0.094	0.175	0.125	0.050	
6	0.176	0.120	0.224	0.160	0.064	
7	0.193	0.131	0.245	0.175	0.070	
8	0.220	0.150	0.280	0.200	0.080	
9	0.231	0.158	0.294	0.210	0.084	
10	0.242	0.165	0.308	0.220	0.088	
11	0.259	0.176	0.329	0.235	0.094	
12	0.275	0.188	0.350	0.250	0.100	
13	0.292	0.199	0.371	0.265	0.106	

CARBIDE  
END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# 238NVA

NVA type for tough materials, short



INFO

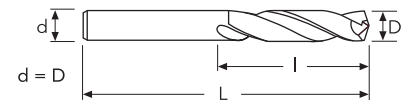


P	M	K	N	S	H
★	★	☆	☆	☆	

★ 1st choice ☆ suitable

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
1.00	0/-0.014	1	12	34	10	P238NVA0100	●
1.10	0/-0.014	1.1	14	36	10	P238NVA0110	●
1.20	0/-0.014	1.2	16	38	10	P238NVA0120	●
1.25	0/-0.014	1.25	16	38	10	P238NVA0125	●
1.30	0/-0.014	1.3	16	38	10	P238NVA0130	●
1.40	0/-0.014	1.4	18	40	10	P238NVA0140	●
1.50	0/-0.014	1.5	18	40	10	P238NVA0150	●
1.60	0/-0.014	1.6	20	43	10	P238NVA0160	●
1.70	0/-0.014	1.7	20	43	10	P238NVA0170	●
1.75	0/-0.014	1.75	22	46	10	P238NVA0175	●
1.80	0/-0.014	1.8	22	46	10	P238NVA0180	●
1.90	0/-0.014	1.9	22	46	10	P238NVA0190	●
2.00	0/-0.014	2	24	49	10	P238NVA0200	●
2.10	0/-0.014	2.1	24	49	10	P238NVA0210	●
2.20	0/-0.014	2.2	27	53	10	P238NVA0220	●
2.25	0/-0.014	2.25	27	53	10	P238NVA0225	●
2.30	0/-0.014	2.3	27	53	10	P238NVA0230	●
2.40	0/-0.014	2.4	30	57	10	P238NVA0240	●
2.50	0/-0.014	2.5	30	57	10	P238NVA0250	●
2.60	0/-0.014	2.6	30	57	10	P238NVA0260	●
2.70	0/-0.014	2.7	33	61	10	P238NVA0270	●
2.75	0/-0.014	2.75	33	61	10	P238NVA0275	●
2.80	0/-0.014	2.8	33	61	10	P238NVA0280	●
2.90	0/-0.014	2.9	33	61	10	P238NVA0290	●
3.00	0/-0.014	3	33	61	10	P238NVA0300	●
3.10	0/-0.018	3.1	36	65	10	P238NVA0310	●
3.20	0/-0.018	3.2	36	65	10	P238NVA0320	●
3.25	0/-0.018	3.25	36	65	10	P238NVA0325	●
3.30	0/-0.018	3.3	36	65	10	P238NVA0330	●
3.40	0/-0.018	3.4	39	70	10	P238NVA0340	●
3.50	0/-0.018	3.5	39	70	10	P238NVA0350	●
3.60	0/-0.018	3.6	39	70	10	P238NVA0360	●
3.70	0/-0.018	3.7	39	70	10	P238NVA0370	●
3.75	0/-0.018	3.75	39	70	10	P238NVA0375	●
3.80	0/-0.018	3.8	43	75	10	P238NVA0380	●
3.90	0/-0.018	3.9	43	75	10	P238NVA0390	●
4.00	0/-0.018	4	43	75	10	P238NVA0400	●
4.10	0/-0.018	4.1	43	75	10	P238NVA0410	●
4.20	0/-0.018	4.2	43	75	10	P238NVA0420	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# 238NVA

NVA type for tough materials, short

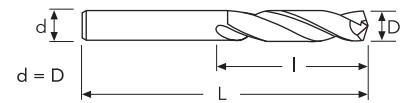


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	☆	☆	☆	☆

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
4.25	0/-0.018	4.25	43	75	10	P238NVA0425	●
4.30	0/-0.018	4.3	47	80	10	P238NVA0430	●
4.40	0/-0.018	4.4	47	80	10	P238NVA0440	●
4.50	0/-0.018	4.5	47	80	10	P238NVA0450	●
4.60	0/-0.018	4.6	47	80	10	P238NVA0460	●
4.70	0/-0.018	4.7	47	80	10	P238NVA0470	●
4.75	0/-0.018	4.75	47	80	10	P238NVA0475	●
4.80	0/-0.018	4.8	52	86	10	P238NVA0480	●
4.90	0/-0.018	4.9	52	86	10	P238NVA0490	●
5.00	0/-0.018	5	52	86	10	P238NVA0500	●
5.10	0/-0.018	5.1	52	86	10	P238NVA0510	●
5.20	0/-0.018	5.2	52	86	10	P238NVA0520	●
5.25	0/-0.018	5.25	52	86	10	P238NVA0525	●
5.30	0/-0.018	5.3	52	86	10	P238NVA0530	●
5.40	0/-0.018	5.4	57	93	10	P238NVA0540	●
5.50	0/-0.018	5.5	57	93	10	P238NVA0550	●
5.60	0/-0.018	5.6	57	93	10	P238NVA0560	●
5.70	0/-0.018	5.7	57	93	10	P238NVA0570	●
5.75	0/-0.018	5.75	57	93	10	P238NVA0575	●
5.80	0/-0.018	5.8	57	93	10	P238NVA0580	●
5.90	0/-0.018	5.9	57	93	10	P238NVA0590	●
6.00	0/-0.018	6	57	93	10	P238NVA0600	●
6.10	0/-0.022	6.1	63	101	10	P238NVA0610	●
6.20	0/-0.022	6.2	63	101	10	P238NVA0620	●
6.25	0/-0.022	6.25	63	101	10	P238NVA0625	●
6.30	0/-0.022	6.3	63	101	10	P238NVA0630	●
6.40	0/-0.022	6.4	63	101	10	P238NVA0640	●
6.50	0/-0.022	6.5	63	101	10	P238NVA0650	●
6.60	0/-0.022	6.6	63	101	5	P238NVA0660	●
6.70	0/-0.022	6.7	63	101	5	P238NVA0670	●
6.75	0/-0.022	6.75	69	109	5	P238NVA0675	●
6.80	0/-0.022	6.8	69	109	5	P238NVA0680	●
6.90	0/-0.022	6.9	69	109	5	P238NVA0690	●
7.00	0/-0.022	7	69	109	5	P238NVA0700	●
7.10	0/-0.022	7.1	69	109	5	P238NVA0710	●
7.20	0/-0.022	7.2	69	109	5	P238NVA0720	●
7.25	0/-0.022	7.25	69	109	5	P238NVA0725	●
7.30	0/-0.022	7.3	69	109	5	P238NVA0730	●
7.40	0/-0.022	7.4	69	109	5	P238NVA0740	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

# 238NVA

NVA type for tough materials, short



INFO

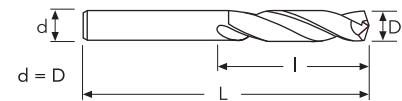


P	M	K	N	S	H
★	★	☆	☆	☆	

★ 1st choice ☆ suitable

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
7.50	0/-0.022	7.5	69	109	5	P238NVA0750	●
7.60	0/-0.022	7.6	75	117	5	P238NVA0760	●
7.70	0/-0.022	7.7	75	117	5	P238NVA0770	●
7.75	0/-0.022	7.75	75	117	5	P238NVA0775	●
7.80	0/-0.022	7.8	75	117	5	P238NVA0780	●
7.90	0/-0.022	7.9	75	117	5	P238NVA0790	●
8.00	0/-0.022	8	75	117	5	P238NVA0800	●
8.10	0/-0.022	8.1	75	117	5	P238NVA0810	●
8.20	0/-0.022	8.2	75	117	5	P238NVA0820	●
8.25	0/-0.022	8.25	75	117	5	P238NVA0825	●
8.30	0/-0.022	8.3	75	117	5	P238NVA0830	●
8.40	0/-0.022	8.4	75	117	5	P238NVA0840	●
8.50	0/-0.022	8.5	75	117	5	P238NVA0850	●
8.60	0/-0.022	8.6	81	125	5	P238NVA0860	●
8.70	0/-0.022	8.7	81	125	5	P238NVA0870	●
8.75	0/-0.022	8.75	81	125	5	P238NVA0875	●
8.80	0/-0.022	8.8	81	125	5	P238NVA0880	●
8.90	0/-0.022	8.9	81	125	5	P238NVA0890	●
9.00	0/-0.022	9	81	125	5	P238NVA0900	●
9.10	0/-0.022	9.1	81	125	5	P238NVA0910	●
9.20	0/-0.022	9.2	81	125	5	P238NVA0920	●
9.25	0/-0.022	9.25	81	125	5	P238NVA0925	●
9.30	0/-0.022	9.3	81	125	5	P238NVA0930	●
9.40	0/-0.022	9.4	81	125	5	P238NVA0940	●
9.50	0/-0.022	9.5	81	125	5	P238NVA0950	●
9.60	0/-0.022	9.6	87	133	5	P238NVA0960	●
9.70	0/-0.022	9.7	87	133	5	P238NVA0970	●
9.75	0/-0.022	9.75	87	133	5	P238NVA0975	●
9.80	0/-0.022	9.8	87	133	5	P238NVA0980	●
9.90	0/-0.022	9.9	87	133	5	P238NVA0990	●
10.00	0/-0.022	10	87	133	5	P238NVA1000	●
10.20	0/-0.027	10.2	87	133	5	P238NVA1020	●
10.50	0/-0.027	10.5	87	133	5	P238NVA1050	●
11.00	0/-0.027	11	94	142	5	P238NVA1100	●
11.50	0/-0.027	11.5	94	142	5	P238NVA1150	●
12.00	0/-0.027	12	101	151	5	P238NVA1200	●
12.50	0/-0.027	12.5	101	151	5	P238NVA1250	●
13.00	0/-0.027	13	101	151	5	P238NVA1300	●
13.50	0/-0.027	13.5	108	160	1	P238NVA1350	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion





CUTTING PARAMETERS

### 238NVA

Material Group ISO 513	P1 P2	P3 P4	P7	M1	M2 M3	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>				
Vc (m/min)	<b>25÷35</b>	<b>20÷30</b>	<b>12÷18</b>	<b>12÷18</b>	<b>8÷12</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
1	0.017	0.014	0.012	0.012	0.009	
1.5	0.035	0.030	0.025	0.025	0.018	
2	0.050	0.043	0.035	0.035	0.025	
2.5	0.060	0.051	0.042	0.042	0.030	
3	0.070	0.060	0.049	0.049	0.035	
3.5	0.080	0.068	0.056	0.056	0.040	
4	0.090	0.077	0.063	0.063	0.045	
5	0.100	0.085	0.070	0.070	0.050	
6	0.110	0.094	0.077	0.077	0.055	
7	0.120	0.102	0.084	0.084	0.060	
8	0.130	0.111	0.091	0.091	0.065	
9	0.140	0.119	0.098	0.098	0.070	
10	0.160	0.136	0.112	0.112	0.080	
11	0.170	0.145	0.119	0.119	0.085	
12	0.180	0.153	0.126	0.126	0.090	
13	0.190	0.162	0.133	0.133	0.095	
14	0.200	0.170	0.140	0.140	0.100	
15	0.210	0.179	0.147	0.147	0.105	
16	0.220	0.187	0.154	0.154	0.110	
17	0.230	0.196	0.161	0.161	0.115	
18	0.240	0.204	0.168	0.168	0.120	
19	0.250	0.213	0.175	0.175	0.125	
20	0.260	0.221	0.182	0.182	0.130	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

Material Group ISO 513	K1 K2	K3 K4	N1 N5	N2 N3 N4	S1 S2 S4	
Hardness/Rm	150÷350 HB	<350 HB			<35 HRC	
Vc (m/min)	<b>25÷35</b>	<b>20÷30</b>	<b>50÷70</b>	<b>40÷60</b>	<b>8÷12</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
1	0.019	0.013	0.024	0.017	0.007	
1.5	0.039	0.026	0.049	0.035	0.014	
2	0.055	0.038	0.070	0.050	0.020	
2.5	0.066	0.045	0.084	0.060	0.024	
3	0.077	0.053	0.098	0.070	0.028	
3.5	0.088	0.060	0.112	0.080	0.032	
4	0.099	0.068	0.126	0.090	0.036	
5	0.110	0.075	0.140	0.100	0.040	
6	0.121	0.083	0.154	0.110	0.044	
7	0.132	0.090	0.168	0.120	0.048	
8	0.143	0.098	0.182	0.130	0.052	
9	0.154	0.105	0.196	0.140	0.056	
10	0.176	0.120	0.224	0.160	0.064	
11	0.187	0.128	0.238	0.170	0.068	
12	0.198	0.135	0.252	0.180	0.072	
13	0.209	0.143	0.266	0.190	0.076	
14	0.220	0.150	0.280	0.200	0.080	
15	0.231	0.158	0.294	0.210	0.084	
16	0.242	0.165	0.308	0.220	0.088	
17	0.253	0.173	0.322	0.230	0.092	
18	0.264	0.180	0.336	0.240	0.096	
19	0.275	0.188	0.350	0.250	0.100	
20	0.286	0.195	0.364	0.260	0.104	

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# 234NVA

NVA type for tough materials, long



\* <math>\varnothing 2\text{ mm}</math> = HSS BR

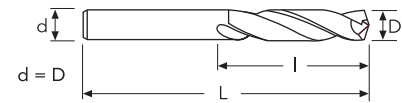


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	★	☆	☆	☆	☆

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
0.50	0/-0.014	0.5	12	32	10	P134NB0050	●
0.60	0/-0.014	0.6	15	35	10	P134NB0060	●
0.70	0/-0.014	0.7	21	42	10	P134NB0070	●
0.80	0/-0.014	0.8	25	46	10	P134NB0080	●
0.90	0/-0.014	0.9	29	51	10	P134NB0090	●
1.00	0/-0.014	1	33	56	10	P134NB0100	●
1.10	0/-0.014	1.1	37	60	10	P134NB0110	●
1.20	0/-0.014	1.2	41	65	10	P134NB0120	●
1.30	0/-0.014	1.3	41	65	10	P134NB0130	●
1.40	0/-0.014	1.4	45	70	10	P134NB0140	●
1.50	0/-0.014	1.5	45	70	10	P134NB0150	●
1.60	0/-0.014	1.6	50	76	10	P134NB0160	●
1.70	0/-0.014	1.7	50	76	10	P134NB0170	●
1.80	0/-0.014	1.8	53	80	10	P134NB0180	●
1.90	0/-0.014	1.9	53	80	10	P134NB0190	●
2.00	0/-0.014	2	56	85	10	P234NVA0200	●
2.10	0/-0.014	2.1	56	85	10	P234NVA0210	●
2.20	0/-0.014	2.2	59	90	10	P234NVA0220	●
2.30	0/-0.014	2.3	59	90	10	P234NVA0230	●
2.40	0/-0.014	2.4	62	95	10	P234NVA0240	●
2.50	0/-0.014	2.5	62	95	10	P234NVA0250	●
2.60	0/-0.014	2.6	62	95	10	P234NVA0260	●
2.70	0/-0.014	2.7	66	100	10	P234NVA0270	●
2.80	0/-0.014	2.8	66	100	10	P234NVA0280	●
2.90	0/-0.014	2.9	66	100	10	P234NVA0290	●
3.00	0/-0.014	3	66	100	10	P234NVA0300	●
3.10	0/-0.018	3.1	69	106	10	P234NVA0310	●
3.20	0/-0.018	3.2	69	106	10	P234NVA0320	●
3.30	0/-0.018	3.3	69	106	10	P234NVA0330	●
3.40	0/-0.018	3.4	73	112	10	P234NVA0340	●
3.50	0/-0.018	3.5	73	112	10	P234NVA0350	●
3.60	0/-0.018	3.6	73	112	10	P234NVA0360	●
3.70	0/-0.018	3.7	73	112	10	P234NVA0370	●
3.80	0/-0.018	3.8	78	119	10	P234NVA0380	●
3.90	0/-0.018	3.9	78	119	10	P234NVA0390	●
4.00	0/-0.018	4	78	119	10	P234NVA0400	●
4.10	0/-0.018	4.1	78	119	10	P234NVA0410	●
4.20	0/-0.018	4.2	78	119	10	P234NVA0420	●
4.30	0/-0.018	4.3	82	126	10	P234NVA0430	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

# 234NVA

NVA type for tough materials, long



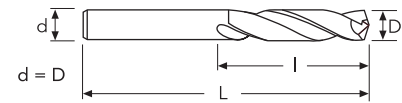
INFO

P	M	K	N	S	H
★	★	☆	☆	☆	

★ 1st choice ☆ suitable

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
4.40	0/-0.018	4.4	82	126	10	P234NVA0440	●
4.50	0/-0.018	4.5	82	126	10	P234NVA0450	●
4.60	0/-0.018	4.6	82	126	10	P234NVA0460	●
4.70	0/-0.018	4.7	82	126	10	P234NVA0470	●
4.80	0/-0.018	4.8	87	132	10	P234NVA0480	●
4.90	0/-0.018	4.9	87	132	10	P234NVA0490	●
5.00	0/-0.018	5	87	132	10	P234NVA0500	●
5.10	0/-0.018	5.1	87	132	10	P234NVA0510	●
5.20	0/-0.018	5.2	87	132	10	P234NVA0520	●
5.30	0/-0.018	5.3	87	132	10	P234NVA0530	●
5.40	0/-0.018	5.4	91	139	10	P234NVA0540	●
5.50	0/-0.018	5.5	91	139	10	P234NVA0550	●
5.60	0/-0.018	5.6	91	139	10	P234NVA0560	●
5.70	0/-0.018	5.7	91	139	10	P234NVA0570	●
5.80	0/-0.018	5.8	91	139	10	P234NVA0580	●
5.90	0/-0.018	5.9	91	139	10	P234NVA0590	●
6.00	0/-0.018	6	91	139	10	P234NVA0600	●
6.10	0/-0.022	6.1	97	148	5	P234NVA0610	●
6.20	0/-0.022	6.2	97	148	5	P234NVA0620	●
6.30	0/-0.022	6.3	97	148	5	P234NVA0630	●
6.40	0/-0.022	6.4	97	148	5	P234NVA0640	○
6.50	0/-0.022	6.5	97	148	5	P234NVA0650	●
6.60	0/-0.022	6.6	97	148	5	P234NVA0660	●
6.70	0/-0.022	6.7	97	148	5	P234NVA0670	●
6.80	0/-0.022	6.8	102	156	5	P234NVA0680	●
6.90	0/-0.022	6.9	102	156	5	P234NVA0690	●
7.00	0/-0.022	7	102	156	5	P234NVA0700	●
7.10	0/-0.022	7.1	102	156	5	P234NVA0710	●
7.20	0/-0.022	7.2	102	156	5	P234NVA0720	●
7.30	0/-0.022	7.3	102	156	5	P234NVA0730	○
7.40	0/-0.022	7.4	102	156	5	P234NVA0740	●
7.50	0/-0.022	7.5	102	156	5	P234NVA0750	●
7.60	0/-0.022	7.6	109	165	5	P234NVA0760	●
7.70	0/-0.022	7.7	109	165	5	P234NVA0770	●
7.80	0/-0.022	7.8	109	165	5	P234NVA0780	●
7.90	0/-0.022	7.9	109	165	5	P234NVA0790	●
8.00	0/-0.022	8	109	165	5	P234NVA0800	●
8.10	0/-0.022	8.1	109	165	5	P234NVA0810	●
8.20	0/-0.022	8.2	109	165	5	P234NVA0820	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



CUTTING PARAMETERS

### 234NVA

Material Group ISO 513	P1 P2	P3 P4	P7	M1	M2 M3	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>				
Vc (m/min)	<b>20÷30</b>	<b>15÷25</b>	<b>12÷16</b>	<b>12÷16</b>	<b>8÷12</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
0.5	0.008	0.007	0.006	0.006	0.004	
0.8	0.015	0.013	0.011	0.011	0.008	
1	0.020	0.017	0.014	0.014	0.010	
1.5	0.030	0.026	0.021	0.021	0.015	
2	0.040	0.034	0.028	0.028	0.020	
2.5	0.050	0.043	0.035	0.035	0.025	
3	0.060	0.051	0.042	0.042	0.030	
3.5	0.070	0.060	0.049	0.049	0.035	
4	0.080	0.068	0.056	0.056	0.040	
5	0.090	0.077	0.063	0.063	0.045	
6	0.100	0.085	0.070	0.070	0.050	
7	0.110	0.094	0.077	0.077	0.055	
8	0.120	0.102	0.084	0.084	0.060	
9	0.130	0.111	0.091	0.091	0.065	
10	0.140	0.119	0.098	0.098	0.070	
11	0.150	0.128	0.105	0.105	0.075	
12	0.160	0.136	0.112	0.112	0.080	

INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

Material Group ISO 513	K1 K2	K3 K4	N1 N5	N2 N3 N4	S1 S2 S4	
Hardness/Rm	150÷350 HB	<350 HB			<35 HRC	
Vc (m/min)	<b>20÷30</b>	<b>20÷30</b>	<b>40÷60</b>	<b>30÷50</b>	<b>8÷12</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
0.5	0.009	0.006	0.011	0.008	0.003	
0.8	0.017	0.011	0.021	0.015	0.006	
1	0.022	0.015	0.028	0.020	0.008	
1.5	0.033	0.023	0.042	0.030	0.012	
2	0.044	0.030	0.056	0.040	0.016	
2.5	0.055	0.038	0.070	0.050	0.020	
3	0.066	0.045	0.084	0.060	0.024	
3.5	0.077	0.053	0.098	0.070	0.028	
4	0.088	0.060	0.112	0.080	0.032	
5	0.099	0.068	0.126	0.090	0.036	
6	0.110	0.075	0.140	0.100	0.040	
7	0.121	0.083	0.154	0.110	0.044	
8	0.132	0.090	0.168	0.120	0.048	
9	0.143	0.098	0.182	0.130	0.052	
10	0.154	0.105	0.196	0.140	0.056	
11	0.165	0.113	0.210	0.150	0.060	
12	0.176	0.120	0.224	0.160	0.064	

INFO

# 234LS-234LSTH

LS type for deep holes, long (234LS),  
LS type for deep holes, PV15 coated, long (234LSTH)

DIN  
340

LS

HSS/CO  
OX

HSS/CO  
PV15

130°

35-40°

**234LS 234LSTH**



234LS



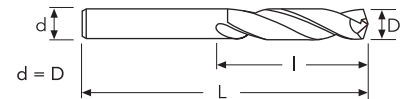
234LSTH

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	☆	★			

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	l	L	PACKAGING	234LS		234LSTH	
						EDP No.	Stock	EDP No.	Stock
2.00	0/-0.014	2	56	85	10	P234LS0200	●	P234LSTH0200	●
2.10	0/-0.014	2.1	56	85	10	P234LS0210	●	P234LSTH0210	●
2.20	0/-0.014	2.2	59	90	10	P234LS0220	●	P234LSTH0220	●
2.30	0/-0.014	2.3	59	90	10	P234LS0230	●	P234LSTH0230	●
2.40	0/-0.014	2.4	62	95	10	P234LS0240	●	P234LSTH0240	●
2.50	0/-0.014	2.5	62	95	10	P234LS0250	●	P234LSTH0250	●
2.60	0/-0.014	2.6	62	95	10	P234LS0260	●	P234LSTH0260	●
2.70	0/-0.014	2.7	66	100	10	P234LS0270	●	P234LSTH0270	●
2.80	0/-0.014	2.8	66	100	10	P234LS0280	●	P234LSTH0280	●
2.90	0/-0.014	2.9	66	100	10	P234LS0290	●	P234LSTH0290	●
3.00	0/-0.014	3	66	100	10	P234LS0300	●	P234LSTH0300	●
3.10	0/-0.018	3.1	69	106	10	P234LS0310	●	P234LSTH0310	●
3.20	0/-0.018	3.2	69	106	10	P234LS0320	●	P234LSTH0320	●
3.30	0/-0.018	3.3	69	106	10	P234LS0330	●	P234LSTH0330	●
3.40	0/-0.018	3.4	73	112	10	P234LS0340	●	P234LSTH0340	●
3.50	0/-0.018	3.5	73	112	10	P234LS0350	●	P234LSTH0350	●
3.60	0/-0.018	3.6	73	112	10	P234LS0360	●	P234LSTH0360	●
3.70	0/-0.018	3.7	73	112	10	P234LS0370	●	P234LSTH0370	●
3.80	0/-0.018	3.8	78	119	10	P234LS0380	●	P234LSTH0380	●
3.90	0/-0.018	3.9	78	119	10	P234LS0390	●	P234LSTH0390	●
4.00	0/-0.018	4	78	119	10	P234LS0400	●	P234LSTH0400	●
4.20	0/-0.018	4.2	78	119	10	P234LS0420	●	P234LSTH0420	●
4.50	0/-0.018	4.5	82	126	10	P234LS0450	●	P234LSTH0450	●
4.80	0/-0.018	4.8	87	132	10	P234LS0480	●	P234LSTH0480	●
5.00	0/-0.018	5	87	132	10	P234LS0500	●	P234LSTH0500	●
5.20	0/-0.018	5.2	87	132	10	P234LS0520	●	P234LSTH0520	●
5.50	0/-0.018	5.5	91	139	10	P234LS0550	●	P234LSTH0550	●
5.80	0/-0.018	5.8	91	139	10	P234LS0580	●	P234LSTH0580	●
6.00	0/-0.018	6	91	139	10	P234LS0600	●	P234LSTH0600	●
6.20	0/-0.022	6.2	97	148	5	P234LS0620	●	P234LSTH0620	●
6.50	0/-0.022	6.5	97	148	5	P234LS0650	●	P234LSTH0650	●
6.80	0/-0.022	6.8	102	156	5	P234LS0680	●	P234LSTH0680	●
7.00	0/-0.022	7	102	156	5	P234LS0700	●	P234LSTH0700	●
7.20	0/-0.022	7.2	102	156	5	P234LS0720	●		
7.50	0/-0.022	7.5	102	156	5	P234LS0750	●	P234LSTH0750	●
7.80	0/-0.022	7.8	109	165	5	P234LS0780	●		
8.00	0/-0.022	8	109	165	5	P234LS0800	●	P234LSTH0800	●
8.20	0/-0.022	8.2	109	165	5	P234LS0820	●		
8.50	0/-0.022	8.5	109	165	5	P234LS0850	●	P234LSTH0850	●

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



INFO

## 234LS

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>			150÷350 HB	
Vc (m/min)	<b>20÷30</b>	<b>15÷25</b>	<b>10÷14</b>	<b>10÷14</b>	<b>20÷30</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
2	0.040	0.034	0.028	0.028	0.044	
2.5	0.050	0.043	0.035	0.035	0.055	
3	0.060	0.051	0.042	0.042	0.066	
3.5	0.070	0.060	0.049	0.049	0.077	
4	0.080	0.068	0.056	0.056	0.088	
5	0.090	0.077	0.063	0.063	0.099	
6	0.100	0.085	0.070	0.070	0.110	
7	0.110	0.094	0.077	0.077	0.121	
8	0.120	0.102	0.084	0.084	0.132	
9	0.130	0.111	0.091	0.091	0.143	
10	0.140	0.119	0.098	0.098	0.154	
11	0.150	0.128	0.105	0.105	0.165	
12	0.160	0.136	0.112	0.112	0.176	
13	0.170	0.145	0.119	0.119	0.187	

## 234LSTH

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>			150÷350 HB	
Vc (m/min)	<b>25÷35</b>	<b>20÷30</b>	<b>16÷20</b>	<b>16÷20</b>	<b>25÷35</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
2	0.040	0.034	0.028	0.028	0.044	
2.5	0.050	0.043	0.035	0.035	0.055	
3	0.060	0.051	0.042	0.042	0.066	
3.5	0.070	0.060	0.049	0.049	0.077	
4	0.080	0.068	0.056	0.056	0.088	
5	0.090	0.077	0.063	0.063	0.099	
6	0.100	0.085	0.070	0.070	0.110	
7	0.110	0.094	0.077	0.077	0.121	
8	0.120	0.102	0.084	0.084	0.132	
9	0.130	0.111	0.091	0.091	0.143	
10	0.140	0.119	0.098	0.098	0.154	
11	0.150	0.128	0.105	0.105	0.165	
12	0.160	0.136	0.112	0.112	0.176	
13	0.170	0.145	0.119	0.119	0.187	

HSS  
END-MILLS

CARBIDE  
BURRS



# 2691LS-2691LSTH

LS type for deep holes. extra-long/1 (2691LS);  
 LS type for deep holes. PV15 coated. extra-long/1 (2691LSTH)

DIN 1869/1	LS	HSS/Co BR	HSS/CO PV15	130°	35-40°
		2691LS	2691LSTH		

INFO



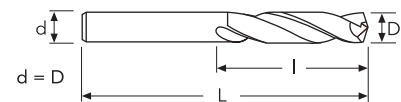
2691LS



2691LSTH

P	M	K	N	S	H
★	☆	★			

★ 1st choice ☆ suitable



CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D(h8)	D Tol.	d	l	L	PACKAGING	2691LS		2691LSTH	
						EDP No.	Stock	EDP No.	Stock
2.00	0/-0.014	2	85	125	10	P2691LS0200	●	P2691LSTH0200	●
2.50	0/-0.014	2.5	95	140	10	P2691LS0250	●	P2691LSTH0250	●
3.00	0/-0.014	3	100	150	10	P2691LS0300	●	P2691LSTH0300	●
3.50	0/-0.018	3.5	115	165	10	P2691LS0350	●	P2691LSTH0350	●
4.00	0/-0.018	4	120	175	10	P2691LS0400	●	P2691LSTH0400	●
4.50	0/-0.018	4.5	125	185	10	P2691LS0450	●	P2691LSTH0450	●
5.00	0/-0.018	5	135	195	10	P2691LS0500	●	P2691LSTH0500	●
5.50	0/-0.018	5.5	140	205	10	P2691LS0550	●	P2691LSTH0550	●
6.00	0/-0.018	6	140	205	10	P2691LS0600	●	P2691LSTH0600	●
6.50	0/-0.022	6.5	150	215	5	P2691LS0650	●	P2691LSTH0650	●
6.75	0/-0.022	6.75	155	225	5	P2691LS0675	●		
7.00	0/-0.022	7	155	225	5	P2691LS0700	●	P2691LSTH0700	●
7.50	0/-0.022	7.5	155	225	5	P2691LS0750	●	P2691LSTH0750	●
8.00	0/-0.022	8	165	240	5	P2691LS0800	●	P2691LSTH0800	●
8.50	0/-0.022	8.5	165	240	5	P2691LS0850	●	P2691LSTH0850	●
9.00	0/-0.022	9	175	250	5	P2691LS0900	●	P2691LSTH0900	●
9.50	0/-0.022	9.5	175	250	5	P2691LS0950	●	P2691LSTH0950	●
10.00	0/-0.022	10	185	265	5	P2691LS1000	●	P2691LSTH1000	●
10.50	0/-0.027	10.5	185	265	5	P2691LS1050	●	P2691LSTH1050	●
11.00	0/-0.027	11	195	280	5	P2691LS1100	●	P2691LSTH1100	●
11.50	0/-0.027	11.5	195	280	5	P2691LS1150	●	P2691LSTH1150	●
12.00	0/-0.027	12	205	295	5	P2691LS1200	●	P2691LSTH1200	●
12.50	0/-0.027	12.5	205	295	5	P2691LS1250	●	P2691LSTH1250	●
13.00	0/-0.027	13	205	295	5	P2691LS1300	●	P2691LSTH1300	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

## 2691LS

	Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
	Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>			150÷350 HB	
Vc (m/min)	<b>20÷24</b>	<b>16÷20</b>	<b>8÷12</b>	<b>8÷12</b>	<b>20÷24</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
2	0.032	0.027	0.022	0.022	0.035		
2.5	0.040	0.034	0.028	0.028	0.044		
3	0.048	0.041	0.034	0.034	0.053		
3.5	0.056	0.048	0.039	0.039	0.062		
4	0.064	0.054	0.045	0.045	0.070		
5	0.072	0.061	0.050	0.050	0.079		
6	0.080	0.068	0.056	0.056	0.088		
7	0.088	0.075	0.062	0.062	0.097		
8	0.096	0.082	0.067	0.067	0.106		
9	0.104	0.088	0.073	0.073	0.114		
10	0.112	0.095	0.078	0.078	0.123		
11	0.120	0.102	0.084	0.084	0.132		
12	0.128	0.109	0.090	0.090	0.141		
13	0.136	0.116	0.095	0.095	0.150		

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

## 2691LSTH

	Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
	Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>			150÷350 HB	
Vc (m/min)	<b>24÷28</b>	<b>20÷24</b>	<b>10÷14</b>	<b>10÷14</b>	<b>24÷28</b>		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
2	0.032	0.027	0.022	0.022	0.035		
2.5	0.040	0.034	0.028	0.028	0.044		
3	0.048	0.041	0.034	0.034	0.053		
3.5	0.056	0.048	0.039	0.039	0.062		
4	0.064	0.054	0.045	0.045	0.070		
5	0.072	0.061	0.050	0.050	0.079		
6	0.080	0.068	0.056	0.056	0.088		
7	0.088	0.075	0.062	0.062	0.097		
8	0.096	0.082	0.067	0.067	0.106		
9	0.104	0.088	0.073	0.073	0.114		
10	0.112	0.095	0.078	0.078	0.123		
11	0.120	0.102	0.084	0.084	0.132		
12	0.128	0.109	0.090	0.090	0.141		
13	0.136	0.116	0.095	0.095	0.150		

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

# 1692LS

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

Material Group ISO 513	P1 P2	P3 P4	K1 K2			
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	150÷350 HB			
Vc (m/min)	<b>20÷24</b>	<b>16÷20</b>	<b>20÷24</b>			
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
<b>3.5</b>	0.045	0.038	0.050			
<b>4</b>	0.053	0.045	0.058			
<b>5</b>	0.060	0.051	0.066			
<b>6</b>	0.068	0.057	0.074			
<b>7</b>	0.075	0.064	0.083			
<b>8</b>	0.083	0.070	0.091			
<b>9</b>	0.090	0.077	0.099			
<b>10</b>	0.098	0.083	0.107			
<b>11</b>	0.105	0.089	0.116			
<b>12</b>	0.113	0.096	0.124			
<b>13</b>	0.120	0.102	0.132			

HSS  
DRILLS

LFTA  
SUTA  
**HSS-HSS/CO**

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# 1693LS

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

	Material Group ISO 513	P1 P2	P3 P4	K1 K2			
	Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	150÷350 HB			
Vc (m/min)	<b>15÷25</b>	<b>10÷20</b>	<b>15÷25</b>				
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)				
<b>3.5</b>	0.045	0.038	0.050				
<b>4</b>	0.053	0.045	0.058				
<b>5</b>	0.060	0.051	0.066				
<b>6</b>	0.068	0.057	0.074				
<b>7</b>	0.075	0.064	0.083				
<b>8</b>	0.083	0.070	0.091				
<b>9</b>	0.090	0.077	0.099				
<b>10</b>	0.098	0.083	0.107				
<b>11</b>	0.105	0.089	0.116				
<b>12</b>	0.113	0.096	0.124				
<b>13</b>	0.120	0.102	0.132				

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO**

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# 145N-145NTI

N type for general purpose. MT shank. short (145N).

N type for general purpose. MT shank. TiN coated. short (145NTI)

DIN  
345

N

HSS  
OX

HSS  
TIN

118°

25-30°

**145N    145NTI**

INFO



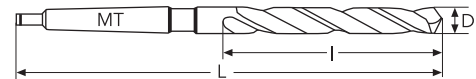
**145N**



**145NTI**

P	M	K	N	S	H
★		☆	☆		

★ 1st choice    ☆ suitable



CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D(h8)	D Tol.	MT	I	L	PACKAGING	145N		145NTI	
						EDP No.	Stock	EDP No.	Stock
5.00	0/-0.018	1	52	133	1	P145N0500	●		
5.25	0/-0.018	1	52	133	1	P145N0525	○		
5.50	0/-0.018	1	57	138	1	P145N0550	●		
5.75	0/-0.018	1	57	138	1	P145N0575	○		
6.00	0/-0.018	1	57	138	1	P145N0600	●		
6.25	0/-0.022	1	63	144	1	P145N0625	○		
6.50	0/-0.022	1	63	144	1	P145N0650	●		
6.75	0/-0.022	1	69	150	1	P145N0675	●		
7.00	0/-0.022	1	69	150	1	P145N0700	●		
7.25	0/-0.022	1	69	150	1	P145N0725	○		
7.50	0/-0.022	1	69	150	1	P145N0750	●		
7.75	0/-0.022	1	75	156	1	P145N0775	○		
8.00	0/-0.022	1	75	156	1	P145N0800	●		
8.25	0/-0.022	1	75	156	1	P145N0825	○		
8.50	0/-0.022	1	75	156	1	P145N0850	●		
8.75	0/-0.022	1	81	162	1	P145N0875	○		
9.00	0/-0.022	1	81	162	1	P145N0900	●		
9.25	0/-0.022	1	81	162	1	P145N0925	○		
9.50	0/-0.022	1	81	162	1	P145N0950	●		
9.75	0/-0.022	1	87	168	1	P145N0975	○		
10.00	0/-0.022	1	87	168	1	P145N1000	●		
10.25	0/-0.027	1	87	168	1	P145N1025	●		
10.50	0/-0.027	1	87	168	1	P145N1050	●		
10.75	0/-0.027	1	94	175	1	P145N1075	○		
11.00	0/-0.027	1	94	175	1	P145N1100	●		
11.25	0/-0.027	1	94	175	1	P145N1125	○		
11.50	0/-0.027	1	94	175	1	P145N1150	●		
11.75	0/-0.027	1	94	175	1	P145N1175	○		
12.00	0/-0.027	1	101	182	1	P145N1200	●		
12.25	0/-0.027	1	101	182	1	P145N1225	○		
12.50	0/-0.027	1	101	182	1	P145N1250	●		
12.75	0/-0.027	1	101	182	1	P145N1275	○		
13.00	0/-0.027	1	101	182	1	P145N1300	●	P145NTI1300	●
13.25	0/-0.027	1	108	189	1	P145N1325	●		
13.50	0/-0.027	1	108	189	1	P145N1350	●	P145NTI1350	●
13.75	0/-0.027	1	108	189	1	P145N1375	●		
14.00	0/-0.027	1	108	189	1	P145N1400	●	P145NTI1400	●
14.25	0/-0.027	2	114	212	1	P145N1425	●		
14.50	0/-0.027	2	114	212	1	P145N1450	●	P145NTI1450	●

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO**

CARBIDE  
END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard    ○ non-standard stock    ▽ stock exhaustion

INFO

# 145N-145NTI

N type for general purpose. MT shank. short (145N).

N type for general purpose. MT shank. TiN coated. short (145NTI)

DIN  
345

N

HSS  
OX

HSS  
TiN

118°

25-30°

**145N    145NTI**



145N



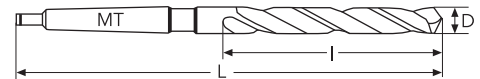
145NTI

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★		☆	☆		

★ 1st choice ☆ suitable



						145N		145NTI	
D(h8)	D Tol.	MT	I	L	PACKAGING	EDP No.	Stock	EDP No.	Stock
14.75	0/-0.027	2	114	212	1	P145N1475	●		
15.00	0/-0.027	2	114	212	1	P145N1500	●	P145NTI1500	●
15.25	0/-0.027	2	120	218	1	P145N1525	●		
15.50	0/-0.027	2	120	218	1	P145N1550	●	P145NTI1550	●
15.75	0/-0.027	2	120	218	1	P145N1575	●		
16.00	0/-0.027	2	120	218	1	P145N1600	●	P145NTI1600	●
16.25	0/-0.027	2	125	223	1	P145N1625	●		
16.50	0/-0.027	2	125	223	1	P145N1650	●	P145NTI1650	●
16.75	0/-0.027	2	125	223	1	P145N1675	●		
17.00	0/-0.027	2	125	223	1	P145N1700	●	P145NTI1700	●
17.25	0/-0.027	2	130	228	1	P145N1725	●		
17.50	0/-0.027	2	130	228	1	P145N1750	●	P145NTI1750	●
17.75	0/-0.027	2	130	228	1	P145N1775	●		
18.00	0/-0.027	2	130	228	1	P145N1800	●	P145NTI1800	●
18.25	0/-0.033	2	135	233	1	P145N1825	●		
18.50	0/-0.033	2	135	233	1	P145N1850	●	P145NTI1850	●
18.75	0/-0.033	2	135	233	1	P145N1875	●		
19.00	0/-0.033	2	135	233	1	P145N1900	●	P145NTI1900	●
19.25	0/-0.033	2	140	238	1	P145N1925	●		
19.50	0/-0.033	2	140	238	1	P145N1950	●	P145NTI1950	●
19.75	0/-0.033	2	140	238	1	P145N1975	●		
20.00	0/-0.033	2	140	238	1	P145N2000	●	P145NTI2000	●
20.25	0/-0.033	2	145	243	1	P145N2025	●		
20.50	0/-0.033	2	145	243	1	P145N2050	●	P145NTI2050	●
20.75	0/-0.033	2	145	243	1	P145N2075	●		
21.00	0/-0.033	2	145	243	1	P145N2100	●	P145NTI2100	●
21.25	0/-0.033	2	150	248	1	P145N2125	●		
21.50	0/-0.033	2	150	248	1	P145N2150	●	P145NTI2150	●
21.75	0/-0.033	2	150	248	1	P145N2175	●		
22.00	0/-0.033	2	150	248	1	P145N2200	●	P145NTI2200	●
22.25	0/-0.033	2	150	248	1	P145N2225	●		
22.50	0/-0.033	2	155	253	1	P145N2250	●	P145NTI2250	●
22.75	0/-0.033	2	155	253	1	P145N2275	●		
23.00	0/-0.033	2	155	253	1	P145N2300	●	P145NTI2300	●
23.25	0/-0.033	3	155	276	1	P145N2325	●		
23.50	0/-0.033	3	155	276	1	P145N2350	●	P145NTI2350	●
23.75	0/-0.033	3	160	281	1	P145N2375	●		
24.00	0/-0.033	3	160	281	1	P145N2400	●	P145NTI2400	●
24.25	0/-0.033	3	160	281	1	P145N2425	●		

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard    ○ non-standard stock    ▽ stock exhaustion



# 145N-145NTI

N type for general purpose. MT shank. short (145N).

N type for general purpose. MT shank. TiN coated. short (145NTI)

DIN  
345

N

HSS  
OX

HSS  
TIN

118°

25-30°

**145N    145NTI**

INFO



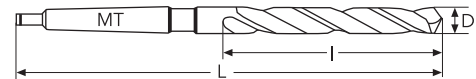
145N



145NTI

P	M	K	N	S	H
★		☆	☆		

★ 1st choice ☆ suitable



D(h8)	D Tol.	MT	I	L	PACKAGING	145N		145NTI	
						EDP No.	Stock	EDP No.	Stock
24.50	0/-0.033	3	160	281	1	P145N2450	●	P145NTI2450	●
24.75	0/-0.033	3	160	281	1	P145N2475	●		
25.00	0/-0.033	3	160	281	1	P145N2500	●	P145NTI2500	●
25.25	0/-0.033	3	165	286	1	P145N2525	○		
25.50	0/-0.033	3	165	286	1	P145N2550	●		
25.75	0/-0.033	3	165	286	1	P145N2575	○		
26.00	0/-0.033	3	165	286	1	P145N2600	●	P145NTI2600	●
26.25	0/-0.033	3	165	286	1	P145N2625	○		
26.50	0/-0.033	3	165	286	1	P145N2650	●		
26.75	0/-0.033	3	170	291	1	P145N2675	○		
27.00	0/-0.033	3	170	291	1	P145N2700	●	P145NTI2700	●
27.25	0/-0.033	3	170	291	1	P145N2725	○		
27.50	0/-0.033	3	170	291	1	P145N2750	●		
27.75	0/-0.033	3	170	291	1	P145N2775	○		
28.00	0/-0.033	3	170	291	1	P145N2800	●	P145NTI2800	●
28.25	0/-0.033	3	175	296	1	P145N2825	○		
28.50	0/-0.033	3	175	296	1	P145N2850	●		
28.75	0/-0.033	3	175	296	1	P145N2875	○		
29.00	0/-0.033	3	175	296	1	P145N2900	●	P145NTI2900	●
29.25	0/-0.033	3	175	296	1	P145N2925	○		
29.50	0/-0.033	3	175	296	1	P145N2950	●		
29.75	0/-0.033	3	175	296	1	P145N2975	○		
30.00	0/-0.033	3	175	296	1	P145N3000	●	P145NTI3000	●
30.25	0/-0.039	3	180	301	1	P145N3025	○		
30.50	0/-0.039	3	180	301	1	P145N3050	●		
30.75	0/-0.039	3	180	301	1	P145N3075	○		
31.00	0/-0.039	3	180	301	1	P145N3100	●		
31.25	0/-0.039	3	180	301	1	P145N3125	○		
31.50	0/-0.039	3	180	301	1	P145N3150	●		
31.75	0/-0.039	3	185	306	1	P145N3175	○		
32.00	0/-0.039	4	185	334	1	P145N3200	●		
32.50	0/-0.039	4	185	334	1	P145N3250	●		
33.00	0/-0.039	4	185	334	1	P145N3300	●		
33.50	0/-0.039	4	185	334	1	P145N3350	●		
34.00	0/-0.039	4	190	339	1	P145N3400	●		
34.50	0/-0.039	4	190	339	1	P145N3450	●		
35.00	0/-0.039	4	190	339	1	P145N3500	●		
35.50	0/-0.039	4	190	339	1	P145N3550	●		
36.00	0/-0.039	4	195	344	1	P145N3600	●		

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard    ○ non-standard stock    ▽ stock exhaustion



CUTTING PARAMETERS

INFO

### 145N

Material Group ISO 513	P1 P2	P3 P4	K1 K2	N1 N5	N2 N3 N4	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	150÷350 HB			
Vc (m/min)	<b>25÷35</b>	<b>20÷30</b>	<b>25÷35</b>	<b>50÷70</b>	<b>40÷60</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
5	0.100	0.085	0.110	0.140	0.100	
6	0.120	0.102	0.132	0.168	0.120	
7	0.140	0.119	0.154	0.196	0.140	
8	0.160	0.136	0.176	0.224	0.160	
9	0.180	0.153	0.198	0.252	0.180	
10	0.200	0.170	0.220	0.280	0.200	
11	0.208	0.177	0.229	0.291	0.208	
12	0.216	0.184	0.238	0.302	0.216	
13	0.224	0.190	0.246	0.314	0.224	
14	0.232	0.197	0.255	0.325	0.232	
15	0.240	0.204	0.264	0.336	0.240	
16	0.250	0.213	0.275	0.350	0.250	
17	0.265	0.225	0.292	0.371	0.265	
18	0.280	0.238	0.308	0.392	0.280	
19	0.295	0.251	0.325	0.413	0.295	
20	0.315	0.268	0.347	0.441	0.315	
22	0.330	0.281	0.363	0.462	0.330	
25	0.350	0.298	0.385	0.490	0.350	
27	0.370	0.315	0.407	0.518	0.370	
30	0.400	0.340	0.440	0.560	0.400	
35	0.450	0.383	0.495	0.630	0.450	
40	0.500	0.425	0.550	0.700	0.500	
45	0.560	0.476	0.616	0.784	0.560	
50	0.630	0.536	0.693	0.882	0.630	
55	0.700	0.595	0.770	0.980	0.700	
60	0.800	0.680	0.880	1.120	0.800	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

### 145NTI

Material Group ISO 513	P1 P2	P3 P4	K1 K2	N1 N5	N2 N3 N4	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	150÷350 HB			
Vc (m/min)	<b>30÷40</b>	<b>25÷35</b>	<b>30÷40</b>	<b>60÷80</b>	<b>50÷70</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
13	0.224	0.190	0.246	0.314	0.224	
14	0.232	0.197	0.255	0.325	0.232	
15	0.240	0.204	0.264	0.336	0.240	
16	0.250	0.213	0.275	0.350	0.250	
17	0.265	0.225	0.292	0.371	0.265	
18	0.280	0.238	0.308	0.392	0.280	
19	0.295	0.251	0.325	0.413	0.295	
20	0.315	0.268	0.347	0.441	0.315	
22	0.330	0.281	0.363	0.462	0.330	
25	0.350	0.298	0.385	0.490	0.350	
27	0.370	0.315	0.407	0.518	0.370	
30	0.400	0.340	0.440	0.560	0.400	

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

245N

Material Group ISO 513	P1 P2	P3 P4	P7	M1	M2 M3	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>				
Vc (m/min)	<b>25÷35</b>	<b>20÷30</b>	<b>12÷18</b>	<b>12÷18</b>	<b>8÷12</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
13	0.224	0.190	0.157	0.157	0.112	
14	0.232	0.197	0.162	0.162	0.116	
15	0.240	0.204	0.168	0.168	0.120	
16	0.250	0.213	0.175	0.175	0.125	
17	0.265	0.225	0.186	0.186	0.133	
18	0.280	0.238	0.196	0.196	0.140	
19	0.295	0.251	0.207	0.207	0.148	
20	0.315	0.268	0.221	0.221	0.158	
22	0.330	0.281	0.231	0.231	0.165	
25	0.350	0.298	0.245	0.245	0.175	
27	0.370	0.315	0.259	0.259	0.185	
30	0.400	0.340	0.280	0.280	0.200	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

Material Group ISO 513	K1 K2	K3 K4	N1 N5	N2 N3 N4	S1 S2 S4	
Hardness/Rm	150÷350 HB	<350 HB			<35 HRC	
Vc (m/min)	<b>25÷35</b>	<b>20÷30</b>	<b>50÷70</b>	<b>40÷60</b>	<b>8÷12</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
13	0.246	0.168	0.314	0.224	0.090	
14	0.255	0.174	0.325	0.232	0.093	
15	0.264	0.180	0.336	0.240	0.096	
16	0.275	0.188	0.350	0.250	0.100	
17	0.292	0.199	0.371	0.265	0.106	
18	0.308	0.210	0.392	0.280	0.112	
19	0.325	0.221	0.413	0.295	0.118	
20	0.347	0.236	0.441	0.315	0.126	
22	0.363	0.248	0.462	0.330	0.132	
25	0.385	0.263	0.490	0.350	0.140	
27	0.407	0.278	0.518	0.370	0.148	
30	0.440	0.300	0.560	0.400	0.160	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



## CUTTING PARAMETERS

## 241LS

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>			150÷350 HB	
Vc (m/min)	<b>15÷25</b>	<b>10÷20</b>	<b>10÷14</b>	<b>10÷14</b>	<b>20÷30</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
<b>13</b>	0.160	0.136	0.112	0.112	0.176	
<b>14</b>	0.170	0.145	0.119	0.119	0.187	
<b>15</b>	0.180	0.153	0.126	0.126	0.198	
<b>16</b>	0.200	0.170	0.140	0.140	0.220	
<b>17</b>	0.190	0.162	0.133	0.133	0.209	
<b>18</b>	0.205	0.174	0.144	0.144	0.226	
<b>19</b>	0.220	0.187	0.154	0.154	0.242	
<b>20</b>	0.235	0.200	0.165	0.165	0.259	
<b>21</b>	0.250	0.213	0.175	0.175	0.275	
<b>22</b>	0.265	0.225	0.186	0.186	0.292	
<b>23</b>	0.280	0.238	0.196	0.196	0.308	
<b>24</b>	0.295	0.251	0.207	0.207	0.325	
<b>25</b>	0.310	0.264	0.217	0.217	0.341	
<b>26</b>	0.325	0.276	0.228	0.228	0.358	
<b>27</b>	0.340	0.289	0.238	0.238	0.374	
<b>28</b>	0.355	0.302	0.249	0.249	0.391	
<b>29</b>	0.370	0.315	0.259	0.259	0.407	
<b>30</b>	0.385	0.327	0.270	0.270	0.424	

INFO

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
**HSS-HSS/CO**
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS





## CUTTING PARAMETERS

## 2701LS

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>			150÷350 HB	
Vc (m/min)	<b>20÷24</b>	<b>16÷20</b>	<b>8÷12</b>	<b>8÷12</b>	<b>20÷24</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
13	0.140	0.119	0.098	0.098	0.154	
14	0.150	0.128	0.105	0.105	0.165	
15	0.160	0.136	0.112	0.112	0.176	
16	0.180	0.153	0.126	0.126	0.198	
17	0.190	0.162	0.133	0.133	0.209	
18	0.200	0.170	0.140	0.140	0.220	
19	0.210	0.179	0.147	0.147	0.231	
20	0.220	0.187	0.154	0.154	0.242	
21	0.220	0.187	0.154	0.154	0.242	
22	0.230	0.196	0.161	0.161	0.253	
23	0.250	0.213	0.175	0.175	0.275	
24	0.260	0.221	0.182	0.182	0.286	
25	0.280	0.238	0.196	0.196	0.308	
26	0.290	0.247	0.203	0.203	0.319	
27	0.300	0.255	0.210	0.210	0.330	
28	0.310	0.264	0.217	0.217	0.341	
29	0.325	0.276	0.228	0.228	0.358	
30	0.340	0.289	0.238	0.238	0.374	

INFO

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
**HSS-HSS/CO**
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS



## CUTTING PARAMETERS

## 2702LS

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
Hardness/Rm	500÷700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	<700 N/mm <sup>2</sup>	<750 N/mm <sup>2</sup>	150÷350 HB	
Vc (m/min)	<b>20÷24</b>	<b>16÷20</b>	<b>8÷12</b>	<b>8÷12</b>	<b>20÷24</b>	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
13	0.130	0.111	0.091	0.091	0.143	
14	0.140	0.119	0.098	0.098	0.154	
15	0.150	0.128	0.105	0.105	0.165	
16	0.160	0.136	0.112	0.112	0.176	
17	0.170	0.145	0.119	0.119	0.187	
18	0.180	0.153	0.126	0.126	0.198	
19	0.190	0.162	0.133	0.133	0.209	
20	0.200	0.170	0.140	0.140	0.220	
21	0.210	0.179	0.147	0.147	0.231	
22	0.220	0.187	0.154	0.154	0.242	
23	0.230	0.196	0.161	0.161	0.253	
24	0.240	0.204	0.168	0.168	0.264	
25	0.250	0.213	0.175	0.175	0.275	
26	0.270	0.230	0.189	0.189	0.297	
27	0.280	0.238	0.196	0.196	0.308	
28	0.290	0.247	0.203	0.203	0.319	
29	0.300	0.255	0.210	0.210	0.330	
30	0.310	0.264	0.217	0.217	0.341	

INFO

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
**HSS-HSS/CO**
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS



## CARBIDE END MILLS

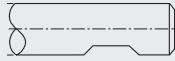


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ALU .	477
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🇮🇹 Legenda 🇩🇪 Verzeichnis 🇫🇷 Légende 🇪🇸 Leyenda 🇷🇺 Условные обозначения

STOCK		
●	<ul style="list-style-type: none"> <li>🇮🇹 stock standard</li> <li>🇩🇪 stock standard</li> <li>🇩🇪 Standard Lager</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 stock standard</li> <li>🇪🇸 stock estándar</li> <li>🇷🇺 складская позиция</li> </ul>
○	<ul style="list-style-type: none"> <li>🇮🇹 non-standard stock</li> <li>🇩🇪 stock non standard</li> <li>🇩🇪 nicht Standard Lager</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 stock non standard</li> <li>🇪🇸 stock no estándar</li> <li>🇷🇺 не складская позиция</li> </ul>
▽	<ul style="list-style-type: none"> <li>🇮🇹 stock exhaustion</li> <li>🇩🇪 esaurimento stock</li> <li>🇩🇪 Vorraterschöpfung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 épuisement du stock</li> <li>🇪🇸 agotamiento de stock</li> <li>🇷🇺 складские остатки</li> </ul>










🇮🇹 APPLICATION GUIDELINES 🇩🇪 INDICAZIONI PER L'APPLICAZIONE 🇩🇪 LEITFADEN ZUR ANWENDUNG 🇫🇷 INDICATIONS POUR L'APPLICATION 🇪🇸 INDICACIONES PARA SU APLICACIÓN 🇷🇺 УКАЗАНИЯ ПО ПРИМЕНЕНИЮ		
★	<ul style="list-style-type: none"> <li>🇮🇹 1st choice</li> <li>🇩🇪 1a scelta</li> <li>🇩🇪 1. Wahl</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 1er choix</li> <li>🇪🇸 1ª elección</li> <li>🇷🇺 1-й выбор</li> </ul>
☆	<ul style="list-style-type: none"> <li>🇮🇹 suitable</li> <li>🇩🇪 adatto</li> <li>🇩🇪 geeignet</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 adapté</li> <li>🇪🇸 adecuado</li> <li>🇷🇺 пригоден</li> </ul>

🇮🇹 SHANK 🇩🇪 ATTACCO 🇩🇪 SCHAFT 🇫🇷 QUEUE 🇪🇸 MANGO 🇷🇺 ХВОСТОВИК		
	<ul style="list-style-type: none"> <li>🇮🇹 cylindrical shank</li> <li>🇩🇪 attacco cilindrico</li> <li>🇩🇪 zylindrischer Schaft</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 queue cylindrique</li> <li>🇪🇸 mango cilíndrico</li> <li>🇷🇺 цилиндрическое крепление</li> </ul>
	Weldon	

🇮🇹 MILLING STRATEGY 🇩🇪 STRATEGIA DI FRESATURA 🇩🇪 FRÄSSTRATEGIE 🇫🇷 STRATÉGIES DE FRAISAGE 🇪🇸 ESTRATEGIA DE FRESADO 🇷🇺 СТРАТЕГИЯ ФРЕЗЕРОВАНИЯ		
	<ul style="list-style-type: none"> <li>🇮🇹 slotting</li> <li>🇩🇪 fresatura di cave</li> <li>🇩🇪 Nutfräsen</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 rainurage</li> <li>🇪🇸 ranurado</li> <li>🇷🇺 фрезерование канавок</li> </ul>
	<ul style="list-style-type: none"> <li>🇮🇹 side milling</li> <li>🇩🇪 contornatura</li> <li>🇩🇪 Konturfräsen</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 contournage</li> <li>🇪🇸 perfiladura</li> <li>🇷🇺 фрезерование по контуру</li> </ul>
	<ul style="list-style-type: none"> <li>🇮🇹 3D machining</li> <li>🇩🇪 fresatura 3D</li> <li>🇩🇪 3D-Bearbeitung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 fraisage 3D</li> <li>🇪🇸 fresado 3D</li> <li>🇷🇺 3D фрезерование</li> </ul>
	<ul style="list-style-type: none"> <li>🇮🇹 square rib</li> <li>🇩🇪 nervatura piana</li> <li>🇩🇪 Flachrippen</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 rainurage</li> <li>🇪🇸 nervio plano</li> <li>🇷🇺 прямоугольное оребрение</li> </ul>
	<ul style="list-style-type: none"> <li>🇮🇹 copying</li> <li>🇩🇪 copiatura</li> <li>🇩🇪 Kopieren</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 copiage</li> <li>🇪🇸 copia</li> <li>🇷🇺 копирование</li> </ul>
	<ul style="list-style-type: none"> <li>🇮🇹 round rib</li> <li>🇩🇪 nervatura raggiata</li> <li>🇩🇪 Rundrippen</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 rainurage rayonné</li> <li>🇪🇸 nervio radiado</li> <li>🇷🇺 радиальное оребрение</li> </ul>

🇮🇹 Legenda 🇩🇪 Verzeichnis 🇫🇷 Légende 🇪🇸 Leyenda 🇷🇺 Условные обозначения

🇩🇪 MILLING STRATEGY 🇮🇹 STRATEGIA DI FRESATURA 🇩🇪 FRÄSSTRATEGIE 🇫🇷 STRATÉGIES DE FRAISAGE 🇪🇸 ESTRATEGIA DE FRESADO 🇷🇺 СТРАТЕГИЯ ФРЕЗЕРОВАНИЯ		
	<ul style="list-style-type: none"> <li>🇩🇪 helical</li> <li>🇮🇹 interpolazione elicoidale</li> <li>🇩🇪 Helixinterpolation</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 interpolation hélicoïdale</li> <li>🇪🇸 interpolación helicoidal</li> <li>🇷🇺 винтовая интерполяция</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 ramping</li> <li>🇮🇹 entrata in rampa</li> <li>🇩🇪 Rampen</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 entrée en ramping</li> <li>🇪🇸 entrada en rampa</li> <li>🇷🇺 фрезерование под углом</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 vertical</li> <li>🇮🇹 fresatura assiale</li> <li>🇩🇪 Vertikalfräsen</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 fraisage axial</li> <li>🇪🇸 fresado axial</li> <li>🇷🇺 осевое фрезерование</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 drilling</li> <li>🇮🇹 foratura</li> <li>🇩🇪 Bohren</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 perçage</li> <li>🇪🇸 taladro</li> <li>🇷🇺 сверление</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 trochoidal</li> <li>🇮🇹 fresatura trocoidale</li> <li>🇩🇪 trochoidales Fräsen</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 fraisage trochoïdal</li> <li>🇪🇸 fresado trocoidal</li> <li>🇷🇺 трохоидальное фрезерование</li> </ul>

🇩🇪 APPLICATION RANGE 🇮🇹 GAMMA DI APPLICAZIONE 🇩🇪 ANWENDUNGSBEREICH 🇫🇷 GAMME D'APPLICATION 🇪🇸 RANGO DE APLICACIÓN 🇷🇺 ОБЛАСТЬ ПРИМЕНЕНИЯ		
	<ul style="list-style-type: none"> <li>🇩🇪 general purpose</li> <li>🇮🇹 uso generico</li> <li>🇩🇪 allgemeine Anwendung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 applications génériques</li> <li>🇪🇸 uso genérico</li> <li>🇷🇺 общего назначения</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 &lt; 40 HRC variable helix and unequal pitch</li> <li>🇮🇹 &lt; 40 HRC elica variabile e passo differenziato</li> <li>🇩🇪 &lt; 40 HRC ungleicher Teilung und Winkel</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 &lt; 40 HRC hélice et pas différencié</li> <li>🇪🇸 &lt; 40 HRC hélice variable y paso diferenciado</li> <li>🇷🇺 &lt; 40 HRC переменный завиток и дифференциальная кромка</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 30+55 HRC unequal pitch</li> <li>🇮🇹 30+55 HRC passo differenziato</li> <li>🇩🇪 30+55 HRC ungleicher Teilung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 30+55 HRC pas différencié</li> <li>🇪🇸 30+55 HRC paso diferenciado</li> <li>🇷🇺 30+55 HRC неодинаковый шаг режущих кромок</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 for stainless steel</li> <li>🇮🇹 per acciaio inossidabile</li> <li>🇩🇪 für rostfreien Stahl</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 pour acier inoxydable</li> <li>🇪🇸 para acero inoxidable</li> <li>🇷🇺 для нержавеющей сталей</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 for aluminium</li> <li>🇮🇹 per alluminio</li> <li>🇩🇪 für Aluminium</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 pour aluminium</li> <li>🇪🇸 para aluminio</li> <li>🇷🇺 для алюминия</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 unequal pitch (UP) for Aluminium</li> <li>🇮🇹 passo differenziato (UP) per alluminio</li> <li>🇩🇪 ungleiche Teilung (UP) für Aluminium</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 pas différencié (UP) pour aluminium</li> <li>🇪🇸 paso diferenciado (UP) para aluminio</li> <li>🇷🇺 неравномерный шаг (UP) для алюминия</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 30+55 HRC general purpose and hardened steel</li> <li>🇮🇹 30+55 HRC uso generico e acciaio temprato</li> <li>🇩🇪 30+55 HRC allgemeine Anwendung und gehärtete Stähle</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 30+55 HRC utilisation générale et aciers trempés</li> <li>🇪🇸 30+55 HRC mecanizado genérico y acero templado</li> <li>🇷🇺 30+55 HRC общее назначение и для закалённых сталей</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 30+70 HRC general purpose and hardened steel</li> <li>🇮🇹 30+70 HRC uso generico e acciaio temprato</li> <li>🇩🇪 30+70 HRC allgemeine Anwendung und gehärtete Stähle</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 30+70 HRC utilisation générale et aciers trempés</li> <li>🇪🇸 30+70 HRC mecanizado genérico y acero templado</li> <li>🇷🇺 30+70 HRC общее назначение и для закалённых сталей</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 &lt; 70 HRC for hardened steel</li> <li>🇮🇹 &lt; 70 HRC per acciai temprati</li> <li>🇩🇪 &lt; 70 HRC für Hartstahl</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 &lt; 70 HRC pour acier trempé</li> <li>🇪🇸 &lt; 70 HRC para aceros templados</li> <li>🇷🇺 &lt; 70 HRC для закалённых сталей</li> </ul>

Legenda Verzeichnis Légende Leyenda Условные обозначения




	TYPE	TIPO	TYP	TYPE	TIPO	ТИП
 SQUARE	sharp corner spigolo vivo scharfe Kante					arête vive borde puntiagudo острая кромка
 C45°	45° chamfer smusso a 45° 45° abgeschrägt					biseau à 45° chafilán a 45° фаска 45°
 C+R	45° chamfer + radius smusso a 45° + raggio 45° abgeschrägt + Radius					biseau à 45° + rayon chafilán a 45° + radio фаска 45° + радиус
 RADIUS	corner radius torica Eckradius					torique tórica с радиусом при вершине
 BALL NOSE	ball nose raggiata runder Stirn					bout hémisphérique fresa de bola сферическая
 HIGH FEED	high feed alto avanzamento hoher Vorschub					haute vitesse alto avance высокая подача

NR. OF FLUTES	N. DI TAGLIANTI	ANZAHL DER SCHNEIDEN	NOMBRE DE DENTS	N. DE LABIOS	КОЛИЧЕСТВО РЕЖУЩИХ КРОМОК
 Z1	single flute monotagliante Einzelschneide				monocoupe monofilo 1 зуб
 Z2	2 flutes 2 taglienti 2 Schneiden				2 arêtes de coupe 2 filos 2 зуба
 Z3	3 flutes 3 taglienti 3 Schneiden				3 arêtes de coupe 3 filos 3 зуба
 Z3 UP	3 flutes unequal pitch 3 taglienti passo differenziato 3 Schneiden ungleiche Teilung				3 arêtes de coupe pas différencié 3 filos paso diferenciado 3 зуба с неравномерным шагом
 Z4	4 flutes 4 taglienti 4 Schneiden				4 arêtes de coupe 4 filos 4 зуба
 Z4 UP	4 flutes unequal pitch 4 taglienti passo differenziato 4 Schneiden ungleiche Teilung				4 arêtes de coupe pas différencié 4 filos paso diferenciado 4 зуба с неравномерным шагом
 Z5	5 flutes 5 taglienti 5 Schneiden				5 arêtes de coupe 5 filos 5 зуба
 Z6	6 flutes 6 taglienti 6 Schneiden				6 arêtes de coupe 6 filos 6 зуба









🇮🇹 Legenda 🇩🇪 Verzeichnis 🇫🇷 Légende 🇪🇸 Leyenda 🇷🇺 Условные обозначения

🇮🇹 CHIPBREAKER STYLE 🇫🇷 TIPO DI ROMPIRUCIOLO 🇪🇸 SPÄNEBRECHER TYP 🇮🇹 TYPE DE BRISE-COPEAUX 🇪🇸 TIPO DE ROMPEVIRUTAS 🇷🇺 ТИП СТРУЖКОЛОМА		
 NR COARSE	🇮🇹 roughing coarse pitch 🇫🇷 sgrossare passo grosso 🇩🇪 Schruppfräser Regelgewinde	🇫🇷 ébauche pas gros 🇪🇸 desbaste paso grueso 🇷🇺 черновая с крупным шагом
 HR FINE	🇮🇹 roughing fine pitch 🇫🇷 sgrossare passo fine 🇩🇪 Schruppfräser Feingewinde	🇫🇷 ébauche pas fin 🇪🇸 desbaste paso fino 🇷🇺 черновая с мелким шагом

🇮🇹 MATERIAL 🇫🇷 MATERIALE 🇩🇪 WERKSTOFF 🇫🇷 MATIÈRE 🇪🇸 MATERIAL 🇷🇺 МАТЕРИАЛ		
 NMG ...	🇮🇹 nano micrograin 🇫🇷 nano micrograna 🇩🇪 nano Mikrokörnung	🇫🇷 nano micrograin 🇪🇸 nano micrograno 🇷🇺 нано микрозернистый твёрдый сплав
 UMG ...	🇮🇹 ultra fine micrograin 🇫🇷 micrograna ultra fine 🇩🇪 ultrafeine Mikrokörnung	🇫🇷 micrograin ultra-fin 🇪🇸 micrograno ultra fino 🇷🇺 ультра микрозернистый твёрдый сплав
 MG ...	🇮🇹 micrograin 🇫🇷 micrograna 🇩🇪 Mikrokörnung	🇫🇷 micrograin 🇪🇸 micrograno 🇷🇺 микрозернистый твёрдый сплав

🇮🇹 SURFACE TREATMENT 🇫🇷 TRATTAMENTO SUPERFICIALE 🇩🇪 OBERFLÄCHENBEHANDLUNG 🇮🇹 TREATMENT DE SURFACE 🇪🇸 TRATAMIENTO SUPERFICIAL 🇷🇺 ОБРАБОТКА ПОВЕРХНОСТИ		
 ... BR	🇮🇹 uncoated 🇫🇷 non rivestito 🇩🇪 unbeschichtet	🇫🇷 non revêtu 🇪🇸 no revestido 🇷🇺 без покрытия
 ... POLISHED	🇮🇹 polished 🇫🇷 lappato 🇩🇪 geläppt	🇫🇷 poli 🇪🇸 pulido 🇷🇺 полированный

🇮🇹 COATINGS 🇫🇷 RIVESTIMENTI 🇩🇪 BESCHICHTUNGEN 🇫🇷 REVÊTEMENTS 🇪🇸 RECUBRIMENTOS 🇷🇺 ПОКРЫТИЕ							
		 ... PV200	 ... PV300	 ... ENDLESS	 ... ENDLESS ORANGE	 ... MH COAT	 ... UH RED
🇮🇹 hardness (HV) 🇫🇷 durezza (HV) 🇩🇪 Härte (HV)	🇫🇷 dreté (HV) 🇪🇸 durezza (HV) 🇷🇺 твёрдость (HV)	3300	3300	3300	3300	3600	3600
🇮🇹 friction coefficient 🇫🇷 coefficiente d'attrito 🇩🇪 Reibungskoeffizient	🇫🇷 coefficient de frottement 🇪🇸 coeficiente de rozamiento 🇷🇺 коэффициент трения	0.3	0.3	0.3	0.35	0.3	0.35
🇮🇹 thickness (μ) 🇫🇷 spessore (μ) 🇩🇪 dicke (μ)	🇫🇷 epaisseur (μ) 🇪🇸 espesor (μ) 🇷🇺 толщина (мкм)	3	2.5+3.5	2.5+3.5	2.5+3.5	2.5+3.5	2.5+3.5
🇮🇹 max working temperature (°C) 🇫🇷 temperatura max (°C) 🇩🇪 höchste Temperatur (°C)	🇫🇷 température maximale (°C) 🇪🇸 temperatura máx (°C) 🇷🇺 макс. температура (°C)	950°	1100°	900°	1000°	1300°	1200°

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	<b>G2WS2</b>	302	
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	<b>G2211</b>	304	
	<b>G2212</b>	304	
	<b>GB305</b>	307	
	<b>G2CSH3</b>	309	
	<b>G2WSH3</b>	311	
	<b>G2310</b>	313	
	<b>G2311</b>	313	
	<b>G2312</b>	313	
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G2 general purpose, roughing	<b>G2CSFR</b>	325	
	<b>G2WSFR</b>	327	
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G2 general purpose, ball nose	<b>GB255</b>	335	
	<b>G2CSB2</b>	337	

RANGE	NORM	TYPE	MATERIAL / COATING	HRC	HELIX ANGLE	GEOMETRY	Z	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H
1-12	OSAWA	N	MG BR	<45	30°	SQUARE	2	★	☆	★	☆		
1-20	OSAWA	N	MG PV200	<45	30°	SQUARE	2	★	☆	★	☆		
3-20	OSAWA	N	MG PV200	<45	30°	SQUARE	2	★	☆	★	☆		
2-6	OSAWA	N	MG PV200	<45	30°	SQUARE	2	★	☆	★	☆		
5-12	OSAWA	N	MG PV200	<45	30°	SQUARE	2	★	☆	★	☆		
8-16	OSAWA	N	MG PV200	<45	30°	SQUARE	2	★	☆	★	☆		
1-12	OSAWA	N	MG BR	<45	45°	SQUARE	3	★	☆	★	☆		
1-20	OSAWA	N	MG PV200	<45	45°	SQUARE	3	★	☆	★	☆		
3-20	OSAWA	N	MG PV200	<45	45°	SQUARE	3	★	☆	★	☆		
2-6	OSAWA	N	MG PV200	<45	45°	SQUARE	3	★	☆	★	☆		
4-12	OSAWA	N	MG PV200	<45	45°	SQUARE	3	★	☆	★	☆		
8-20	OSAWA	N	MG PV200	<45	45°	SQUARE	3	★	☆	★	☆		
1-12	OSAWA	N	MG BR	<45	30°	SQUARE	4	★	☆	★	☆		
1-25	OSAWA	N	MG PV200	<45	30°	SQUARE	4	★	☆	★	☆		
3-20	OSAWA	N	MG PV200	<45	30°	SQUARE	4	★	☆	★	☆		
2-6	OSAWA	N	MG PV200	<45	30°	SQUARE	4	★	☆	★	☆		
3-12	OSAWA	N	MG PV200	<45	30°	SQUARE	4	★	☆	★	☆		
8-20	OSAWA	N	MG PV200	<45	30°	SQUARE	4	★	☆	★	☆		
16-20	OSAWA	N	MG PV200	<45	30°	SQUARE	4	★	☆	★	☆		
6-20	OSAWA	N	MG PV200	<45	45°	SQUARE	6	★	☆	★	☆		
4-20	OSAWA	N - HR	MG PV200	<45	30°	SQUARE	3-4	★	☆	★	☆		
6-20	OSAWA	N - HR	MG PV200	<45	30°	SQUARE	3-4	★	☆	★	☆		
1-12	OSAWA	N	MG PV200	<45	30°	CORNER RADIUS	2	★	☆	★	☆		
1-12	OSAWA	N	MG PV200	<45	30°	CORNER RADIUS	4	★	☆	★	☆		
2-12	OSAWA	N	MG PV200	<45	30°	CORNER RADIUS	4	★	☆	★	☆		
1-12	OSAWA	N	MG BR	<45	30°	BALL NOSE	2	★	☆	★	☆		
1-20	OSAWA	N	MG PV200	<45	30°	BALL NOSE	2	★	☆	★	☆		

★ 1st choice ☆ suitable



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G2 general purpose, ball nose	<b>G2250</b>	339	
	<b>G2251</b>	339	
	<b>G2CSB4</b>	341	
MDTA general purpose, square	<b>MDTACS2</b>	344	
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	<b>MDTACS4</b>	354	
	<b>MDTA410</b>	356	
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MDTA general purpose, roughing	<b>MDTAUPR</b>	360	
MDTA general purpose, ball nose	<b>MDTACSB2</b>	362	
	<b>MDTA250</b>	364	
HF UNI < 40 HRC, 45° chamfer	<b>HF840</b>	370	
	<b>HF440</b>	374	
	<b>HF441</b>	379	
HF UNI < 40 HRC, roughing	<b>HF844</b>	385	
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	<b>HF445</b>	393	
HF UNI < 40 HRC, corner radius	<b>HF342</b>	398	
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	<b>HF442</b>	405	
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	<b>HF542</b>	415	
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	<b>HF943</b>	422	

RANGE	NORM	TYPE	MATERIAL / COATING	HRC	HELIX ANGLE	GEOMETRY	Z	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H
1-12	OSAWA	N	MG PV200	<45	30°	BALL NOSE	2	★	☆	★	☆		
6-20	OSAWA	N	MG PV200	<45	30°	BALL NOSE	2	★	☆	★	☆		
1-20	OSAWA	N	MG PV200	<45	30°	BALL NOSE	4	★	☆	★	☆		
1-20	OSAWA	N	MG PV200	<45	30°	SQUARE	2	★	☆	★	☆		
3-12	OSAWA	N	MG PV200	<45	30°	SQUARE	2	★	☆	★	☆		
3-12	OSAWA	N	MG BR	<45	30°	SQUARE	2	★	☆	★	☆		
1-20	OSAWA	N	MG PV200	<45	30°	SQUARE	3	★	☆	★	☆		
3-20	OSAWA	N	MG PV200	<45	45°	SQUARE	3	★	☆	★	☆		
1-20	OSAWA	N	MG PV200	<45	30°	SQUARE	4	★	☆	★	☆		
3-16	OSAWA	N	MG PV200	<45	30°	SQUARE	4	★	☆	★	☆		
3-20	OSAWA	N	MG BR	<45	30°	SQUARE	4	★	☆	★	☆		
6-20	OSAWA	N - UP - NR	MG PV200	<45	40°	C45°	3-4	★	☆	★			
1-12	OSAWA	N	MG PV200	<45	30°	BALL NOSE	2	★	☆	★	☆		
3-12	OSAWA	N	MG PV200	<45	30°	BALL NOSE	2	★	☆	★	☆		
3-20	OSAWA	VH/UP	MG PV300	<40	36°/39°	CHAMFER 45°	4	★	★	★		★	
3-20	OSAWA	VH/UP	MG PV300	<40	36°/39°	CHAMFER 45°	4	★	★	★		★	
3-20	OSAWA	VH/UP	MG PV300	<40	36°/39°	CHAMFER 45°	4	★	★	★		★	
6-20	OSAWA	VH/UP - HR	MG PV300	<40	36°/39°	CHAMFER 45°	4	★	★	★		★	
6-20	OSAWA	VH/UP - HR	MG PV300	<40	36°/39°	CHAMFER 45°	4	★	★	★		★	
6-20	OSAWA	VH/UP - HR	MG PV300	<40	36°/39°	CHAMFER 45°	4	★	★	★		★	
3-12	OSAWA	VH/UP	MG PV300	<40	36°/39°	CORNER RADIUS	4	★	★	★		★	
4-20	OSAWA	VH/UP	MG PV300	<40	36°/39°	CORNER RADIUS	4	★	★	★		★	
3-20	OSAWA	VH/UP	MG PV300	<40	36°/39°	CORNER RADIUS	4	★	★	★		★	
3-20	OSAWA	VH/UP	MG PV300	<40	36°/39°	CORNER RADIUS	4	★	★	★		★	
6-20	OSAWA	VH/UP	MG PV300	<40	36°/39°	CORNER RADIUS	4	★	★	★		★	
4-20	OSAWA	VH/UP	MG PV300	<40	36°/39°	CORNER RADIUS	4	★	★	★		★	
4-20	OSAWA	VH/UP	MG PV300	<40	36°/39°	CORNER RADIUS	4	★	★	★		★	

★ 1st choice ☆ suitable



	ITEM No.	PAGE	
HF UNI < 40 HRC, corner radius	<b>HF642</b>	426	
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	<b>HF743</b>	435	
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HF HARD 30÷55 HRC, 45° chamfer	<b>HF850</b>	443	
	<b>HF450</b>	447	
	<b>HF451</b>	451	
HF HARD 30÷55 HRC, corner radius	<b>HF852</b>	455	
	<b>HF452</b>	459	
MEF stainless steel and super alloys, square	<b>MEFCS2</b>	464	
	<b>MEFCSH3</b>	466	
	<b>MEFCS4</b>	468	
	<b>MEF600</b>	470	
MEF stainless steel and super alloys, roughing	<b>MEF901</b>	472	
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ALU unequal pitch, square	<b>HFAL4</b>	478	
ALU unequal pitch, corner radius	<b>HFAL3</b>	481	
	<b>HFA53</b>	484	
ALU square	<b>MDCSA1</b>	487	
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	<b>MDCSA3</b>	492	
	<b>MDA310</b>	494	
	<b>MDA311</b>	494	
	<b>MDA312</b>	494	
	<b>MDCSAM</b>	497	
ALU corner radius	<b>MCA212R</b>	499	

RANGE	NORM	TYPE	MATERIAL / COATING	HRC	HELIX ANGLE	GEOMETRY	Z	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H
4-20	OSAWA	VH	MG PV300	<40	36°/37°/38°	CORNER RADIUS	5	★	★	★		★	
4-20	OSAWA	VH	MG PV300	<40	36°/37°/38°	CORNER RADIUS	5	★	★	★		★	
6-20	OSAWA	VH	MG PV300	<40	36°/37°/38°	CORNER RADIUS	5	★	★	★		★	
6-20	OSAWA	VH	MG PV300	<40	36°/37°/38°	CORNER RADIUS	5	★	★	★		★	
1-20	OSAWA	VH/UP	MG PV300	<40	36°/39°	CR+C45°	4	★	★	★		★	
3-20	OSAWA	UP	MG PV300	35÷55	40°	CHAMFER 45°	4	★	★	★		★	★
3-20	OSAWA	UP	MG PV300	35÷55	40°	CHAMFER 45°	4	★	★	★		★	★
3-20	OSAWA	UP	MG PV300	35÷55	40°	CHAMFER 45°	4	★	★	★		★	★
4-20	OSAWA	UP	MG PV300	35÷55	40°	CORNER RADIUS	4	★	★	★		★	★
3-20	OSAWA	UP	MG PV300	35÷55	40°	CORNER RADIUS	4	★	★	★		★	★
1-16	OSAWA	VA	UMG ENDLESS	<45	35°	SQUARE	2	★	★			★	
6-20	OSAWA	VA	UMG ENDLESS	<45	50°	SQUARE	3	★	★			★	
2-20	OSAWA	VA	UMG ENDLESS	<45	35°	SQUARE	4	★	★			★	
6-20	OSAWA	VA	UMG ENDLESS	<45	50°	SQUARE	6-8	★	★			★	
4-20	OSAWA	VA - HR	UMG ENDLESS	<45	45°	SQUARE	3-6	★	★			★	
6-20	OSAWA	VA - HR	UMG ENDLESS	<45	45°	SQUARE	4-6	★	★			★	
3-20	OSAWA	UP ALU	MG BR		40°	SQUARE	4				★		
2-20	OSAWA	UP ALU	MG POLISHED		30°	CORNER RADIUS	3				★		
3-20	OSAWA	UP ALU	MG BR		30°	CORNER RADIUS	3				★		
2-12	OSAWA	ALU	MG POLISHED		25°	SQUARE	1				★		
1-20	OSAWA	ALU	MG POLISHED		45°	SQUARE	2				★		
1-20	OSAWA	ALU	MG POLISHED		55°	SQUARE	3				★		
3-6	OSAWA	ALU	MG POLISHED		55°	SQUARE	3				★		
3-12	OSAWA	ALU	MG POLISHED		55°	SQUARE	3				★		
8-20	OSAWA	ALU	MG POLISHED		55°	SQUARE	3				★		
6-12	OSAWA	ALU	MG POLISHED		50°	SQUARE	6				★		
2-12	OSAWA	ALU	MG PV200		25°	CORNER RADIUS	2				★		

★ 1st choice ☆ suitable



	ITEM No.	PAGE	
ALU ball nose	<b>MDCAB2</b>	501	
MEX 30÷55 HRC, square	<b>MEXM2</b>	504	
	<b>MEXM2SC</b>	506	
	<b>MEXLN2</b>	508	
	<b>MEXCS2</b>	513	
	<b>MEXCL2</b>	515	
MEX 30÷55 HRC, square	<b>MEX400</b>	517	
	<b>MEXCL4</b>	519	
	<b>MEXCSHM</b>	521	
	<b>MEXCLHM</b>	523	
MEX 30÷55 HRC, roughing	<b>MEXCSFR</b>	525	
MEX 30÷55 HRC, corner radius	<b>MEXLN2R</b>	527	
	<b>MEXLS2R</b>	533	
	<b>MEXCS4R</b>	535	
	<b>MEX410R</b>	538	
	<b>MEXLS4R</b>	540	
	<b>MEX610R</b>	542	
	<b>MEX611R</b>	544	
MEX 30÷55 HRC and MH 30÷70 HRC, ball nose	<b>MHMB204</b>	546	
	<b>MHMB206</b>	548	
	<b>MHLNB2</b>	550	
	<b>MHCRB2</b>	555	
	<b>MEXCSB2</b>	557	
	<b>MEXCLSB2</b>	559	
	<b>MEX253</b>	561	
UH < 70 HRC, square	<b>UHM204</b>	564	
	<b>UHLN2</b>	566	



RANGE	NORM	TYPE	MATERIAL / COATING	HRC	HELIX ANGLE	GEOMETRY	Z	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H
1-12	OSAWA	ALU	MG POLISHED		40°	BALL NOSE	2				★		
0.3-2	OSAWA	MEX	UMG ENDLESS ORANGE	<55	40°	SQUARE	2	★		★			★
0.2-0.9	OSAWA	MEX	UMG ENDLESS ORANGE	<55	40°	SQUARE	2	★		★			★
0.2-4	OSAWA	MEX	UMG ENDLESS ORANGE	<55	40°	SQUARE	2	★		★			★
1-20	OSAWA	MEX	UMG ENDLESS ORANGE	<55	40°	SQUARE	2	★		★			★
1-12	OSAWA	MEX	UMG ENDLESS ORANGE	<55	40°	SQUARE	2	★		★			★
1-25	OSAWA	MEX UP	UMG ENDLESS ORANGE	<55	40°	SQUARE	4	★		★			★
2-25	OSAWA	MEX	UMG ENDLESS ORANGE	<55	30°-40°	SQUARE	4	★		★			★
3-20	OSAWA	MEX	UMG ENDLESS ORANGE	<55	50°	SQUARE	6-8	★		★			★
3-20	OSAWA	MEX	UMG ENDLESS ORANGE	<55	50°	SQUARE	6-8	★		★			★
6-20	OSAWA	MEX - HR	UMG ENDLESS ORANGE	<55	20°	SQUARE	3-4	★		★			★
0.3-4	OSAWA	MEX	UMG ENDLESS ORANGE	<55	40°	CORNER RADIUS	2	★		★			★
2-16	OSAWA	MEX	UMG ENDLESS ORANGE	<55	40°	CORNER RADIUS	2	★		★			★
1-20	OSAWA	MEX	UMG ENDLESS ORANGE	<55	40°	CORNER RADIUS	4	★		★			★
2-12	OSAWA	MEX	UMG ENDLESS ORANGE	<55	30°	CORNER RADIUS	4	★		★			★
2-16	OSAWA	MEX	UMG ENDLESS ORANGE	<55	40°	CORNER RADIUS	4	★		★			★
6-12	OSAWA	MEX	UMG ENDLESS ORANGE	<55	45°	CORNER RADIUS	6	★		★			★
6-12	OSAWA	MEX	UMG ENDLESS ORANGE	<55	45°	CORNER RADIUS	6	★		★			★
0.2-2	OSAWA	MH	NMG MH COAT	30÷70	30°	BALL NOSE	2	★		★			★
0.2-0.8	OSAWA	MH	NMG MH COAT	30÷70	30°	BALL NOSE	2	★		★			★
0.2-4	OSAWA	MH	NMG MH COAT	30÷70	30°	BALL NOSE	2	★		★			★
0.5-2	OSAWA	MH	NMG MH COAT	30÷70	30°	BALL NOSE	2	★		★			★
1-20	OSAWA	MEX	UMG ENDLESS ORANGE	<55	30°	BALL NOSE	2	★		★			★
1-20	OSAWA	MEX	UMG ENDLESS ORANGE	<55	30°	BALL NOSE	2	★		★			★
1-20	OSAWA	MEX	UMG ENDLESS ORANGE	<55	30°	BALL NOSE	2	★		★			★
0.1-0.9	OSAWA	UH	NMG UH RED	<70	40°	SQUARE	2	☆		☆			★
0.2-4	OSAWA	UH	NMG UH RED	<70	40°	SQUARE	2	☆		☆			★

★ 1st choice ☆ suitable

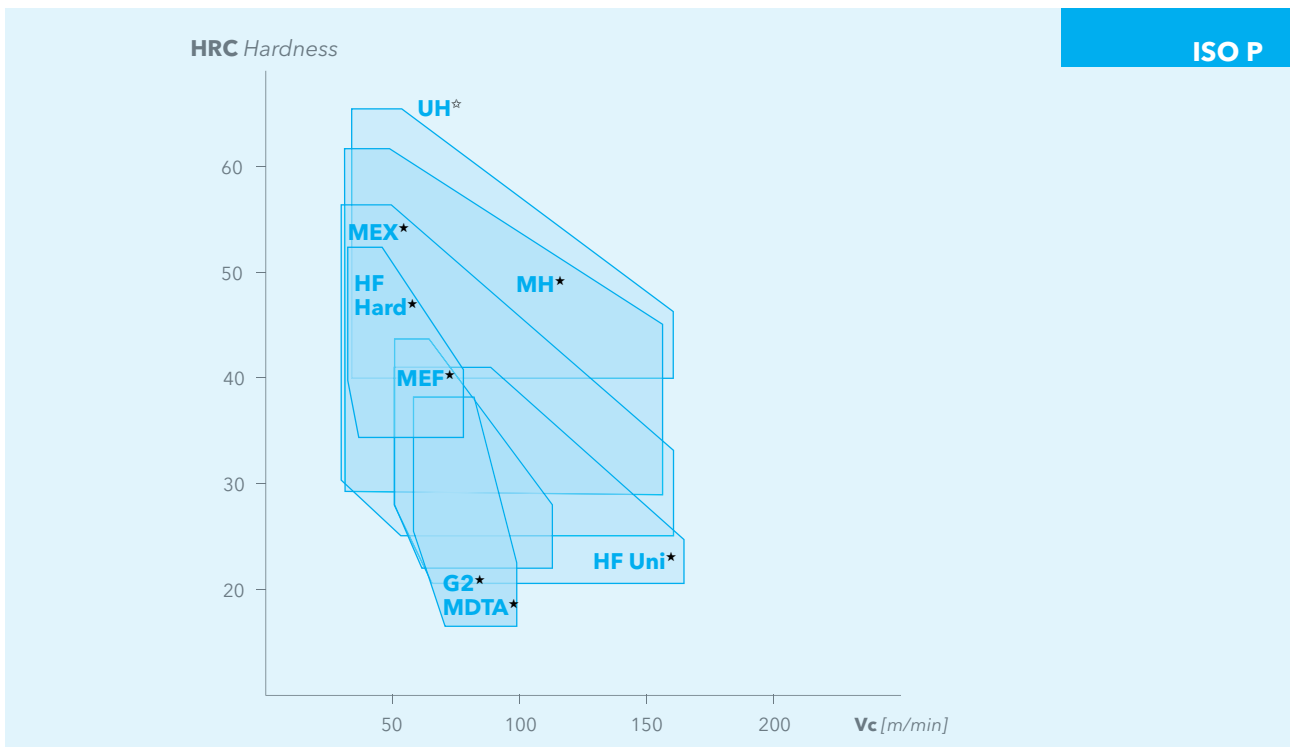


	ITEM No.	PAGE	
UH < 70 HRC, square	<b>UH600</b>	571	
	<b>UH612</b>	573	
UH < 70 HRC, corner radius	<b>UHM206</b>	575	
	<b>UH211</b>	577	
	<b>UH212</b>	579	
	<b>UHCS2</b>	584	
	<b>UHF4LN</b>	586	
	<b>UHF-RT</b>	590	
	<b>UHF4</b>	592	
	<b>UHCS4</b>	594	
	<b>UH410</b>	596	
	<b>UH411</b>	599	
	<b>UH412</b>	601	
	<b>UH413</b>	603	
	<b>UH610R</b>	605	
	<b>UH611R</b>	607	
	UH < 70 HRC and MH 30÷70 HRC, ball nose	<b>MHMB204</b>	609
<b>MHMB206</b>		611	
<b>MHLNB2</b>		613	
<b>MHCRB2</b>		618	
<b>UHCSB2</b>		620	
<b>UH250</b>		622	
<b>UH253</b>		624	

RANGE	NORM	TYPE	MATERIAL / COATING	HRC	HELIX ANGLE	GEOMETRY	Z	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H
3-20	OSAWA	UH	NMG UH RED	<70	50°	SQUARE	6-8	☆		☆			★
3-20	OSAWA	UH	NMG UH RED	<70	50°	SQUARE	6-8	☆		☆			★
0.3-2	OSAWA	UH	NMG UH RED	<70	40°	CORNER RADIUS	2	☆		☆			★
1-6	OSAWA	UH	NMG UH RED	<70	40°	CORNER RADIUS	2	☆		☆			★
0.2-4	OSAWA	UH	NMG UH RED	<70	40°	CORNER RADIUS	2	☆		☆			★
1-12	OSAWA	UH	NMG UH RED	<70	40°	CORNER RADIUS	2	☆		☆			★
1-4	OSAWA	UP - UH	NMG UH RED	<70	25°	CORNER RADIUS	4	☆		☆			★
2-12	OSAWA	UH	NMG UH RED	<70	25°	CORNER RADIUS	4-6	☆		☆			★
2-12	OSAWA	UH	NMG UH RED	<70	25°	CORNER RADIUS	4	☆		☆			★
1-12	OSAWA	UH	NMG UH RED	<70	40°	CORNER RADIUS	4	☆		☆			★
1-20	OSAWA	UH	NMG UH RED	<70	40°	CORNER RADIUS	4	☆		☆			★
3-12	OSAWA	UH	NMG UH RED	<70	40°	CORNER RADIUS	4	☆		☆			★
2-12	OSAWA	UH	NMG UH RED	<70	40°	CORNER RADIUS	4	☆		☆			★
6-16	OSAWA	UH	NMG UH RED	<70	40°	CORNER RADIUS	4	☆		☆			★
6-12	OSAWA	UH	NMG UH RED	<70	50°	CORNER RADIUS	6	☆		☆			★
6-20	OSAWA	UH	NMG UH RED	<70	50°	CORNER RADIUS	6	☆		☆			★
0.2-0.8	OSAWA	MH	NMG MH COAT	30÷70	30°	BALL NOSE	2	☆		☆			★
0.4-0.8	OSAWA	MH	NMG MH COAT	30÷70	30°	BALL NOSE	2	☆		☆			★
0.2-4	OSAWA	MH	NMG MH COAT	30÷70	30°	BALL NOSE	2	☆		☆			★
0.5-2	OSAWA	MH	NMG MH COAT	30÷70	30°	BALL NOSE	2	☆		☆			★
1-20	OSAWA	UH	NMG UH RED	<70	30°	BALL NOSE	2	☆		☆			★
1-20	OSAWA	UH	NMG UH RED	<70	30°	BALL NOSE	2	☆		☆			★
1-20	OSAWA	UH	NMG UH RED	<70	30°	BALL NOSE	2	☆		☆			★

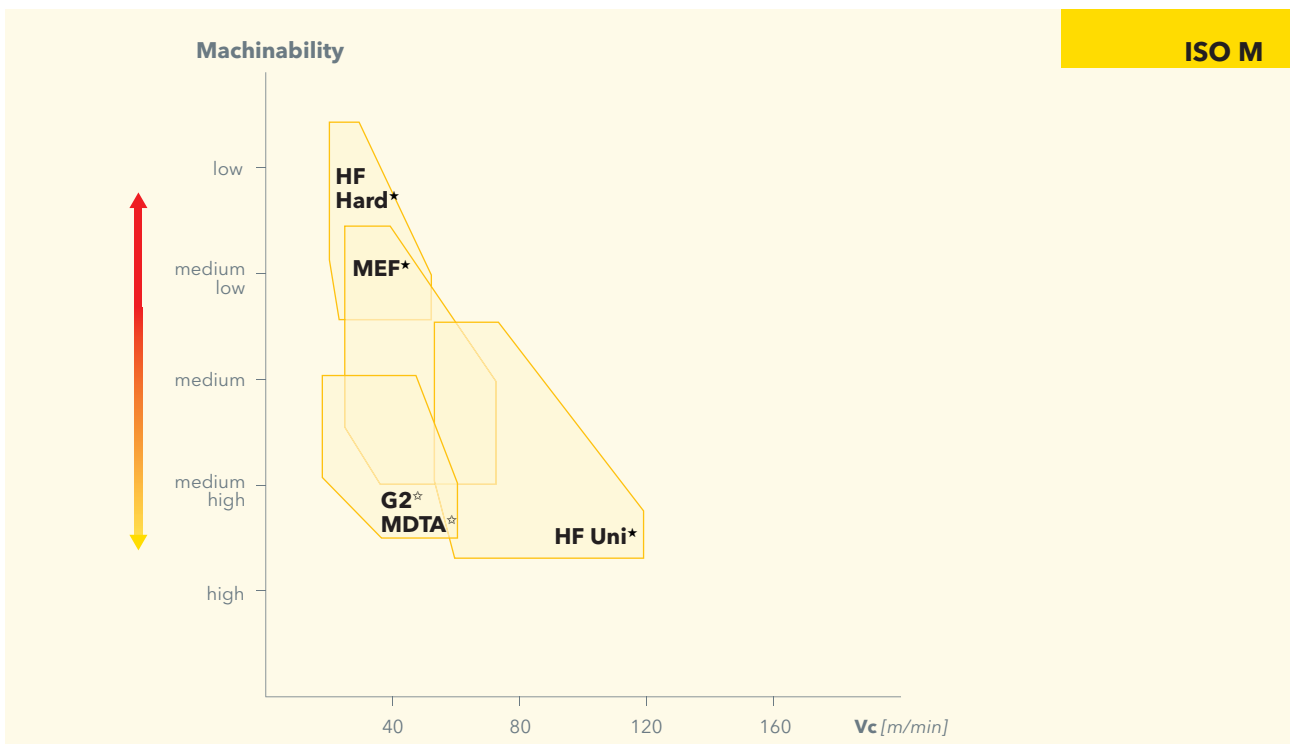
★ 1st choice ☆ suitable

STEEL APPLICATION



★ 1st choice ☆ suitable

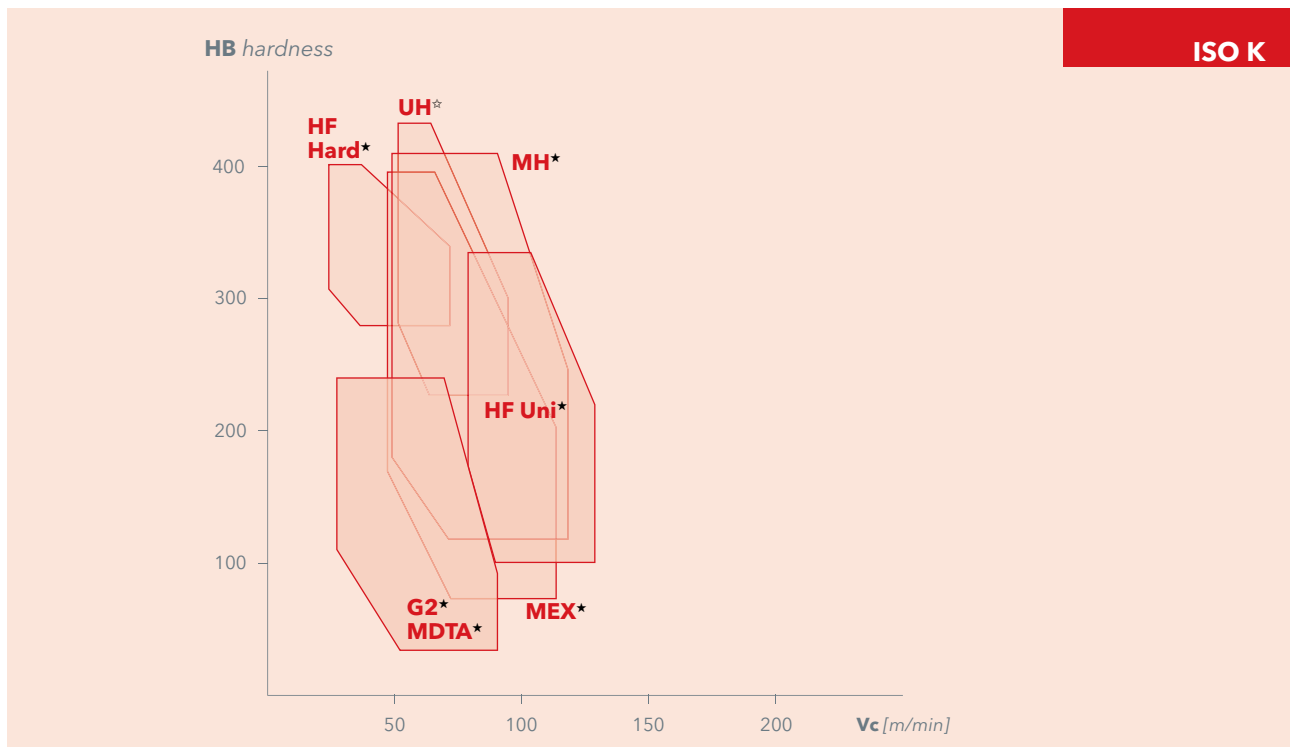
STAINLESS STEEL APPLICATION



★ 1st choice ☆ suitable

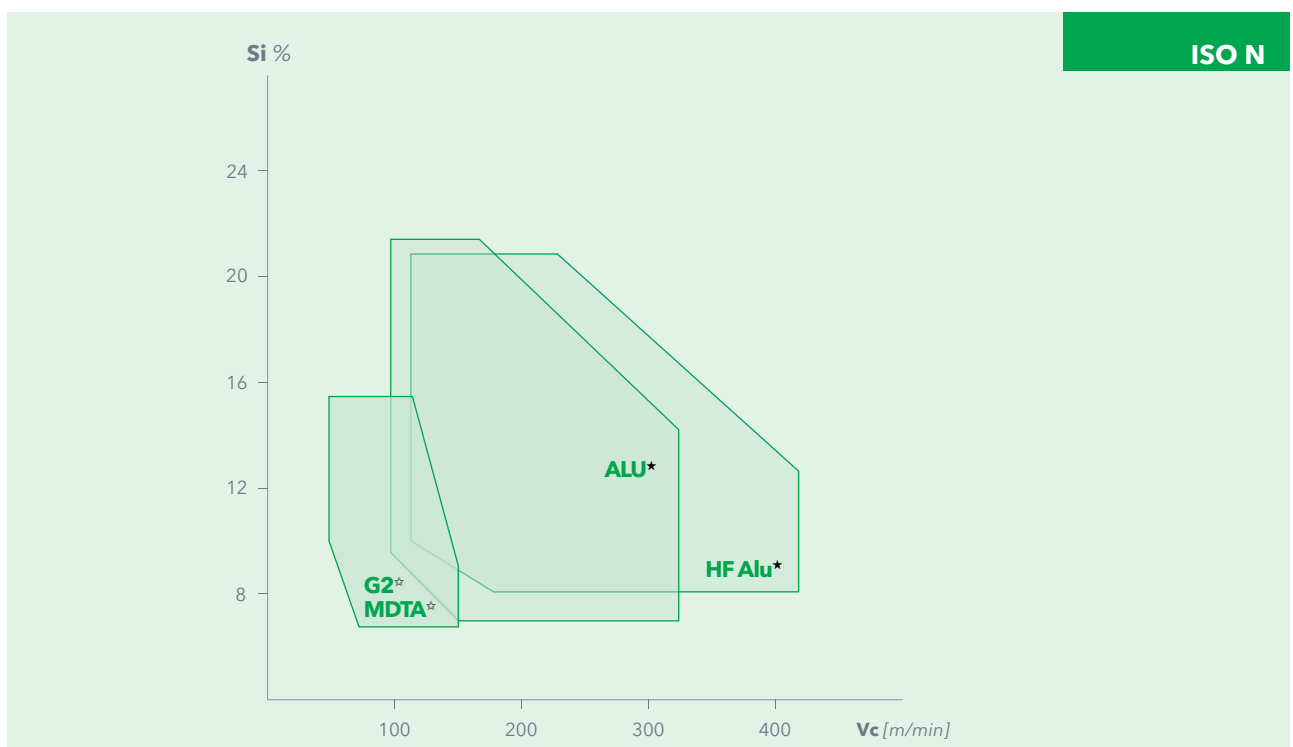
- G2 : general purpose (page 298)
- MDTA : general purpose (page 344)
- HF UNI : universal purpose (page 370)
- HF HARD : special purpose (page 443)
- MEF : special purpose (page 464)
- MEX : special purpose (page 504)
- MH : special purpose (page 546/609)
- UH : special purpose (page 564)

CAST IRON APPLICATION



★ 1st choice ☆ suitable

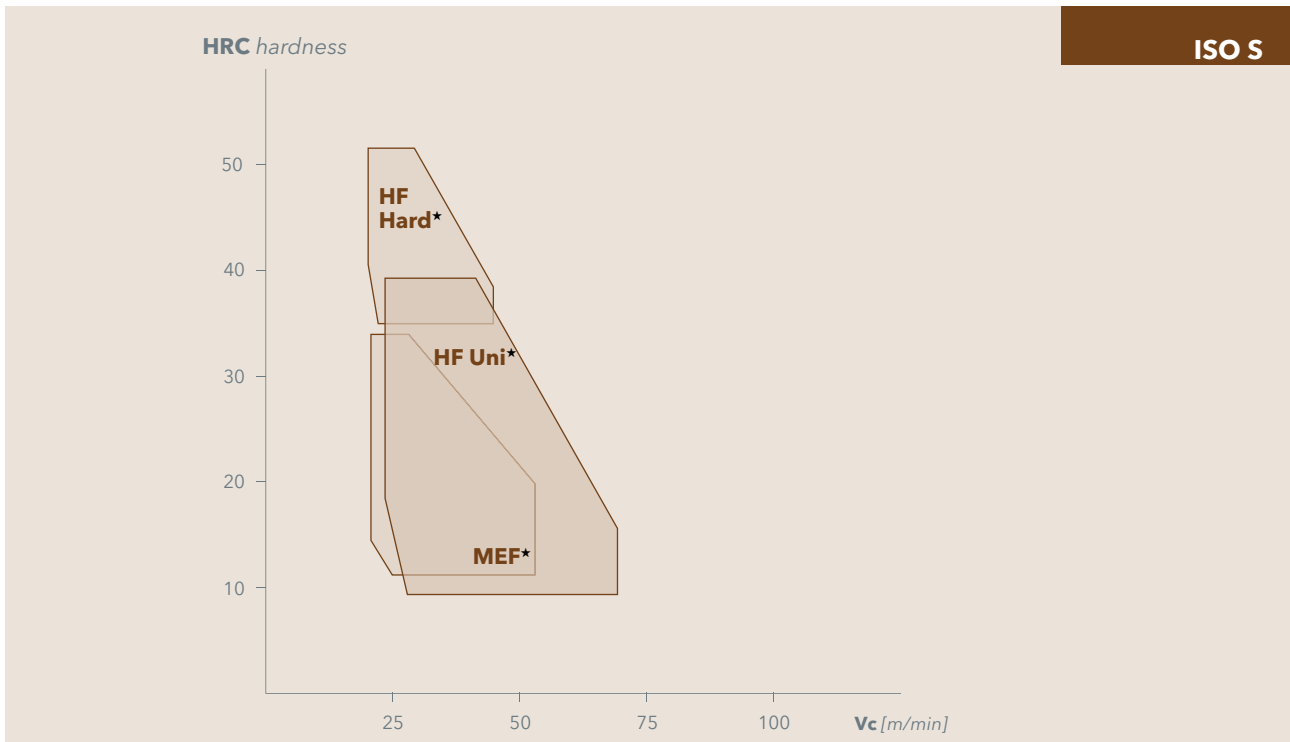
NON-FERROUS MATERIALS APPLICATION



★ 1st choice ☆ suitable

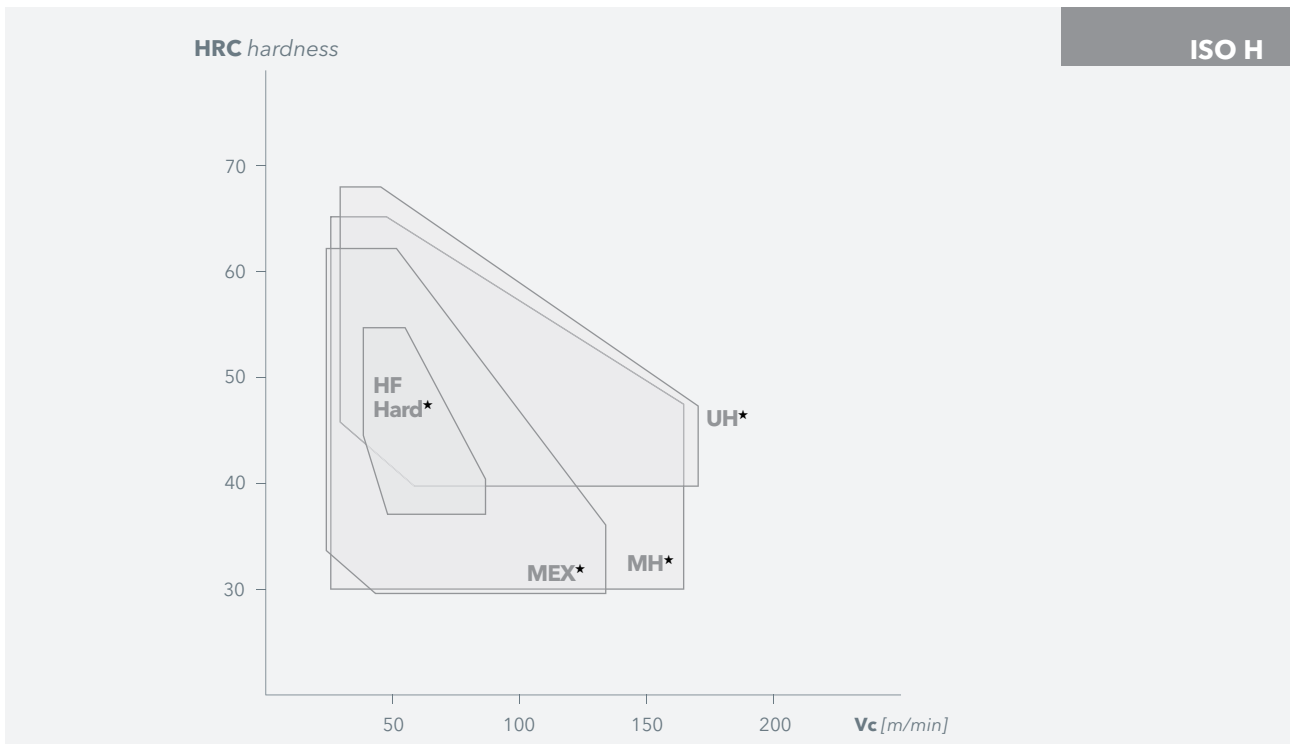
- G2 : general purpose (page 298)
- MDTA : general purpose (page 344)
- HF UNI : universal purpose (page 370)
- HF HARD : special purpose (page 443)
- ALU : special purpose (page 478)
- MEX : special purpose (page 504)
- MH : special purpose (page 546/609)
- UH : special purpose (page 564)

SUPER ALLOYS APPLICATION



★ 1st choice ☆ suitable

HARDENED STEEL APPLICATION



★ 1st choice ☆ suitable

- HF UNI : universal purpose (page 370)
- HF HARD : special purpose (page 443)
- MEF : special purpose (page 464)
- MEX : special purpose (page 504)
- MH : special purpose (page 546/609)
- UH : special purpose (page 564)



INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

## G2

### GENERAL PURPOSE

✚ Range of general-purpose endmills, featuring new cutting geometries and innovative coatings for enhanced performance. The answer given by Osawa to the market demand for higher performance tools. Thanks to a fully optimized manufacturing process and to large production batches the G2 range excels in the cost-performance ratio.

🇮🇹 Gamma di frese per uso generico, dotate di geometria di taglio e rivestimenti innovativi per garantire prestazioni ancora più elevate. La risposta di Osawa ad un mercato che chiede utensili sempre più performanti e competitivi. L'innovazione nei processi produttivi consente alla gamma G2 di eccellere nel rapporto qualità-prezzo.

🇩🇪 Produktpalette von Fräser für allgemeine Anwendungen, ausgestattet mit einer Schnittgeometrie und innovativen Beschichtungen zur Gewährleistung noch höheren Leistungen. Die Antwort von Osawa auf einen Markt, der immer leistungsstärkere und wettbewerbsfähigere Werkzeuge fordert. Dank der Innovation der Produktionsprozesse zeichnet sich die Produktreihe G2 durch ein außergewöhnliches Preis-Leistungsverhältnis aus.

🇫🇷 Gamme de fraises pour un usage général, dotées de géométrie de coupe et de revêtements innovants pour garantir des prestations encore plus élevées. C'est la réponse d'Osawa à un marché qui nécessite d'outils de plus en plus performants et compétitifs. L'innovation des processus de production permet à la gamme G2 d'avoir un rapport qualité-prix excellent.

🇪🇸 Gama de fresas para uso genérico, provistas de geometría de corte y revestimientos innovadores para garantizar prestaciones aún más elevadas. La respuesta de Osawa a un mercado que pide herramientas cada vez con mayor rendimiento y más competitivas. La innovación en los procesos de producción permite a la gama G2 sobresalir en la relación calidad-precio.

🇷🇺 Ассортимент фрез общего назначения, с новой геометрией и покрытиями, гарантирующими высокоэффективную работу. Это ответ компании Osawa на запросы рынка, который требует всё более конкурентоспособные инструменты с высокими эксплуатационными характеристиками. Инновации в производственных процессах и большие изготавливаемые партии позволяют серии G2 иметь превосходное соотношение цена-качество.

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS





CUTTING PARAMETERS

INFO

**GB205**

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>50÷60</b>	<b>30÷50</b>	<b>20÷40</b>	<b>70÷90</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>1</b>	0.004	0.003	0.003	0.005
	<b>2</b>	0.007	0.006	0.005	0.009
	<b>3</b>	0.010	0.009	0.008	0.013
	<b>4</b>	0.014	0.012	0.011	0.018
	<b>5</b>	0.018	0.015	0.014	0.023
	<b>6</b>	0.023	0.020	0.017	0.030
	<b>8</b>	0.030	0.026	0.023	0.039
	<b>10</b>	0.038	0.032	0.029	0.049
<b>12</b>	0.045	0.038	0.034	0.059	

< D3 mm: ap = 0.2D

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.3D</b>
	Vc (m/min)	<b>50÷60</b>	<b>30÷50</b>	<b>20÷40</b>	<b>70÷90</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>1</b>	0.004	0.004	0.003	0.006
	<b>2</b>	0.009	0.007	0.007	0.011
	<b>3</b>	0.013	0.011	0.009	0.016
	<b>4</b>	0.018	0.015	0.013	0.023
	<b>5</b>	0.023	0.019	0.017	0.029
	<b>6</b>	0.029	0.024	0.022	0.037
	<b>8</b>	0.038	0.032	0.028	0.049
	<b>10</b>	0.048	0.040	0.036	0.062
<b>12</b>	0.056	0.048	0.042	0.073	

< D3 mm: ae = 0.2D

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>
	Vc (m/min)	<b>40÷50</b>	<b>30÷40</b>	<b>20÷30</b>	<b>60÷80</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>1</b>	0.002	0.002	0.002	0.003
	<b>2</b>	0.004	0.004	0.003	0.006
	<b>3</b>	0.006	0.005	0.005	0.008
	<b>4</b>	0.009	0.007	0.007	0.011
	<b>5</b>	0.011	0.010	0.008	0.015
	<b>6</b>	0.014	0.012	0.011	0.019
	<b>8</b>	0.019	0.016	0.014	0.024
	<b>10</b>	0.024	0.020	0.018	0.031
<b>12</b>	0.028	0.024	0.021	0.037	

< D3 mm: ap = 0.5D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

**G2**  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



### G2CS2

<p>SLOTTING</p>	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.004	0.003	0.003	0.005
	2	0.008	0.007	0.006	0.010
	3	0.012	0.010	0.009	0.016
	4	0.016	0.014	0.012	0.021
	5	0.020	0.017	0.015	0.026
	6	0.025	0.021	0.019	0.033
	8	0.032	0.027	0.024	0.042
	10	0.038	0.032	0.029	0.049
	12	0.045	0.038	0.034	0.059
	14	0.052	0.044	0.039	0.068
16	0.060	0.051	0.045	0.078	
18	0.070	0.060	0.053	0.091	
20	0.080	0.068	0.060	0.104	

< D3 mm: ap = 0.2D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

<p>SIDE MILLING</p>	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.005	0.004	0.004	0.006
	2	0.010	0.008	0.007	0.012
	3	0.014	0.012	0.011	0.019
	4	0.019	0.016	0.014	0.025
	5	0.024	0.020	0.018	0.031
	6	0.030	0.026	0.023	0.039
	8	0.038	0.033	0.029	0.050
	10	0.046	0.039	0.034	0.059
	12	0.054	0.046	0.041	0.070
	14	0.062	0.053	0.047	0.081
16	0.072	0.061	0.054	0.094	
18	0.084	0.071	0.063	0.109	
20	0.096	0.082	0.072	0.125	

< D3 mm: ae = 0.2D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

**G2**  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

<p>DRILLING</p>	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>
	Vc (m/min)	<b>70÷90</b>	<b>40÷60</b>	<b>25÷35</b>	<b>80÷100</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.002	0.002	0.002	0.003
	2	0.005	0.004	0.004	0.006
	3	0.007	0.006	0.005	0.009
	4	0.010	0.008	0.007	0.012
	5	0.012	0.010	0.009	0.016
	6	0.015	0.013	0.011	0.020
	8	0.019	0.016	0.014	0.025
	10	0.023	0.019	0.017	0.030
	12	0.027	0.023	0.020	0.035
	14	0.031	0.027	0.023	0.041
16	0.036	0.031	0.027	0.047	
18	0.042	0.036	0.032	0.055	
20	0.048	0.041	0.036	0.062	

< D3 mm: ap = 0.5D

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

INFO

**G2WS2**

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.012	0.010	0.009	0.016
	4	0.016	0.014	0.012	0.021
	5	0.020	0.017	0.015	0.026
	6	0.025	0.021	0.019	0.033
	8	0.032	0.027	0.024	0.042
	10	0.038	0.032	0.029	0.049
	12	0.045	0.038	0.034	0.059
	14	0.052	0.044	0.039	0.068
	16	0.060	0.051	0.045	0.078
18	0.070	0.060	0.053	0.091	
20	0.080	0.068	0.060	0.104	

< D3 mm: ap = 0.2D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.014	0.012	0.011	0.019
	4	0.019	0.016	0.014	0.025
	5	0.024	0.020	0.018	0.031
	6	0.030	0.026	0.023	0.039
	8	0.038	0.033	0.029	0.050
	10	0.046	0.039	0.034	0.059
	12	0.054	0.046	0.041	0.070
	14	0.062	0.053	0.047	0.081
	16	0.072	0.061	0.054	0.094
18	0.084	0.071	0.063	0.109	
20	0.096	0.082	0.072	0.125	

< D3 mm: ae = 0.2D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

**G2**  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>
	Vc (m/min)	<b>70÷90</b>	<b>40÷60</b>	<b>25÷35</b>	<b>80÷100</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.007	0.006	0.005	0.009
	4	0.010	0.008	0.007	0.012
	5	0.012	0.010	0.009	0.016
	6	0.015	0.013	0.011	0.020
	8	0.019	0.016	0.014	0.025
	10	0.023	0.019	0.017	0.030
	12	0.027	0.023	0.020	0.035
	14	0.031	0.027	0.023	0.041
	16	0.036	0.031	0.027	0.047
18	0.042	0.036	0.032	0.055	
20	0.048	0.041	0.036	0.062	

< D3 mm: ap = 0.5D

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

INFO

**G2210-G2211**

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>70÷90</b>	<b>45÷65</b>	<b>30÷50</b>	<b>80÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>2</b>	0.007	0.006	0.005	0.009
	<b>3</b>	0.010	0.009	0.008	0.013
	<b>4</b>	0.014	0.012	0.011	0.018
	<b>5</b>	0.018	0.015	0.014	0.023
	<b>6</b>	0.023	0.019	0.017	0.029
	<b>8</b>	0.030	0.026	0.023	0.039
	<b>10</b>	0.035	0.030	0.026	0.046
<b>12</b>	0.041	0.035	0.031	0.053	

< D3 mm: ap = 0.2D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>
	Vc (m/min)	<b>70÷90</b>	<b>45÷65</b>	<b>30÷50</b>	<b>80÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>2</b>	0.008	0.007	0.006	0.011
	<b>3</b>	0.012	0.010	0.009	0.016
	<b>4</b>	0.017	0.014	0.013	0.022
	<b>5</b>	0.022	0.018	0.016	0.028
	<b>6</b>	0.027	0.023	0.020	0.035
	<b>8</b>	0.036	0.031	0.027	0.047
	<b>10</b>	0.042	0.036	0.032	0.055
<b>12</b>	0.049	0.042	0.037	0.064	

< D3 mm: ae = 0.2D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>
	Vc (m/min)	<b>60÷80</b>	<b>40÷60</b>	<b>25÷35</b>	<b>70÷100</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>2</b>	0.004	0.004	0.003	0.005
	<b>3</b>	0.006	0.005	0.005	0.008
	<b>4</b>	0.008	0.007	0.006	0.011
	<b>5</b>	0.011	0.009	0.008	0.014
	<b>6</b>	0.014	0.011	0.010	0.018
	<b>8</b>	0.018	0.015	0.014	0.023
	<b>10</b>	0.021	0.018	0.016	0.027
<b>12</b>	0.025	0.021	0.018	0.032	

< D3 mm: ap = 0.5D

CARBIDE END-MILLS

**G2**  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

INFO

# G2212

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>
Vc (m/min)	<b>55÷75</b>	<b>40÷60</b>	<b>20÷40</b>	<b>70÷90</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>8</b>	0.026	0.022	0.020	0.034
<b>10</b>	0.032	0.027	0.024	0.042
<b>12</b>	0.036	0.031	0.027	0.047
<b>14</b>	0.042	0.036	0.032	0.055
<b>16</b>	0.048	0.041	0.036	0.062



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)	<b>55÷75</b>	<b>40÷60</b>	<b>20÷40</b>	<b>70÷90</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>8</b>	0.031	0.027	0.023	0.041
<b>10</b>	0.038	0.033	0.029	0.050
<b>12</b>	0.043	0.037	0.032	0.056
<b>14</b>	0.050	0.043	0.038	0.066
<b>16</b>	0.058	0.049	0.043	0.075

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>
Vc (m/min)	<b>50÷70</b>	<b>35÷55</b>	<b>20÷30</b>	<b>60÷80</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>8</b>	0.016	0.013	0.012	0.020
<b>10</b>	0.019	0.016	0.014	0.025
<b>12</b>	0.022	0.018	0.016	0.028
<b>14</b>	0.025	0.021	0.019	0.033
<b>16</b>	0.029	0.024	0.022	0.037

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS





INFO

# GB305

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>50÷60</b>	<b>30÷50</b>	<b>20÷40</b>	<b>70÷90</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.003	0.003	0.002	0.004
<b>2</b>	0.006	0.005	0.004	0.008
<b>3</b>	0.009	0.007	0.006	0.011
<b>4</b>	0.012	0.010	0.009	0.016
<b>5</b>	0.015	0.013	0.012	0.020
<b>6</b>	0.020	0.017	0.015	0.026
<b>8</b>	0.026	0.022	0.019	0.033
<b>10</b>	0.032	0.028	0.024	0.042
<b>12</b>	0.038	0.033	0.029	0.050

< D3 mm: ap = 0.2D

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>20÷40</b>	<b>80÷100</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.004	0.003	0.003	0.005
<b>2</b>	0.007	0.006	0.005	0.009
<b>3</b>	0.010	0.009	0.008	0.013
<b>4</b>	0.014	0.012	0.011	0.019
<b>5</b>	0.018	0.016	0.014	0.024
<b>6</b>	0.024	0.020	0.018	0.031
<b>8</b>	0.031	0.026	0.023	0.040
<b>10</b>	0.039	0.033	0.029	0.051
<b>12</b>	0.046	0.039	0.035	0.060

< D3 mm: ae = 0.1D

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

### G2CSH3

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>80÷120</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.003	0.003	0.002	0.004
2	0.006	0.005	0.005	0.008
3	0.009	0.008	0.007	0.012
4	0.013	0.011	0.009	0.016
5	0.016	0.013	0.012	0.020
6	0.019	0.016	0.014	0.024
8	0.025	0.021	0.019	0.033
10	0.031	0.027	0.023	0.041
12	0.040	0.034	0.030	0.052
14	0.046	0.039	0.035	0.060
16	0.056	0.048	0.042	0.073
18	0.065	0.055	0.049	0.085
20	0.075	0.064	0.056	0.098

< D3 mm: ap = 0.2D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>110÷130</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.004	0.003	0.003	0.005
2	0.008	0.006	0.006	0.010
3	0.011	0.010	0.008	0.015
4	0.015	0.013	0.011	0.020
5	0.019	0.016	0.014	0.024
6	0.023	0.019	0.017	0.029
8	0.030	0.026	0.023	0.039
10	0.038	0.032	0.028	0.049
12	0.048	0.041	0.036	0.062
14	0.056	0.047	0.042	0.072
16	0.068	0.057	0.051	0.088
18	0.078	0.066	0.059	0.101
20	0.090	0.077	0.068	0.117

< D3 mm: ae = 0.1D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

### G2WSH3

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>80÷120</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.009	0.008	0.007	0.012
4	0.013	0.011	0.009	0.016
5	0.016	0.013	0.012	0.020
6	0.019	0.016	0.014	0.024
8	0.025	0.021	0.019	0.033
10	0.031	0.027	0.023	0.041
12	0.040	0.034	0.030	0.052
14	0.046	0.039	0.035	0.060
16	0.056	0.048	0.042	0.073
18	0.065	0.055	0.049	0.085
20	0.075	0.064	0.056	0.098

< D3 mm: ap = 0.2D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>110÷130</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.011	0.010	0.008	0.015
4	0.015	0.013	0.011	0.020
5	0.019	0.016	0.014	0.024
6	0.023	0.019	0.017	0.029
8	0.030	0.026	0.023	0.039
10	0.038	0.032	0.028	0.049
12	0.048	0.041	0.036	0.062
14	0.056	0.047	0.042	0.072
16	0.068	0.057	0.051	0.088
18	0.078	0.066	0.059	0.101
20	0.090	0.077	0.068	0.117

< D3 mm: ae = 0.1D

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

### G2310-G2311

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>60÷80</b>	<b>35+55</b>	<b>25+35</b>	<b>80÷100</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.006	0.005	0.004	0.007
3	0.008	0.007	0.006	0.011
4	0.011	0.010	0.008	0.015
5	0.014	0.012	0.011	0.018
6	0.017	0.014	0.013	0.022
8	0.023	0.019	0.017	0.029
10	0.028	0.024	0.021	0.037
12	0.036	0.031	0.027	0.047

< D3 mm: ap = 0.2D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)	<b>70÷90</b>	<b>45+65</b>	<b>30+50</b>	<b>80÷120</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.007	0.006	0.005	0.009
3	0.011	0.009	0.008	0.014
4	0.014	0.012	0.011	0.018
5	0.018	0.015	0.013	0.023
6	0.021	0.018	0.016	0.027
8	0.028	0.024	0.021	0.037
10	0.035	0.030	0.026	0.046
12	0.045	0.038	0.034	0.059

< D3 mm: ae = 0.1D

### G2312

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)	<b>55+75</b>	<b>40+60</b>	<b>20+40</b>	<b>70+90</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
8	0.020	0.017	0.015	0.026
10	0.025	0.021	0.019	0.033
12	0.032	0.027	0.024	0.042
14	0.037	0.031	0.028	0.048
16	0.045	0.038	0.034	0.059

HSS  
END-MILLS

CARBIDE  
BURRS





INFO

# GB405

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>
Vc (m/min)	<b>50÷70</b>	<b>40÷50</b>	<b>20÷40</b>	<b>80÷100</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.003	0.003	0.002	0.004	
<b>2</b>	0.006	0.006	0.005	0.008	
<b>3</b>	0.010	0.008	0.007	0.013	
<b>4</b>	0.013	0.011	0.010	0.017	
<b>5</b>	0.016	0.014	0.012	0.021	
<b>6</b>	0.020	0.017	0.015	0.026	
<b>8</b>	0.026	0.022	0.019	0.034	
<b>10</b>	0.031	0.026	0.023	0.040	
<b>12</b>	0.036	0.031	0.027	0.047	

< D3 mm: ae = 0.1D

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

**G2**

- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# G2CS4

cylindrical shank, 4 flutes



OSAWA  
NORM

N

MG  
PV200

<45  
HRC

30°

SQUARE

Z4

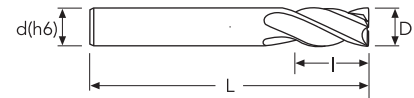
INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D	D Tol.	C	C Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
1	0/-0.020			4	3		50	4	G2CS4010	●
1.5	0/-0.020			4	4.5		50	4	G2CS4015	●
2	0/-0.020			4	6		50	4	G2CS4020	●
2.5	0/-0.020			4	7		50	4	G2CS4025	●
3	0/-0.020			4	8		50	4	G2CS4030	●
3.5	0/-0.020			4	10		50	4	G2CS4035	●
4	0/-0.020			4	11		50	4	G2CS4040	●
4.5	0/-0.020			6	13		50	4	G2CS4045	●
5	0/-0.020			6	13		50	4	G2CS4050	●
5.5	0/-0.020			6	13		50	4	G2CS4055	●
6	0/-0.020			6	15		50	4	G2CS4060	●
6.5	0/-0.025			8	17		60	4	G2CS4065	●
7	0/-0.025			8	17		60	4	G2CS4070	●
7.5	0/-0.025			8	17		60	4	G2CS4075	●
8	0/-0.025			8	20		60	4	G2CS4080	●
8.5	0/-0.025			10	23		75	4	G2CS4085	●
9	0/-0.025			10	23		75	4	G2CS4090	●
9.5	0/-0.025			10	25		75	4	G2CS4095	●
10	0/-0.025			10	30		75	4	G2CS4100	●
10.5	0/-0.025			12	25		75	4	G2CS4105	●
11	0/-0.025			12	30		75	4	G2CS4110	●
11.5	0/-0.025			12	28		75	4	G2CS4115	●
12	0/-0.025			12	30		75	4	G2CS4120	●
12.5	0/-0.030			14	26		83	4	G2CS4125	●
13	0/-0.030			14	26		83	4	G2CS4130	●
13.5	0/-0.030			14	26		83	4	G2CS4135	●
14	0/-0.030			14	26		83	4	G2CS4140	●
14.5	0/-0.030			16	32		92	4	G2CS4145	●
15	0/-0.030			16	32		92	4	G2CS4150	●
15.5	0/-0.030			16	32		92	4	G2CS4155	●
16	0/-0.030			16	32		92	4	G2CS4160	●
17	0/-0.030			20	40		100	4	G2CS4170	●
18	0/-0.030			20	40		100	4	G2CS4180	●
19	0/-0.030			20	40		100	4	G2CS4190	●
20	0/-0.030			20	40		100	4	G2CS4200	●
22	0/-0.030			25	40		100	4	G2CS4220	●
25	0/-0.030			25	40		100	4	G2CS4250	●

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

**G2**  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# G2CS4

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.004	0.003	0.003	0.005
<b>2</b>	0.007	0.006	0.005	0.009
<b>3</b>	0.010	0.009	0.008	0.013
<b>4</b>	0.013	0.011	0.010	0.017
<b>5</b>	0.016	0.014	0.012	0.021
<b>6</b>	0.019	0.016	0.014	0.025
<b>8</b>	0.025	0.021	0.019	0.033
<b>10</b>	0.032	0.027	0.024	0.042
<b>12</b>	0.040	0.034	0.030	0.052
<b>14</b>	0.047	0.040	0.035	0.061
<b>16</b>	0.054	0.046	0.041	0.070
<b>18</b>	0.060	0.051	0.045	0.078
<b>20</b>	0.065	0.055	0.049	0.085
<b>22</b>	0.073	0.062	0.055	0.095
<b>25</b>	0.083	0.071	0.062	0.108

< D3 mm: ae = 0.1D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

**G2**

MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

## G2WS4

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.010	0.009	0.008	0.013	
<b>4</b>	0.013	0.011	0.010	0.017	
<b>5</b>	0.016	0.014	0.012	0.021	
<b>6</b>	0.019	0.016	0.014	0.025	
<b>8</b>	0.025	0.021	0.019	0.033	
<b>10</b>	0.032	0.027	0.024	0.042	
<b>12</b>	0.040	0.034	0.030	0.052	
<b>14</b>	0.047	0.040	0.035	0.061	
<b>16</b>	0.054	0.046	0.041	0.070	
<b>18</b>	0.060	0.051	0.045	0.078	
<b>20</b>	0.065	0.055	0.049	0.085	

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS

G2

 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS

# G2410-11-12-13

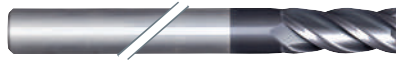
cylindrical shank, 4 flutes, long



INFO



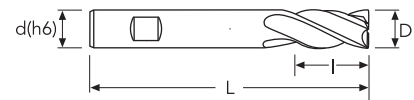
G2410



G2411-G2412-G2413



★ 1st choice ☆ suitable



CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D	D Tol.	C	C Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
2	0/-0.030			4	9		75	4	G2410020	●
2.5	0/-0.030			4	10		75	4	G2410025	●
3	0/-0.030			4	15		75	4	G2410030	●
3.5	0/-0.030			4	15		75	4	G2410035	●
4	0/-0.030			4	20		75	4	G2410040	●
4.5	0/-0.030			6	20		75	4	G2410045	●
5	0/-0.030			6	25		75	4	G2410050	●
6	0/-0.030			6	25		75	4	G2410060	●
3	0/-0.030			6	15		100	4	G2411030	●
4	0/-0.030			6	25		100	4	G2411040	●
5	0/-0.030			6	30		100	4	G2411050	●
6	0/-0.030			6	30		100	4	G2411060	●
7	0/-0.030			8	35		100	4	G2411070	●
8	0/-0.035			8	35		100	4	G2411080	●
9	0/-0.035			10	40		100	4	G2411090	●
10	0/-0.035			10	40		100	4	G2411100	●
11	0/-0.035			12	45		100	4	G2411110	●
12	0/-0.035			12	45		100	4	G2411120	●
8	0/-0.035			8	40		150	4	G2412080	●
10	0/-0.035			10	50		150	4	G2412100	●
12	0/-0.035			12	50		150	4	G2412120	●
16	0/-0.040			16	70		150	4	G2412160	●
18	0/-0.040			20	80		150	4	G2412180	●
20	0/-0.040			20	80		150	4	G2412200	●
16	0/-0.040			16	40		200	4	G2413160	●
20	0/-0.040			20	40		200	4	G2413200	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

## G2410-G2411

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>70+90</b>	<b>45+65</b>	<b>30+50</b>	<b>80+120</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>2</b>	0.006	0.005	0.005	0.008	
<b>3</b>	0.009	0.008	0.007	0.012	
<b>4</b>	0.012	0.010	0.009	0.015	
<b>5</b>	0.014	0.012	0.011	0.019	
<b>6</b>	0.017	0.015	0.013	0.022	
<b>8</b>	0.023	0.019	0.017	0.029	
<b>10</b>	0.029	0.024	0.022	0.037	
<b>12</b>	0.036	0.031	0.027	0.047	

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

&lt; D3 mm: ae = 0.1D

## G2412-G2413

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>55+75</b>	<b>40+60</b>	<b>20+40</b>	<b>70+90</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>8</b>	0.020	0.017	0.015	0.026	
<b>10</b>	0.026	0.022	0.019	0.033	
<b>12</b>	0.032	0.027	0.024	0.042	
<b>14</b>	0.038	0.032	0.028	0.049	
<b>16</b>	0.043	0.037	0.032	0.056	
<b>20</b>	0.065	0.055	0.049	0.085	

HSS  
DRILLS
 LF TA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS

G2

 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS





INFO

## G2CSHM

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
	ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	
	Vc (m/min)	<b>100÷120</b>	<b>70÷90</b>	<b>50÷70</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
<b>6</b>	0.016	0.014	0.012		
<b>8</b>	0.020	0.017	0.015		
<b>10</b>	0.025	0.021	0.019		
<b>12</b>	0.030	0.026	0.023		
<b>14</b>	0.035	0.030	0.026		
<b>16</b>	0.040	0.034	0.030		
<b>20</b>	0.050	0.043	0.038		

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS

G2

 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS



INFO

## G2CSFR

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



D6-8: Z3  
D10-20: Z4

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>		
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>		
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
<b>6</b>	0.030	0.026	0.023		
<b>8</b>	0.045	0.038	0.034		
<b>10</b>	0.060	0.051	0.045		
<b>12</b>	0.072	0.061	0.054		
<b>14</b>	0.085	0.072	0.064		
<b>16</b>	0.096	0.082	0.072		
<b>20</b>	0.120	0.102	0.090		

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

**G2**

MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

## G2WSFR

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



D6-8: Z3  
D10-20: Z4

Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
<b>6</b>	0.030	0.026	0.023	
<b>8</b>	0.045	0.038	0.034	
<b>10</b>	0.060	0.051	0.045	
<b>12</b>	0.072	0.061	0.054	
<b>14</b>	0.085	0.072	0.064	
<b>16</b>	0.096	0.082	0.072	
<b>20</b>	0.120	0.102	0.090	

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

**G2**

MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# G2CS2R

cylindrical shank, 2 flutes, corner radius



OSAWA  
NORM

N

MG  
PV200

<45  
HRC

30°

RADIUS

Z

INFO

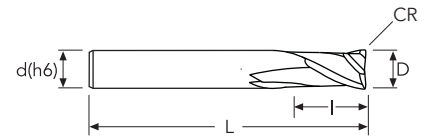
P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable

SLOTTING

SIDE MILLING

DRILLING



CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

D	D Tol.	CR	CR Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
1	0/-0.020	0.20	+/-0.010	4	2		50	2	G2CS2R02010	●
1.5	0/-0.020	0.20	+/-0.010	4	3		50	2	G2CS2R02015	●
1.5	0/-0.020	0.50	+/-0.010	4	3		50	2	G2CS2R05015	●
2	0/-0.020	0.20	+/-0.010	4	4		50	2	G2CS2R02020	●
2	0/-0.020	0.50	+/-0.010	4	4		50	2	G2CS2R05020	●
2.5	0/-0.020	0.20	+/-0.010	4	5		50	2	G2CS2R02025	●
2.5	0/-0.020	0.50	+/-0.010	4	5		50	2	G2CS2R05025	●
3	0/-0.020	0.20	+/-0.010	4	6		50	2	G2CS2R02030	●
3	0/-0.020	0.50	+/-0.010	4	6		50	2	G2CS2R05030	●
3	0/-0.020	1.00	+/-0.010	4	6		50	2	G2CS2R10030	●
4	0/-0.020	0.20	+/-0.010	4	8		50	2	G2CS2R02040	●
4	0/-0.020	0.50	+/-0.010	4	8		50	2	G2CS2R05040	●
4	0/-0.020	1.00	+/-0.010	4	8		50	2	G2CS2R10040	●
5	0/-0.020	0.50	+/-0.010	6	10		50	2	G2CS2R05050	●
5	0/-0.020	1.00	+/-0.010	6	10		50	2	G2CS2R10050	●
6	0/-0.020	0.20	+/-0.010	6	12		50	2	G2CS2R02060	●
6	0/-0.020	0.50	+/-0.010	6	12		50	2	G2CS2R05060	●
6	0/-0.020	1.00	+/-0.010	6	12		50	2	G2CS2R10060	●
6	0/-0.020	1.50	+/-0.010	6	12		50	2	G2CS2R15060	●
6	0/-0.020	2.00	+/-0.010	6	12		50	2	G2CS2R20060	●
8	0/-0.025	0.50	+/-0.010	8	16		60	2	G2CS2R05080	●
8	0/-0.025	1.00	+/-0.010	8	16		60	2	G2CS2R10080	●
8	0/-0.025	1.50	+/-0.010	8	16		60	2	G2CS2R15080	●
8	0/-0.025	2.00	+/-0.010	8	16		60	2	G2CS2R20080	●
10	0/-0.025	0.50	+/-0.010	10	20		75	2	G2CS2R05100	●
10	0/-0.025	1.00	+/-0.010	10	20		75	2	G2CS2R10100	●
10	0/-0.025	1.50	+/-0.010	10	20		75	2	G2CS2R15100	●
10	0/-0.025	2.00	+/-0.010	10	20		75	2	G2CS2R20100	●
12	0/-0.025	0.50	+/-0.010	12	24		75	2	G2CS2R05120	●
12	0/-0.025	1.00	+/-0.010	12	24		75	2	G2CS2R10120	●
12	0/-0.025	1.50	+/-0.010	12	24		75	2	G2CS2R15120	●
12	0/-0.025	2.00	+/-0.010	12	24		75	2	G2CS2R20120	●

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

### G2CS2R

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.004	0.003	0.003	0.005
2	0.008	0.007	0.006	0.010
3	0.012	0.010	0.009	0.016
4	0.016	0.014	0.012	0.021
5	0.020	0.017	0.015	0.026
6	0.025	0.021	0.019	0.033
8	0.032	0.027	0.024	0.042
10	0.038	0.032	0.029	0.049
12	0.045	0.038	0.034	0.059

< D3 mm: ap = 0.2D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.005	0.004	0.004	0.006
2	0.010	0.008	0.007	0.012
3	0.014	0.012	0.011	0.019
4	0.019	0.016	0.014	0.025
5	0.024	0.020	0.018	0.031
6	0.030	0.026	0.023	0.039
8	0.038	0.033	0.029	0.050
10	0.046	0.039	0.034	0.059
12	0.054	0.046	0.041	0.070

< D3 mm: ae = 0.2D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>
Vc (m/min)	<b>70÷90</b>	<b>40÷60</b>	<b>25÷35</b>	<b>80÷100</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.002	0.002	0.002	0.003
2	0.005	0.004	0.004	0.006
3	0.007	0.006	0.005	0.009
4	0.010	0.008	0.007	0.012
5	0.012	0.010	0.009	0.016
6	0.015	0.013	0.011	0.020
8	0.019	0.016	0.014	0.025
10	0.023	0.019	0.017	0.030
12	0.027	0.023	0.020	0.035

< D3 mm: ap = 0.5D

CARBIDE  
BURRS



# G2CS4R

cylindrical shank, 4 flutes, corner radius



OSAWA  
NORM

N

MG  
PV200

<45  
HRC

30°

RADIUS

Z4

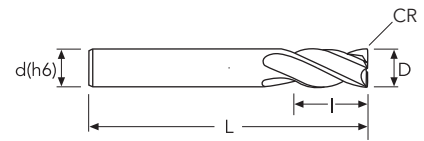
INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
1	0/-0.020	0.20	+/-0.010	4	2		50	4	G2CS4R02010	●
1.5	0/-0.020	0.20	+/-0.010	4	3		50	4	G2CS4R02015	●
1.5	0/-0.020	0.50	+/-0.010	4	3		50	4	G2CS4R05015	●
2	0/-0.020	0.20	+/-0.010	4	4		50	4	G2CS4R02020	●
2	0/-0.020	0.50	+/-0.010	4	4		50	4	G2CS4R05020	●
2.5	0/-0.020	0.20	+/-0.010	4	5		50	4	G2CS4R02025	●
2.5	0/-0.020	0.50	+/-0.010	4	5		50	4	G2CS4R05025	●
3	0/-0.020	0.20	+/-0.010	4	6		50	4	G2CS4R02030	●
3	0/-0.020	0.50	+/-0.010	4	6		50	4	G2CS4R05030	●
3	0/-0.020	1.00	+/-0.010	4	6		50	4	G2CS4R10030	●
4	0/-0.020	0.20	+/-0.010	4	8		50	4	G2CS4R02040	●
4	0/-0.020	0.50	+/-0.010	4	8		50	4	G2CS4R05040	●
4	0/-0.020	1.00	+/-0.010	4	8		50	4	G2CS4R10040	●
5	0/-0.020	0.50	+/-0.010	6	10		50	4	G2CS4R05050	●
5	0/-0.020	1.00	+/-0.010	6	10		50	4	G2CS4R10050	●
6	0/-0.020	0.20	+/-0.010	6	12		50	4	G2CS4R02060	●
6	0/-0.020	0.50	+/-0.010	6	12		50	4	G2CS4R05060	●
6	0/-0.020	1.00	+/-0.010	6	12		50	4	G2CS4R10060	●
6	0/-0.020	1.50	+/-0.010	6	12		50	4	G2CS4R15060	●
6	0/-0.020	2.00	+/-0.010	6	12		50	4	G2CS4R20060	●
8	0/-0.025	0.50	+/-0.010	8	16		60	4	G2CS4R05080	●
8	0/-0.025	1.00	+/-0.010	8	16		60	4	G2CS4R10080	●
8	0/-0.025	1.50	+/-0.010	8	16		60	4	G2CS4R15080	●
8	0/-0.025	2.00	+/-0.010	8	16		60	4	G2CS4R20080	●
10	0/-0.025	0.50	+/-0.010	10	20		75	4	G2CS4R05100	●
10	0/-0.025	1.00	+/-0.010	10	20		75	4	G2CS4R10100	●
10	0/-0.025	1.50	+/-0.010	10	20		75	4	G2CS4R15100	●
10	0/-0.025	2.00	+/-0.010	10	20		75	4	G2CS4R20100	●
10	0/-0.025	2.50	+/-0.010	10	20		75	4	G2CS4R25100	●
10	0/-0.025	3.00	+/-0.010	10	20		75	4	G2CS4R30100	●
12	0/-0.025	0.50	+/-0.010	12	24		75	4	G2CS4R05120	●
12	0/-0.025	1.00	+/-0.010	12	24		75	4	G2CS4R10120	●
12	0/-0.025	1.50	+/-0.010	12	24		75	4	G2CS4R15120	●
12	0/-0.025	2.00	+/-0.010	12	24		75	4	G2CS4R20120	●
12	0/-0.025	2.50	+/-0.010	12	24		75	4	G2CS4R25120	●
12	0/-0.025	3.00	+/-0.010	12	24		75	4	G2CS4R30120	●

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

**G2**  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# G2CS4R

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>
Vc (m/min)	<b>80±100</b>	<b>50±70</b>	<b>30±50</b>	<b>100±120</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.004	0.003	0.003	0.005	0.005
<b>2</b>	0.007	0.006	0.005	0.009	0.009
<b>3</b>	0.010	0.009	0.008	0.013	0.013
<b>4</b>	0.013	0.011	0.010	0.017	0.017
<b>5</b>	0.016	0.014	0.012	0.021	0.021
<b>6</b>	0.019	0.016	0.014	0.025	0.025
<b>8</b>	0.025	0.021	0.019	0.033	0.033
<b>10</b>	0.032	0.027	0.024	0.042	0.042
<b>12</b>	0.040	0.034	0.030	0.052	0.052

< D3 mm: ae = 0.1D

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

**G2**

- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

# G2CL4R

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>
Vc (m/min)	<b>55÷75</b>	<b>40÷60</b>	<b>20÷40</b>	<b>70÷90</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.004	0.003	0.003	0.004
<b>2</b>	0.006	0.005	0.005	0.007
<b>3</b>	0.009	0.008	0.007	0.010
<b>4</b>	0.012	0.010	0.009	0.013
<b>5</b>	0.015	0.013	0.011	0.017
<b>6</b>	0.017	0.014	0.013	0.019
<b>8</b>	0.023	0.020	0.017	0.030
<b>10</b>	0.029	0.025	0.022	0.038
<b>12</b>	0.036	0.031	0.027	0.047

< D3 mm: ae = 0.1D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

**G2**

MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# GB255

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae		<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>
Vc (m/min)		<b>50÷70</b>	<b>35÷55</b>	<b>20÷40</b>	<b>80÷120</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	<b>0.60</b>	0.030	0.023	0.021	0.036
<b>2</b>	<b>1.20</b>	0.040	0.030	0.028	0.048
<b>3</b>	<b>1.80</b>	0.050	0.038	0.035	0.060
<b>4</b>	<b>2.40</b>	0.060	0.045	0.042	0.072
<b>5</b>	<b>3.00</b>	0.070	0.053	0.049	0.084
<b>6</b>	<b>3.60</b>	0.080	0.060	0.056	0.096
<b>8</b>	<b>4.80</b>	0.090	0.068	0.063	0.108
<b>10</b>	<b>6.00</b>	0.105	0.079	0.074	0.126
<b>12</b>	<b>7.20</b>	0.120	0.090	0.084	0.144

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

**G2**

MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# G2CSB2

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae		<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>
Vc (m/min)		<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>110÷130</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	<b>0.60</b>	0.030	0.023	0.021	0.036
<b>2</b>	<b>1.20</b>	0.040	0.030	0.028	0.048
<b>3</b>	<b>1.80</b>	0.050	0.038	0.035	0.060
<b>4</b>	<b>2.40</b>	0.060	0.045	0.042	0.072
<b>5</b>	<b>3.00</b>	0.070	0.053	0.049	0.084
<b>6</b>	<b>3.60</b>	0.080	0.060	0.056	0.096
<b>8</b>	<b>4.80</b>	0.090	0.068	0.063	0.108
<b>10</b>	<b>6.00</b>	0.105	0.079	0.074	0.126
<b>12</b>	<b>7.20</b>	0.120	0.090	0.084	0.144
<b>16</b>	<b>9.60</b>	0.150	0.113	0.105	0.180
<b>20</b>	<b>12.00</b>	0.180	0.135	0.126	0.216

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2

MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS





INFO

### G2250

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae		<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>
Vc (m/min)		<b>70÷90</b>	<b>50÷70</b>	<b>40÷50</b>	<b>100÷120</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	<b>0.60</b>	0.027	0.020	0.019	0.032
<b>2</b>	<b>1.20</b>	0.036	0.027	0.025	0.043
<b>3</b>	<b>1.80</b>	0.045	0.034	0.032	0.054
<b>4</b>	<b>2.40</b>	0.054	0.041	0.038	0.065
<b>5</b>	<b>3.00</b>	0.063	0.047	0.044	0.076
<b>6</b>	<b>3.60</b>	0.072	0.054	0.050	0.086
<b>8</b>	<b>4.80</b>	0.081	0.061	0.057	0.097
<b>10</b>	<b>6.00</b>	0.095	0.071	0.066	0.113
<b>12</b>	<b>7.20</b>	0.108	0.081	0.076	0.130

### G2251

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513		P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae		<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>
Vc (m/min)		<b>60÷80</b>	<b>40÷60</b>	<b>35÷45</b>	<b>90÷110</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	<b>3.60</b>	0.058	0.044	0.041	0.070
<b>8</b>	<b>4.80</b>	0.066	0.049	0.046	0.079
<b>10</b>	<b>6.00</b>	0.077	0.057	0.054	0.092
<b>12</b>	<b>7.20</b>	0.087	0.066	0.061	0.105
<b>16</b>	<b>9.60</b>	0.122	0.092	0.085	0.146
<b>20</b>	<b>12.00</b>	0.146	0.110	0.102	0.175

CARBIDE  
END-MILLS

G2

MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# G2CSB4

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae		<b>0.1D x 0.3D</b>	<b>0.1D x 0.3D</b>	<b>0.1D x 0.3D</b>	<b>0.1D x 0.3D</b>
Vc (m/min)		<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>110÷130</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	<b>0.60</b>	0.030	0.023	0.021	0.036
<b>2</b>	<b>1.20</b>	0.040	0.030	0.028	0.048
<b>3</b>	<b>1.80</b>	0.050	0.038	0.035	0.060
<b>4</b>	<b>2.40</b>	0.060	0.045	0.042	0.072
<b>5</b>	<b>3.00</b>	0.070	0.053	0.049	0.084
<b>6</b>	<b>3.60</b>	0.080	0.060	0.056	0.096
<b>8</b>	<b>4.80</b>	0.090	0.068	0.063	0.108
<b>10</b>	<b>6.00</b>	0.105	0.079	0.074	0.126
<b>12</b>	<b>7.20</b>	0.120	0.090	0.084	0.144
<b>16</b>	<b>9.60</b>	0.150	0.113	0.105	0.180
<b>20</b>	<b>12.00</b>	0.180	0.135	0.126	0.216

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2

MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

## MDTA

GENERAL PURPOSE

✚ MDTA is the Osawa range of micrograin carbide end mills with PV200 coating. MDTA endmills have been developed for general purpose milling up to 45 HRC. The exclusive and innovative PV200 coating (3500HV) ensures the best performance, even in applications with air blow or MQL (Minimum Quantity Lubrication).

🇮🇹 MDTA sono le frese Osawa in metallo duro micrograna con rivestimento PV200 sviluppate per la fresatura di materiali generici sino a 45 HRC. L'esclusivo e innovativo rivestimento PV200 (3500HV) garantisce performance elevate anche in lavorazioni con impiego di refrigerazione con getto d'aria o MQL (Minimum Quantity Lubrication).

🇩🇪 MDTA sind Fräser von Osawa aus Mikrokörnungs-Hartmetall mit Beschichtung PV200, die für das Fräsen von allgemeinen Materialien bis zu 45 HRC entwickelt wurden. Die exklusive und innovative Beschichtung PV200 (3500HV) gewährleistet auch bei Bearbeitungen mit Kühlung durch Luftstrahl oder MQL (Minimum Quantity Lubrication) hohe Leistungen.

🇫🇷 MDTA sont les fraises Osawa en carbure micrograin avec revêtement PV200 développées pour le fraisage de matériaux génériques jusqu'à 45 HRC. Le revêtement PV200 (3500HV) exclusif et innovant garantit des performances élevées même pour les usinages employant un système de lubrification avec jet d'air ou MQL (Minimum Quantity Lubrication).

🇪🇸 MDTA son las fresas Osawa de metal duro micrograno con revestimiento PV200 desarrolladas para el fresado de materiales genéricos hasta 45 HRC. Su exclusivo e innovador revestimiento PV200 (3500HV) garantiza rendimientos elevados incluso en elaboraciones con el uso de refrigeración con chorro de aire o MQL (Minimum Quantity Lubrication).

🇷🇺 MDTA - это фрезы фирмы Osawa из твёрдого сплава с мелкозернистой структурой и покрытием PV200, предназначенные для стандартной обработки материалов с твёрдостью до 45 HRC. Эксклюзивное и инновационное покрытие PV200 (3500HV) гарантирует высокую производительность, даже, при обработке с обдувом воздухом или с масляным туманом.

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



CUTTING PARAMETERS

INFO

### MDTACS2

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.004	0.003	0.003	0.005
	2	0.008	0.007	0.006	0.010
	3	0.012	0.010	0.009	0.016
	4	0.016	0.014	0.012	0.021
	5	0.020	0.017	0.015	0.026
	6	0.025	0.021	0.019	0.033
	8	0.032	0.027	0.024	0.042
	10	0.038	0.032	0.029	0.049
	12	0.045	0.038	0.034	0.059
	14	0.052	0.044	0.039	0.068
16	0.060	0.051	0.045	0.078	
18	0.070	0.060	0.053	0.091	
20	0.080	0.068	0.060	0.104	

< D3 mm: ap = 0.2D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.005	0.004	0.004	0.006
	2	0.010	0.008	0.007	0.012
	3	0.014	0.012	0.011	0.019
	4	0.019	0.016	0.014	0.025
	5	0.024	0.020	0.018	0.031
	6	0.030	0.026	0.023	0.039
	8	0.038	0.033	0.029	0.050
	10	0.046	0.039	0.034	0.059
	12	0.054	0.046	0.041	0.070
	14	0.062	0.053	0.047	0.081
16	0.072	0.061	0.054	0.094	
18	0.084	0.071	0.063	0.109	
20	0.096	0.082	0.072	0.125	

< D3 mm: ae = 0.2D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>
	Vc (m/min)	<b>70÷90</b>	<b>40÷60</b>	<b>25÷35</b>	<b>80÷100</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.002	0.002	0.002	0.003
	2	0.005	0.004	0.004	0.006
	3	0.007	0.006	0.005	0.009
	4	0.010	0.008	0.007	0.012
	5	0.012	0.010	0.009	0.016
	6	0.015	0.013	0.011	0.020
	8	0.019	0.016	0.014	0.025
	10	0.023	0.019	0.017	0.030
	12	0.027	0.023	0.020	0.035
	14	0.031	0.027	0.023	0.041
16	0.036	0.031	0.027	0.047	
18	0.042	0.036	0.032	0.055	
20	0.048	0.041	0.036	0.062	

< D3 mm: ap = 0.5D

HSS END-MILLS

CARBIDE BURRS





CUTTING PARAMETERS

**MDTA210**

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>70÷90</b>	<b>45÷65</b>	<b>30÷40</b>	<b>70÷80</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.010	0.009	0.008	0.013
	<b>4</b>	0.014	0.012	0.011	0.018
	<b>5</b>	0.018	0.015	0.014	0.023
	<b>6</b>	0.023	0.019	0.017	0.029
	<b>8</b>	0.030	0.026	0.023	0.039
<b>10</b>	0.035	0.030	0.026	0.046	
<b>12</b>	0.041	0.035	0.031	0.053	

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>
	Vc (m/min)	<b>70÷90</b>	<b>45÷65</b>	<b>30÷50</b>	<b>80÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0,012	0,010	0,009	0,016
	<b>4</b>	0,017	0,014	0,013	0,022
	<b>5</b>	0,022	0,018	0,016	0,028
	<b>6</b>	0,027	0,023	0,020	0,035
	<b>8</b>	0,036	0,031	0,027	0,047
<b>10</b>	0,042	0,036	0,032	0,055	
<b>12</b>	0,049	0,042	0,037	0,064	

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>
	Vc (m/min)	<b>60÷80</b>	<b>40÷60</b>	<b>25÷35</b>	<b>70÷100</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.006	0.005	0.005	0.008
	<b>4</b>	0.008	0.007	0.006	0.011
	<b>5</b>	0.011	0.009	0.008	0.014
	<b>6</b>	0.014	0.011	0.010	0.018
	<b>8</b>	0.018	0.015	0.014	0.023
<b>10</b>	0.021	0.018	0.016	0.027	
<b>12</b>	0.025	0.021	0.018	0.032	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

**MDCL2**

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>
	Vc (m/min)	<b>40+50</b>	<b>25+35</b>	<b>20+30</b>	<b>60+80</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.010	0.008	0.007	0.011
	<b>4</b>	0.013	0.011	0.010	0.014
	<b>5</b>	0.016	0.014	0.012	0.018
	<b>6</b>	0.020	0.017	0.015	0.022
	<b>8</b>	0.026	0.022	0.019	0.033
<b>10</b>	0.030	0.026	0.023	0.040	
<b>12</b>	0.036	0.031	0.027	0.047	

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
	Vc (m/min)	<b>45+55</b>	<b>30+40</b>	<b>25+35</b>	<b>70+90</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.012	0.010	0.009	0.013
	<b>4</b>	0.015	0.013	0.012	0.017
	<b>5</b>	0.019	0.016	0.014	0.021
	<b>6</b>	0.024	0.020	0.018	0.027
	<b>8</b>	0.031	0.026	0.023	0.040
<b>10</b>	0.036	0.031	0.027	0.047	
<b>12</b>	0.043	0.037	0.032	0.056	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# MDTACS3

cylindrical shank, 3 flutes

OSAWA  
NORM

N

MG  
PV200

<45  
HRC

30°

SQUARE

Z3



CARBIDE  
DRILLS

PU-HPU  
TA-4HTA

SUH

ALH

HRC

SUH MINI

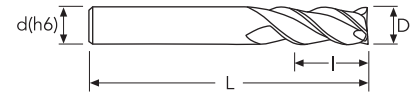
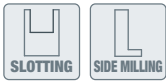
HL

HSD

C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D	D Tol.	C	C Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
1	0/-0.015			3	3		40	3	MDTACS3010403	●
1	0/-0.015			4	3		40	3	MDTACS3010404	●
1.5	0/-0.015			3	4.5		40	3	MDTACS3015403	●
1.5	0/-0.015			4	4.5		40	3	MDTACS3015404	●
2	0/-0.015			3	6.5		40	3	MDTACS3020403	●
2	0/-0.015			4	6.5		40	3	MDTACS3020404	●
2.5	0/-0.015			3	6.5		40	3	MDTACS3025403	●
2.5	0/-0.015			4	6.5		40	3	MDTACS3025404	●
3	0/-0.020			3	9		40	3	MDTACS3030403	●
4	0/-0.020			4	12		50	3	MDTACS3040504	●
5	0/-0.020			6	15		50	3	MDTACS3050506	●
6	0/-0.020			6	16		50	3	MDTACS3060	●
8	0/-0.020			8	20		64	3	MDTACS308064	●
10	0/-0.020			10	22		70	3	MDTACS3100	●
12	0/-0.020			12	25		75	3	MDTACS312075	●
14	0/-0.020			14	25		75	3	MDTACS3140	●
16	0/-0.020			16	32		90	3	MDTACS316090	●
20	0/-0.020			20	38		100	3	MDTACS320038	●

HSS  
DRILLS

LFTA

SUTA

HSS-HSS/CO

CARBIDE  
END-MILLS

G2

MDTA

HF VH/UP

MEF

ALU

MEX/MH

UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

### MDTACS3

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.004	0.003	0.003	0.005	
2	0.008	0.007	0.006	0.010	
3	0.011	0.009	0.008	0.014	
4	0.014	0.012	0.011	0.019	
5	0.018	0.015	0.013	0.023	
6	0.021	0.018	0.016	0.027	
8	0.028	0.023	0.021	0.036	
10	0.035	0.030	0.026	0.046	
12	0.044	0.037	0.033	0.057	
14	0.052	0.044	0.039	0.067	
16	0.059	0.050	0.045	0.077	
18	0.066	0.056	0.050	0.086	
20	0.072	0.061	0.054	0.093	

< D3 mm: ap = 0.2D

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.005	0.004	0.003	0.006	
2	0.009	0.008	0.007	0.012	
3	0.013	0.011	0.010	0.017	
4	0.017	0.015	0.013	0.022	
5	0.021	0.018	0.016	0.027	
6	0.025	0.021	0.019	0.033	
8	0.033	0.028	0.025	0.043	
10	0.042	0.036	0.032	0.055	
12	0.053	0.045	0.040	0.069	
14	0.062	0.053	0.047	0.081	
16	0.071	0.061	0.053	0.093	
18	0.079	0.067	0.059	0.103	
20	0.086	0.073	0.064	0.112	

< D3 mm: ae = 0.1D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

**MDTAWSH3**

<p>SLOTTING</p>	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>80÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.009	0.008	0.007	0.012	
4	0.013	0.011	0.009	0.016	
5	0.016	0.013	0.012	0.020	
6	0.019	0.016	0.014	0.024	
8	0.025	0.021	0.019	0.033	
10	0.031	0.027	0.023	0.041	
12	0.040	0.034	0.030	0.052	
14	0.046	0.039	0.035	0.060	
16	0.056	0.048	0.042	0.073	
18	0.065	0.055	0.049	0.085	
20	0.075	0.064	0.056	0.098	

<p>SIDE MILLING</p>	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
	Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>110÷130</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.011	0.010	0.008	0.015	
4	0.015	0.013	0.011	0.020	
5	0.019	0.016	0.014	0.024	
6	0.023	0.019	0.017	0.029	
8	0.030	0.026	0.023	0.039	
10	0.038	0.032	0.028	0.049	
12	0.048	0.041	0.036	0.062	
14	0.056	0.047	0.042	0.072	
16	0.068	0.057	0.051	0.088	
18	0.078	0.066	0.059	0.101	
20	0.090	0.077	0.068	0.117	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS





CUTTING PARAMETERS

**MDTACS4**

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>1.5D x 0.2D</b>	<b>0.5D x D</b>	
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>100÷120</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.004	0.003	0.003	0.005	
<b>2</b>	0.007	0.006	0.005	0.009	
<b>3</b>	0.010	0.009	0.008	0.013	
<b>4</b>	0.013	0.011	0.010	0.017	
<b>5</b>	0.016	0.014	0.012	0.021	
<b>6</b>	0.019	0.016	0.014	0.025	
<b>8</b>	0.025	0.021	0.019	0.033	
<b>10</b>	0.032	0.027	0.024	0.042	
<b>12</b>	0.040	0.034	0.030	0.052	
<b>14</b>	0.047	0.040	0.035	0.061	
<b>16</b>	0.054	0.046	0.041	0.070	
<b>18</b>	0.060	0.051	0.045	0.078	
<b>20</b>	0.065	0.055	0.049	0.085	
<b>22</b>	0.073	0.062	0.055	0.095	
<b>25</b>	0.083	0.071	0.062	0.108	



< D3 mm: ae = 0.1D

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
**MDTA**  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS


CARBIDE BURRS



## CUTTING PARAMETERS

INFO

## MDTA410

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
	Vc (m/min)	<b>70÷90</b>	<b>45÷65</b>	<b>30÷50</b>	<b>80÷120</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>2</b>	0.006	0.005	0.005	0.008
	<b>3</b>	0.009	0.008	0.007	0.012
	<b>4</b>	0.012	0.010	0.009	0.015
	<b>5</b>	0.014	0.012	0.011	0.019
	<b>6</b>	0.017	0.015	0.013	0.022
<b>8</b>	0.023	0.019	0.017	0.029	
<b>10</b>	0.029	0.024	0.022	0.037	
<b>12</b>	0.036	0.031	0.027	0.047	
<b>14</b>	0.042	0.036	0.032	0.065	
<b>16</b>	0.048	0.041	0.036	0.062	


CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
**MDTA**  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS



## CUTTING PARAMETERS

INFO

## MDCL4

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
	Vc (m/min)	<b>45+55</b>	<b>30+40</b>	<b>25+35</b>	<b>70+90</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.008	0.007	0.006	0.009
	<b>4</b>	0.010	0.009	0.008	0.011
	<b>5</b>	0.013	0.011	0.010	0.014
	<b>6</b>	0.015	0.013	0.011	0.017
	<b>8</b>	0.020	0.017	0.015	0.026
<b>10</b>	0.026	0.022	0.019	0.033	
<b>12</b>	0.032	0.027	0.024	0.042	
<b>14</b>	0.038	0.032	0.028	0.049	
<b>16</b>	0.043	0.037	0.032	0.056	
<b>20</b>	0.052	0.044	0.039	0.068	

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
**MDTA**  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS



CUTTING PARAMETERS

INFO

### MDTAUPR

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>1.5D x 0.1D</b>	
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
	<b>6</b>	0.030	0.026	0.023	
	<b>8</b>	0.045	0.038	0.034	
	<b>10</b>	0.055	0.047	0.041	
	<b>12</b>	0.065	0.055	0.049	
	<b>14</b>	0.075	0.064	0.056	
<b>16</b>	0.085	0.072	0.064		
<b>20</b>	0.100	0.085	0.075		

D6-8: Z3  
D10-20: Z4

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>30÷50</b>	
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
	<b>6</b>	0.040	0.034	0.030	
	<b>8</b>	0.055	0.047	0.041	
	<b>10</b>	0.065	0.055	0.049	
	<b>12</b>	0.080	0.068	0.060	
	<b>14</b>	0.090	0.077	0.068	
<b>16</b>	0.100	0.085	0.075		
<b>20</b>	0.120	0.102	0.090		

D6-8: Z3  
D10-20: Z4

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# MDTACSB2

cylindrical shank, 2 flutes ball nose

OSAWA  
NORM

N

MG  
PV200

<45  
HRC

30°

BALL NOSE

ZZ BALL

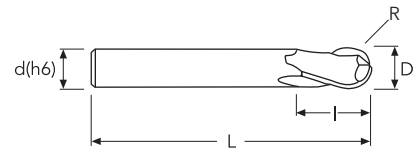


CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

D	D Tol.	R	R Tol.	d(h6)	I	I1	L	z	EDP No.	Stock
1	0/-0.030	0.50	0/-0.020	3	3		40	2	MDTACSB2010	●
1.5	0/-0.030	0.75	0/-0.020	3	5		40	2	MDTACSB2015	●
2	0/-0.030	1.00	0/-0.020	3	7		40	2	MDTACSB2020	●
2.5	0/-0.030	1.25	0/-0.020	3	8		40	2	MDTACSB2025	●
3	0/-0.030	1.50	0/-0.020	3	10		40	2	MDTACSB2030	●
4	0/-0.030	2.00	0/-0.020	4	12		40	2	MDTACSB2040	●
5	0/-0.030	2.50	0/-0.020	5	14		50	2	MDTACSB2050	●
6	0/-0.030	3.00	0/-0.020	6	7		50	2	MDTACSB2060	●
8	0/-0.030	4.00	0/-0.020	8	9		60	2	MDTACSB2080	●
10	0/-0.030	5.00	0/-0.020	10	10		60	2	MDTACSB2100	●
12	0/-0.030	6.00	0/-0.020	12	14		70	2	MDTACSB2120	●

CARBIDE  
END-MILLS

- G2
- MDTA**
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



CUTTING PARAMETERS

**MDTACSB2**

Material Group ISO 513		P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
ap x ae		<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>
Vc (m/min)		<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>110÷130</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	<b>0.60</b>	0.030	0.023	0.021	0.036
<b>2</b>	<b>1.20</b>	0.040	0.030	0.028	0.048
<b>3</b>	<b>1.80</b>	0.050	0.038	0.035	0.060
<b>4</b>	<b>2.40</b>	0.060	0.045	0.042	0.072
<b>5</b>	<b>3.00</b>	0.070	0.053	0.049	0.084
<b>6</b>	<b>3.60</b>	0.080	0.060	0.056	0.096
<b>8</b>	<b>4.80</b>	0.090	0.068	0.063	0.108
<b>10</b>	<b>6.00</b>	0.105	0.079	0.074	0.126
<b>12</b>	<b>7.20</b>	0.120	0.090	0.084	0.144



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
**MDTA**  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

**MDTA250**

	<b>Material Group ISO 513</b>		<b>P1 P2 K1</b>	<b>P3 P4 P7 M1 K2</b>	<b>P5 M2 K3</b>	<b>N1 N2 N3 N4</b>
	<b>Hardness/Rm</b>		≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	
	<b>ap x ae</b>		<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>	<b>0.1D x 0.1D</b>
	<b>Vc (m/min)</b>		<b>70÷90</b>	<b>50÷70</b>	<b>40÷50</b>	<b>100÷120</b>
	<b>D (mm)</b>	<b>D(eff.) (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>1</b>	<b>0.60</b>	0.027	0.020	0.019	0.032
	<b>2</b>	<b>1.20</b>	0.036	0.027	0.025	0.043
	<b>3</b>	<b>1.80</b>	0.045	0.034	0.032	0.054
	<b>4</b>	<b>2.40</b>	0.054	0.041	0.038	0.065
	<b>5</b>	<b>3.00</b>	0.063	0.047	0.044	0.076
	<b>6</b>	<b>3.60</b>	0.072	0.054	0.050	0.086
	<b>8</b>	<b>4.80</b>	0.081	0.061	0.057	0.097
<b>10</b>	<b>6.00</b>	0.095	0.071	0.066	0.113	
<b>12</b>	<b>7.20</b>	0.108	0.081	0.076	0.130	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
**MDTA**  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS





INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

## HF VH/UP

UNIVERSAL PURPOSE

✚ HF EVOLution is the Osawa family of micrograin carbide endmills for universal application with coatings and cutting edges specifically designed for high performance machining of all ISO materials. The HF EVOLution endmills are available in a broad range of types, lengths and radii. They are the ideal tools for both mass production and small batch manufacturing, thanks to the outstanding performance delivered and the universal applicability.

🇮🇹 HF EVOLution è la linea Osawa di frese universali in metallo duro micrograna con spoglie e rivestimenti specifici per la lavorazione ad alto rendimento di tutti i materiali della scala ISO. Le frese HF EVOLution sono disponibili in un'ampia gamma di tipologie, lunghezze e raggi torici. Sono gli utensili ideali sia per le superproduzioni di serie che per la produzione di piccoli lotti, grazie all'eccellenza del rendimento e all'universalità d'impiego.

🇩🇪 HF EVOLution heißt die Linie der Universalfräser aus mikrokörnigem Hartmetall von Osawa, mit Schneidekanten und spezifischen Beschichtungen zur Hochleistungsbearbeitung von allen Materialien der ISO-Skala. Die Fräser HF EVOLution sind in einer reichen Auswahl an Typologien, Längen und Torusradien erhältlich. Mit ihren ausgezeichneten Leistungen und dem universellen Einsatz sind sie die idealen Werkzeuge, sowohl für die Serienproduktion großer Mengen als auch für die Herstellung kleiner Lose.

🇫🇷 HF EVOLution est la ligne Osawa de fraises universelles en carbure micrograin avec dépouilles et revêtements spécifiques pour l'usinage de haute performance de tous les matériaux de l'échelle ISO. Les fraises HF EVOLution sont disponibles dans une large gamme, longueurs et rayons. Ce sont des outils aussi bien pour les grandes séries que pour la production de prototypes, grâce à leur excellence de rendement et leur polyvalence.

🇪🇸 HF EVOLution es la línea de fresas universales de metal duro microgranulado con inclinación y revestimientos específicos para el mecanizado de alto rendimiento de todos los materiales de la escala ISO. Las fresas HF EVOLution están disponibles en una amplia gama de tipologías, longitudes y radios tóricos. Son las herramientas ideales tanto para las superproducciones en serie como para la producción de pequeños lotes, gracias a la excelencia del rendimiento y la universalidad de empleo.

🇷🇺 HF EVOLution - это линейка универсальных фрез Osawa из мелкозернистого твердого сплава со специальным покрытием для высокопроизводительной обработки всех материалов по ISO. Доступна широкая гамма фрез этой серии, имеющих различную длину и радиусы на уголках. Благодаря высокой эффективности и универсальности, это идеальные инструменты как для массового, так и для мелкосерийного производства.

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

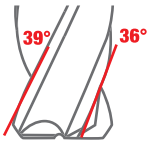
CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

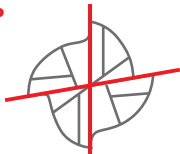
HSS END-MILLS

CARBIDE BURRS

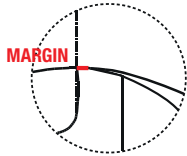
(1) VH



(2) UP



(3) MARGIN



## HIGH PERFORMANCE



Thanks to the variable helix geometry VH (1) with unequal pitch UP (2) and to the highly sophisticated cutting edge preparation (3), the HF EVOLution endmills enable the highest level of performances in terms of tool life, volume of chip removed, productivity and surface finishing.



Grazie alla geometria ad elica variabile VH (1) con passo differenziato UP (2) e alla sofisticata preparazione del tagliente (3), le frese HF EVOLution garantiscono performance di alto livello in termini di durata, volume truciolo asportato, produttività e finitura superficiale.



Dank der Geometrie mit variabler Helix VH (1) mit ungleicher Teilung UP (2) und der sorgfältigen Herstellung der Schneide (3) gewährleisten die Fräser HF EVOLution Höchstleistungen, was die Dauer, das Volumen des abgetragenen Spans, die Produktivität und das Oberflächenfinish betrifft.



Grâce à la géométrie à hélice variable VH (1) à pas décalé UP (2) et à la préparation technique de la partie coupante (3), les fraises HF EVOLution garantissent des performances de haut niveau en termes de durée, volume de débit copeau, productivité et finition superficielle.



Gracias a la geometría de hélice variable VH (1) con paso diferenciado UP (2) y a la sofisticada preparación del filo (3), las fresas HF EVOLution garantizan rendimientos de alto nivel en términos de duración, volumen de la viruta extraída, productividad y acabado de la superficie.



Благодаря геометрии с переменным углом наклона спирали VH (1) с неравномерным шагом UP (2) и сложной формой зубьев (3), фрезы HF EVOLution гарантируют высокую производительность, стойкость, объем удаляемого материала и низкую шероховатость обработанной поверхности.

## UNIVERSAL



The HF EVOLution endmills are universal tools, both for the broad range of materials machineable, the type of applications and for the milling strategies applicable: slotting, side milling, helical interpolation, ramping, vertical milling, drilling and trochoidal milling. Just one single HF tool enables roughing, semi-finishing and finishing applications.



Le frese HF EVOLution sono utensili universali sia per la gamma dei materiali lavorabili che per il tipo di lavorazione e strategia di fresatura applicabile: fresatura dal pieno, contornatura, interpolazione elicoidale, entrata in rampa, fresatura assiale, foratura e fresatura trocoidale. Un unico utensile HF permette lavorazioni di sgrossatura, semi-sgrossatura e finitura.



Die Fräser HF EVOLution sind universelle Werkzeuge, sowohl aufgrund der breiten Palette bearbeitbarer Materialien als auch dank der anwendbaren Bearbeitungsarten und Frässtrategien: Nutfräsen, Konturfräsen, Helixinterpolation, Rampenfräsen, Vertikalfräsen, Bohren und trochoidales Fräsen. Ein einziges HF Werkzeug kann zum Schruppen, Vorschlichten und Schlichten eingesetzt werden.



Les fraises HF EVOLution sont des outils universels aussi bien pour tous types de matériaux que pour tous types d'usinages et de stratégies de fraisages applicables : fraisage de pièces taillées dans la masse, contournage, interpolation hélicoïdale, entrée sur rampe, fraisage axial, perçage et fraisage trochoïdal. Un seul outil HF permet de réaliser des usinages d'ébauche, semi finition et finition.



Las fresas HF EVOLution son herramientas universales tanto por su gama de materiales trabajables como por el tipo de elaboración y estrategia de fresado aplicable: fresado de una sola pieza, contorneado, interpolación helicoidal, entrada en rampa, fresado axial, perforación y fresado trocoidal. Un sola herramienta HF permite elaboraciones de desbastado, semidesbastado y acabado.



Фрезы HF EVOLution являются универсальными инструментами как для широкой гаммы обрабатываемых материалов, так и для многих стратегий фрезерования: фрезерование пазов, уступов, по спирали, под углом, вдоль оси, сверление и трохойдальное фрезерование. С помощью одной фрезы серии HF можно выполнять черновую, получистовую и чистовую обработку.



## COMPLETE RANGE



2 families of tools with application-specific geometries.

- HF UNI (VH+UP), designed for milling of materials with hardness up to 40 HRC: steel (ISO P), stainless steel (ISO M), cast iron (ISO K) and super alloys (ISO S), such as Inconel or Titanium. The HF UNI range is now extended with the new HF UNI SC "smooth cut" which reduces significantly the cutting forces thanks to the cutting edge geometry, becoming particularly suitable in case of machining with less powerful machines.

- HF HARD (UP) for steel (ISO P), stainless steel (ISO M), cast iron (ISO K), super alloys (ISO S), hardened steel (ISO H) milling, with hardness up to 55 HRC.



2 famiglie di utensili con geometrie specifiche.

- HF UNI (VH+UP), per fresatura di materiali con durezza sino a 40 HRC: acciaio (ISO P), acciaio inossidabile (ISO M), ghisa (ISO K) e super leghe (ISO S), quali Inconel o titanio. La gamma HF UNI si arricchisce della nuova HF UNI SC "smooth cut" che, grazie alla geometria del tagliente, riduce notevolmente gli sforzi di taglio, risultando particolarmente adatta all'utilizzo su macchine poco potenti.

- HF HARD (UP) per fresatura di acciaio (ISO P), acciaio inossidabile (ISO M), ghisa (ISO K), super leghe (ISO S), acciaio temprato (ISO H), con durezza sino a 55 HRC.



2 Werkzeugfamilien mit spezifischen Geometrien.

- HF UNI (VH+UP), zum Fräsen von Materialien mit einer Härte bis zu 40HRC: Stahl (ISO P), korrosionsbeständiger Stahl (ISO M), Gusseisen (ISO K) und Superlegierungen (ISO S) wie Inconel oder Titan. Die Serie HF UNI wird durch den neuen Fräser HF UNI SC „Smooth Cut“ erweitert, bei dem dank der Geometrie der Schneide die aufzubringende Schnittkraft wesentlich verringert werden konnte, so dass dieser Fräser besonders für den Einsatz auf weniger leistungsfähigen Maschinen geeignet ist.

- HF HARD (UP) für das Fräsen von Stahl (ISO P), korrosionsbeständigem Stahl (ISO M), Gusseisen (ISO K), Superlegierungen (ISO S), gehärtetem Stahl (ISO H) mit einer Härten bis zu 55HRC.



2 familles d'outils avec des géométries spécifiques.

- HF UNI (VH+UP), pour fraisage de matériaux dont la dureté peut atteindre 40HRC : acier (ISO P), acier inoxydable (ISO M), fonte (ISO K) et super alliages (ISO S), tels que l' inconel ou titane.

La gamme HF UNI s'enrichit de la nouvelle HF UNI SC « smooth cut » qui, grâce à la géométrie de coupe, réduit considérablement les efforts de coupe, ce qui la rend particulièrement adaptée à l'utilisation sur des machines peu puissantes.

- HF HARD (UP), pour fraisage d'acier (ISO P), acier inoxydable (ISO M), fonte (ISO K) et super alliages (ISO S), acier trempé (ISO H), dont la dureté peut atteindre 55HRC.



2 familias de herramientas con geometrías específicas.

- HF UNI (VH+UP), para fresado de materiales con dureza hasta 40HRC: acero (ISO P), acero inoxidable (ISO M), fundición (ISO K) y súper aleaciones (ISO S), como Inconel o titanio. La gama HF UNI se enriquece con la nueva HF UNI SC «smooth cut», que, gracias a la geometría del filo cortante, reduce de forma importante los esfuerzos de corte, resultando especialmente adecuada para su uso en máquinas poco potentes.

- HF HARD (UP), para fresado de acero (ISO P), acero inoxidable (ISO M), fundición (ISO K) y súper aleaciones (ISO S), acero templado (ISO H), con duración de hasta 55 HRC.



2 семейства инструментов со специальной геометрией.

- HF UNI (VH+UP), для фрезерования материалов твердостью до 40HRC: сталь (ISO P), нержавеющей стали (ISO M), чугуна (ISO K) и жаропрочные сплавы (ISO S), такие как инконель и титан.

К этому семейству добавлена новая фреза HF UNI SC «smooth cut» (плавное резание), которая, благодаря форме зубьев, значительно сокращает усилия резания, что делает ее пригодной для использования на маломощных станках.

- HF HARD (UP) для фрезерования стали (ISO P), нержавеющей стали (ISO M), чугуна (ISO K), жаропрочных сплавов (ISO S), закаленной стали (ISO H) твердостью до 55 HRC.

### CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

### HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

### CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

### HSS END-MILLS

### CARBIDE BURRS





CUTTING PARAMETERS

INFO

### HF840

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>130÷150</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.014	0.013	0.011	0.010
	<b>4</b>	0.019	0.017	0.014	0.013
	<b>5</b>	0.023	0.021	0.017	0.016
	<b>6</b>	0.027	0.024	0.020	0.019
	<b>8</b>	0.035	0.032	0.026	0.025
	<b>10</b>	0.042	0.038	0.032	0.029
	<b>12</b>	0.048	0.043	0.036	0.034
	<b>14</b>	0.054	0.049	0.041	0.038
	<b>16</b>	0.060	0.054	0.045	0.042
<b>18</b>	0.066	0.059	0.050	0.046	
<b>20</b>	0.073	0.066	0.055	0.051	
ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.2D x 0.3D</b>	<b>1.2D x 0.3D</b>
	Vc (m/min)	<b>160÷180</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.017	0.015	0.013	0.018
	<b>4</b>	0.022	0.020	0.018	0.024
	<b>5</b>	0.028	0.025	0.022	0.030
	<b>6</b>	0.032	0.029	0.026	0.036
	<b>8</b>	0.042	0.038	0.034	0.046
	<b>10</b>	0.050	0.045	0.040	0.055
	<b>12</b>	0.058	0.052	0.046	0.063
	<b>14</b>	0.065	0.058	0.052	0.071
	<b>16</b>	0.072	0.065	0.058	0.079
<b>18</b>	0.079	0.071	0.063	0.087	
<b>20</b>	0.088	0.079	0.070	0.096	
ap x ae	≤ D5	1.5D x 0.25D	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.010	0.010	0.008	0.008
	<b>4</b>	0.013	0.013	0.011	0.010
	<b>5</b>	0.017	0.016	0.014	0.013
	<b>6</b>	0.020	0.018	0.016	0.015
	<b>8</b>	0.025	0.024	0.021	0.020
	<b>10</b>	0.031	0.029	0.025	0.024
	<b>12</b>	0.035	0.033	0.029	0.027
	<b>14</b>	0.039	0.037	0.032	0.030
	<b>16</b>	0.044	0.041	0.036	0.034
<b>18</b>	0.048	0.045	0.040	0.037	
<b>20</b>	0.053	0.050	0.044	0.041	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

# HF840

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.022	0.020	0.019	0.026
<b>8</b>	0.028	0.026	0.024	0.034
<b>10</b>	0.034	0.031	0.029	0.040
<b>12</b>	0.038	0.035	0.034	0.046
<b>14</b>	0.043	0.040	0.038	0.052
<b>16</b>	0.048	0.044	0.042	0.058
<b>18</b>	0.053	0.048	0.046	0.063
<b>20</b>	0.058	0.054	0.051	0.070

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.027	0.024	0.020	0.019
<b>8</b>	0.035	0.032	0.026	0.025
<b>10</b>	0.042	0.038	0.032	0.029
<b>12</b>	0.048	0.043	0.036	0.034
<b>14</b>	0.054	0.049	0.041	0.038
<b>16</b>	0.060	0.054	0.045	0.042
<b>18</b>	0.066	0.059	0.050	0.046
<b>20</b>	0.073	0.066	0.055	0.051

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.007	0.006	0.006	0.008
<b>4</b>	0.009	0.008	0.007	0.010
<b>5</b>	0.012	0.010	0.009	0.013
<b>6</b>	0.014	0.012	0.011	0.015
<b>8</b>	0.018	0.016	0.014	0.019
<b>10</b>	0.021	0.019	0.017	0.023
<b>12</b>	0.024	0.022	0.019	0.026
<b>14</b>	0.027	0.024	0.022	0.030
<b>16</b>	0.030	0.027	0.024	0.033
<b>18</b>	0.033	0.030	0.026	0.036
<b>20</b>	0.037	0.033	0.029	0.040
ap x ae	≤ D5	0.5D x D	0.25D x D	0.25D x D

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

# HF840

Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>190÷230</b>	<b>130÷150</b>	<b>100÷120</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.035	0.032	0.028	0.039
4	0.046	0.042	0.037	0.051
5	0.058	0.052	0.046	0.063
6	0.068	0.061	0.054	0.074
8	0.088	0.079	0.070	0.096
10	0.105	0.095	0.084	0.116
12	0.120	0.108	0.096	0.132
14	0.135	0.122	0.108	0.149
16	0.150	0.135	0.120	0.165
18	0.165	0.149	0.132	0.182
20	0.183	0.164	0.146	0.201
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	



**NOTES:**

Down milling CNC programming is required.

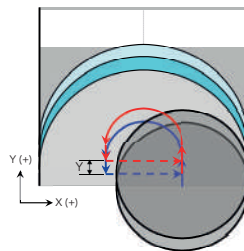
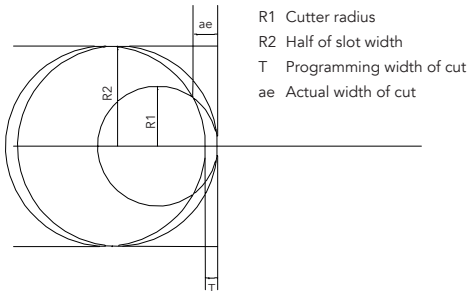
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

INFO

### HF440

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.013	0.011	0.009	0.009
	4	0.017	0.015	0.012	0.012
	5	0.021	0.019	0.016	0.014
	6	0.024	0.022	0.018	0.017
	8	0.032	0.028	0.024	0.022
	10	0.038	0.034	0.028	0.026
	12	0.043	0.039	0.032	0.030
	14	0.049	0.044	0.036	0.034
16	0.054	0.049	0.041	0.038	
20	0.066	0.059	0.049	0.046	
ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	ap x ae	<b>1.5D x D</b>	<b>1.5D x D</b>		
	Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>		
	D (mm)	fz (mm/z)	fz (mm/z)		
	8	0.025	0.023		
	10	0.030	0.027		
	12	0.035	0.031		
	14	0.039	0.035		
	16	0.043	0.039		
20	0.053	0.047			

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.2D x 0.3D</b>	<b>1.2D x 0.3D</b>
	Vc (m/min)	<b>130÷150</b>	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.015	0.014	0.012	0.017
	4	0.020	0.018	0.016	0.022
	5	0.025	0.022	0.020	0.027
	6	0.029	0.026	0.023	0.032
	8	0.038	0.034	0.030	0.042
	10	0.045	0.041	0.036	0.050
	12	0.052	0.047	0.041	0.057
	14	0.058	0.052	0.047	0.064
16	0.065	0.058	0.052	0.071	
20	0.079	0.071	0.063	0.087	
ap x ae	≤ D5	1.5D x 0.25D	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

# HF440

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
α° x ae	<b>5° x 0.4D</b>	<b>5° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>	
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
<b>3</b>	0.009	0.009	0.008	0.007	
<b>4</b>	0.012	0.011	0.010	0.009	
<b>5</b>	0.015	0.014	0.012	0.012	
<b>6</b>	0.018	0.016	0.015	0.014	
<b>8</b>	0.023	0.021	0.019	0.018	
<b>10</b>	0.028	0.026	0.023	0.021	
<b>12</b>	0.031	0.029	0.026	0.024	
<b>14</b>	0.035	0.033	0.029	0.027	
<b>16</b>	0.039	0.037	0.032	0.030	
<b>20</b>	0.048	0.045	0.039	0.037	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>	
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
<b>6</b>	0.019	0.018	0.017	0.023	
<b>8</b>	0.025	0.023	0.022	0.030	
<b>10</b>	0.030	0.028	0.026	0.036	
<b>12</b>	0.034	0.032	0.030	0.042	
<b>14</b>	0.039	0.036	0.034	0.047	
<b>16</b>	0.043	0.040	0.038	0.052	
<b>20</b>	0.052	0.048	0.046	0.063	

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	
α° x ae	<b>30° x D</b>	<b>15° x D</b>			
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>			
D (mm)	fz (mm/z)	fz (mm/z)			
<b>10</b>	0.025	0.023			
<b>12</b>	0.028	0.026			
<b>14</b>	0.032	0.029			
<b>16</b>	0.035	0.032			
<b>20</b>	0.043	0.039			

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

**HF440**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.024	0.022	0.018	0.017
	<b>8</b>	0.032	0.028	0.024	0.022
	<b>10</b>	0.038	0.034	0.028	0.026
	<b>12</b>	0.043	0.039	0.032	0.030
	<b>14</b>	0.049	0.044	0.036	0.034
<b>16</b>	0.054	0.049	0.041	0.038	
<b>20</b>	0.066	0.059	0.049	0.046	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>	<b>40÷60</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.006	0.006	0.005	0.007
	<b>4</b>	0.008	0.007	0.007	0.009
	<b>5</b>	0.010	0.009	0.008	0.011
	<b>6</b>	0.012	0.011	0.010	0.013
	<b>8</b>	0.016	0.014	0.013	0.017
<b>10</b>	0.019	0.017	0.015	0.021	
<b>12</b>	0.022	0.019	0.017	0.024	
<b>14</b>	0.024	0.022	0.019	0.027	
<b>16</b>	0.027	0.024	0.022	0.030	
<b>20</b>	0.033	0.030	0.026	0.036	
ap x ae	<b>≤ D5</b>	0.5D x D	0.5D x D	0.25D x D	0.25D x D

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# HF440

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.2D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.032	0.028	0.025	0.035
<b>4</b>	0.042	0.037	0.033	0.046
<b>5</b>	0.052	0.047	0.041	0.057
<b>6</b>	0.061	0.055	0.049	0.067
<b>8</b>	0.079	0.071	0.063	0.087
<b>10</b>	0.095	0.085	0.076	0.104
<b>12</b>	0.108	0.097	0.086	0.119
<b>14</b>	0.122	0.109	0.097	0.134
<b>16</b>	0.135	0.122	0.108	0.149
<b>20</b>	0.164	0.148	0.131	0.181
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	

**NOTES:**

Down milling CNC programming is required.

"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

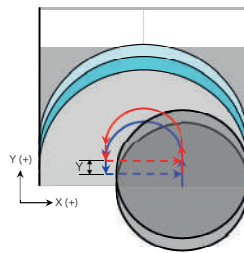
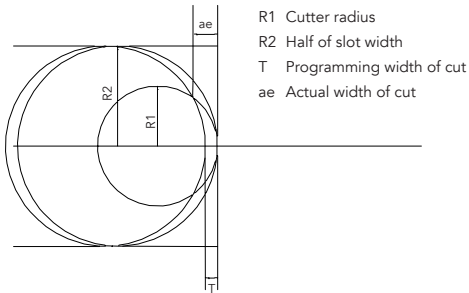
The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP**
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS





INFO

# HF441

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.013	0.011	0.009	0.009
<b>4</b>	0.017	0.015	0.012	0.012
<b>5</b>	0.021	0.019	0.016	0.014
<b>6</b>	0.024	0.022	0.018	0.017
<b>8</b>	0.032	0.028	0.024	0.022
<b>10</b>	0.038	0.034	0.028	0.026
<b>12</b>	0.043	0.039	0.032	0.030
<b>14</b>	0.049	0.044	0.036	0.034
<b>16</b>	0.054	0.049	0.041	0.038
<b>18</b>	0.059	0.053	0.045	0.042
<b>20</b>	0.066	0.059	0.049	0.046
ap x ae	≤ D5	0.5D x D	0.25D x D	0.25D x D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
ap x ae	<b>1.5D x D</b>	<b>1.5D x D</b>		
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>		
D (mm)	fz (mm/z)	fz (mm/z)		
<b>8</b>	0.025	0.023		
<b>10</b>	0.030	0.027		
<b>12</b>	0.035	0.031		
<b>14</b>	0.039	0.035		
<b>16</b>	0.043	0.039		
<b>18</b>	0.048	0.043		
<b>20</b>	0.053	0.047		

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1			
Hardness/Rm	≤700 N/mm <sup>2</sup>			
ap x ae	<b>2D x D</b>			
Vc (m/min)	<b>60÷80</b>			
D (mm)	fz (mm/z)			
<b>10</b>	0.023			
<b>12</b>	0.026			
<b>14</b>	0.029			
<b>16</b>	0.032			
<b>18</b>	0.036			
<b>20</b>	0.039			

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF440 PARAMETERS.

CUTTING PARAMETERS

**HF441**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.2D x 0.3D</b>	<b>1.2D x 0.3D</b>
	Vc (m/min)	<b>130÷150</b>	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.015	0.014	0.012	0.017
	4	0.020	0.018	0.016	0.022
	5	0.025	0.022	0.020	0.027
	6	0.029	0.026	0.023	0.032
	8	0.038	0.034	0.030	0.042
	10	0.045	0.041	0.036	0.050
	12	0.052	0.047	0.041	0.057
	14	0.058	0.052	0.047	0.064
16	0.065	0.058	0.052	0.071	
18	0.071	0.064	0.057	0.078	
20	0.079	0.071	0.063	0.087	
ap x ae	≤ D5	1.5D x 0.25D	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.009	0.009	0.008	0.007
	4	0.012	0.011	0.010	0.009
	5	0.015	0.014	0.012	0.012
	6	0.018	0.016	0.015	0.014
	8	0.023	0.021	0.019	0.018
	10	0.028	0.026	0.023	0.021
	12	0.031	0.029	0.026	0.024
	14	0.035	0.033	0.029	0.027
16	0.039	0.037	0.032	0.030	
18	0.043	0.040	0.036	0.033	
20	0.048	0.045	0.039	0.037	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF440 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF441

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.019	0.018	0.017	0.023
<b>8</b>	0.025	0.023	0.022	0.030
<b>10</b>	0.030	0.028	0.026	0.036
<b>12</b>	0.034	0.032	0.030	0.042
<b>14</b>	0.039	0.036	0.034	0.047
<b>16</b>	0.043	0.040	0.038	0.052
<b>18</b>	0.047	0.044	0.042	0.057
<b>20</b>	0.052	0.048	0.046	0.063

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
α° x ae	<b>30° x D</b>	<b>15° x D</b>		
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>		
D (mm)	fz (mm/z)	fz (mm/z)		
<b>10</b>	0.025	0.023		
<b>12</b>	0.028	0.026		
<b>14</b>	0.032	0.029		
<b>16</b>	0.035	0.032		
<b>18</b>	0.039	0.036		
<b>20</b>	0.043	0.039		

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1			
Hardness/Rm	≤700 N/mm <sup>2</sup>			
α° x ae	<b>45° x D</b>			
Vc (m/min)	<b>60÷80</b>			
D (mm)	fz (mm/z)			
<b>10</b>	0.024			
<b>12</b>	0.028			
<b>14</b>	0.031			
<b>16</b>	0.035			
<b>18</b>	0.038			
<b>20</b>	0.042			

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF440 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF441

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.024	0.022	0.018	0.017
	8	0.032	0.028	0.024	0.022
	10	0.038	0.034	0.028	0.026
	12	0.043	0.039	0.032	0.030
	14	0.049	0.044	0.036	0.034
	16	0.054	0.049	0.041	0.038
	18	0.059	0.053	0.045	0.042
20	0.066	0.059	0.049	0.046	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>	<b>40÷60</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.006	0.006	0.005	0.007
	4	0.008	0.007	0.007	0.009
	5	0.010	0.009	0.008	0.011
	6	0.012	0.011	0.010	0.013
	8	0.016	0.014	0.013	0.017
	10	0.019	0.017	0.015	0.021
	12	0.022	0.019	0.017	0.024
14	0.024	0.022	0.019	0.027	
16	0.027	0.024	0.022	0.030	
18	0.030	0.027	0.024	0.033	
20	0.033	0.030	0.026	0.036	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D
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CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF440 PARAMETERS.

INFO

# HF441

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.032	0.028	0.025	0.035
4	0.042	0.037	0.033	0.046
5	0.052	0.047	0.041	0.057
6	0.061	0.055	0.049	0.067
8	0.079	0.071	0.063	0.087
10	0.095	0.085	0.076	0.104
12	0.108	0.097	0.086	0.119
14	0.122	0.109	0.097	0.134
16	0.135	0.122	0.108	0.149
18	0.149	0.134	0.119	0.163
20	0.164	0.148	0.131	0.181
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	

**NOTES:**

Down milling CNC programming is required.

"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

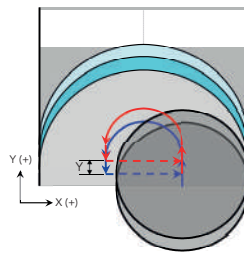
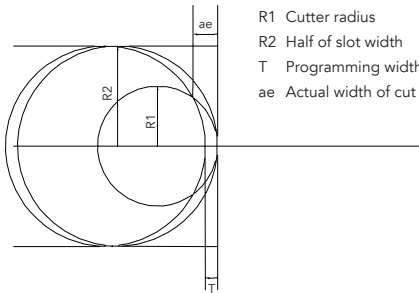
With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

HSS DRILLS

CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH



HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF440 PARAMETERS.

# HF844

cylindrical shank, 45° chamfer, roughing HR



OSAWA  
NORM

MG  
PV300

<40  
HRC

VH 36°/39°

C45°

HR  
FINE

Z4 UP

INFO

P	M	K	N	S	H
★	★	★		★	

★ 1st choice ☆ suitable

1.50  
SLOTTING

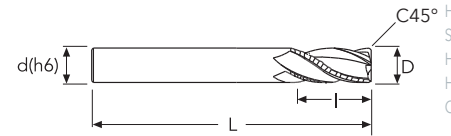
SIDE MILLING

HELICAL

RAMPING

VERTICAL

TROCROIDAL



CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D	D Tol.	C45°	C45° Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
6	0/-0.020	0.10	+/-0.020	6	16		57	4	HF844060	●
8	0/-0.020	0.20	+/-0.020	8	20		64	4	HF844080	●
10	0/-0.020	0.20	+/-0.020	10	22		72	4	HF844100	●
12	0/-0.020	0.20	+/-0.020	12	26		83	4	HF844120	●
14	0/-0.020	0.20	+/-0.020	14	26		83	4	HF844140	●
16	0/-0.020	0.30	+/-0.020	16	32		92	4	HF844160	●
18	0/-0.020	0.30	+/-0.020	18	32		92	4	HF844180	●
20	0/-0.020	0.40	+/-0.020	20	38		104	4	HF844200	●

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HFVH/UP**
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# HF844

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.029	0.026	0.022	0.020
<b>8</b>	0.038	0.034	0.028	0.026
<b>10</b>	0.045	0.041	0.034	0.032
<b>12</b>	0.052	0.047	0.039	0.036
<b>14</b>	0.058	0.052	0.044	0.041
<b>16</b>	0.065	0.058	0.049	0.045
<b>20</b>	0.079	0.071	0.059	0.055

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
ap x ae	<b>1.5D x D</b>	<b>1.5D x D</b>		
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>		
D (mm)	fz (mm/z)	fz (mm/z)		
<b>8</b>	0.030	0.027		
<b>10</b>	0.036	0.033		
<b>12</b>	0.041	0.037		
<b>14</b>	0.047	0.042		
<b>16</b>	0.052	0.047		
<b>20</b>	0.063	0.057		

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.2D x 0.3D</b>	<b>1.2D x 0.3D</b>
Vc (m/min)	<b>130÷150</b>	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.035	0.031	0.028	0.038
<b>8</b>	0.045	0.041	0.036	0.050
<b>10</b>	0.054	0.049	0.044	0.060
<b>12</b>	0.062	0.056	0.050	0.068
<b>14</b>	0.070	0.063	0.056	0.077
<b>16</b>	0.078	0.070	0.062	0.086
<b>20</b>	0.095	0.085	0.076	0.104

HSS  
END-MILLS

CARBIDE  
BURRS



CUTTING PARAMETERS

**HF844**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>8° x 0.4D</b>	<b>6° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.020	0.019	0.016	0.016
	<b>8</b>	0.026	0.024	0.021	0.021
	<b>10</b>	0.031	0.029	0.026	0.025
	<b>12</b>	0.036	0.033	0.029	0.029
	<b>14</b>	0.040	0.037	0.033	0.033
<b>16</b>	0.045	0.041	0.037	0.036	
<b>20</b>	0.055	0.050	0.045	0.044	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>8</b>	0.030	0.028	0.026	0.036
	<b>10</b>	0.036	0.033	0.032	0.044
	<b>12</b>	0.041	0.038	0.036	0.050
	<b>14</b>	0.047	0.043	0.041	0.056
	<b>16</b>	0.052	0.048	0.045	0.062
<b>20</b>	0.063	0.058	0.055	0.076	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	α° x ae	<b>30° x D</b>	<b>15° x D</b>		
	Vc (m/min)	<b>85÷105</b>	<b>45÷65</b>		
	D (mm)	fz (mm/z)	fz (mm/z)		
	<b>10</b>	0.030	0.027		
	<b>12</b>	0.034	0.031		
	<b>14</b>	0.038	0.035		
	<b>16</b>	0.042	0.039		
	<b>20</b>	0.051	0.047		

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

INFO

# HF844

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.029	0.026	0.022	0.020
8	0.038	0.034	0.028	0.026
10	0.045	0.041	0.034	0.032
12	0.052	0.047	0.039	0.036
14	0.058	0.052	0.044	0.041
16	0.065	0.058	0.049	0.045
20	0.079	0.071	0.059	0.055



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.073	0.066	0.058	0.080
8	0.095	0.085	0.076	0.104
10	0.113	0.102	0.091	0.125
12	0.130	0.117	0.104	0.143
14	0.146	0.131	0.117	0.160
16	0.162	0.146	0.130	0.178
20	0.197	0.177	0.158	0.217

NOTES:

Down milling CNC programming is required.  
 "ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

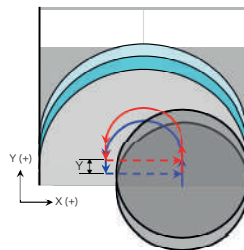
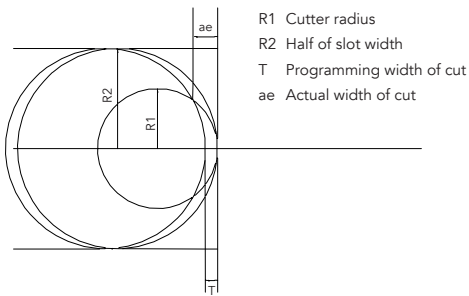
The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

# HF444

cylindrical shank and reduced neck, 45° chamfer, roughing HR



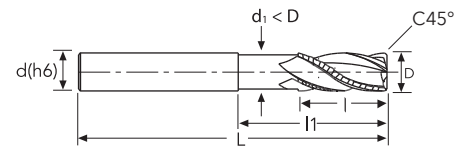
OSAWA NORM	MG PV300	<40 HRC	VH 36°/39°	C45°	HR FINE	Z4 UP
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INFO

P	M	K	N	S	H
★	★	★		★	

★ 1st choice ☆ suitable

SLOTTING	SIDE MILLING	HELICAL	RAMPING	VERTICAL	TROCHOIDAL
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D	D Tol.	C45°	C45° Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
6	0/-0.050	0.10	+/-0.020	6	13	20	5.80	57	4	HF444060	●
8	0/-0.050	0.20	+/-0.020	8	20	26	7.80	64	4	HF444080	●
10	0/-0.050	0.20	+/-0.020	10	22	30	9.80	72	4	HF444100	●
12	0/-0.050	0.20	+/-0.020	12	26	36	11.80	83	4	HF444120	●
14	0/-0.050	0.20	+/-0.020	14	26	36	13.70	83	4	HF444140	●
16	0/-0.050	0.30	+/-0.020	16	32	42	15.70	92	4	HF444160	●
20	0/-0.050	0.40	+/-0.020	20	38	50	19.70	104	4	HF444200	●

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# HF444

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.026	0.024	0.020	0.018
<b>8</b>	0.034	0.031	0.026	0.024
<b>10</b>	0.041	0.037	0.031	0.029
<b>12</b>	0.047	0.042	0.035	0.033
<b>14</b>	0.052	0.047	0.039	0.037
<b>16</b>	0.058	0.052	0.044	0.041
<b>20</b>	0.071	0.064	0.053	0.050

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
ap x ae	<b>1.5D x D</b>	<b>1.5D x D</b>		
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>		
D (mm)	fz (mm/z)	fz (mm/z)		
<b>8</b>	0.027	0.024		
<b>10</b>	0.033	0.029		
<b>12</b>	0.037	0.034		
<b>14</b>	0.042	0.038		
<b>16</b>	0.047	0.042		
<b>20</b>	0.057	0.051		

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.2D x 0.3D</b>	<b>1.2D x 0.3D</b>
Vc (m/min)	<b>130÷150</b>	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.031	0.028	0.025	0.035
<b>8</b>	0.041	0.037	0.033	0.045
<b>10</b>	0.049	0.044	0.039	0.054
<b>12</b>	0.056	0.050	0.045	0.062
<b>14</b>	0.063	0.057	0.050	0.069
<b>16</b>	0.070	0.063	0.056	0.077
<b>20</b>	0.085	0.077	0.068	0.094

HSS  
END-MILLS

CARBIDE  
BURRS

CUTTING PARAMETERS

INFO

### HF444

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>7° x 0.4D</b>	<b>5° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.018	0.017	0.016	0.015
	<b>8</b>	0.024	0.022	0.020	0.019
	<b>10</b>	0.029	0.027	0.025	0.023
	<b>12</b>	0.033	0.031	0.028	0.026
	<b>14</b>	0.037	0.034	0.032	0.029
<b>16</b>	0.041	0.038	0.035	0.033	
<b>20</b>	0.050	0.046	0.043	0.040	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>8</b>	0.027	0.025	0.024	0.033
	<b>10</b>	0.033	0.030	0.029	0.039
	<b>12</b>	0.037	0.034	0.033	0.045
	<b>14</b>	0.042	0.039	0.037	0.050
	<b>16</b>	0.047	0.043	0.041	0.056
<b>20</b>	0.057	0.052	0.050	0.068	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	α° x ae	<b>30° x D</b>	<b>15° x D</b>		
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>		
	D (mm)	fz (mm/z)	fz (mm/z)		
	<b>10</b>	0.027	0.024		
	<b>12</b>	0.030	0.028		
	<b>14</b>	0.034	0.031		
	<b>16</b>	0.038	0.035		
	<b>20</b>	0.046	0.042		

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# HF444

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.026	0.024	0.020	0.018
8	0.034	0.031	0.026	0.024
10	0.041	0.037	0.031	0.029
12	0.047	0.042	0.035	0.033
14	0.052	0.047	0.039	0.037
16	0.058	0.052	0.044	0.041
20	0.071	0.064	0.053	0.050



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.066	0.059	0.052	0.072
8	0.085	0.077	0.068	0.094
10	0.102	0.092	0.082	0.112
12	0.117	0.105	0.093	0.128
14	0.131	0.118	0.105	0.144
16	0.146	0.131	0.117	0.160
20	0.177	0.160	0.142	0.195

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

**NOTES:**

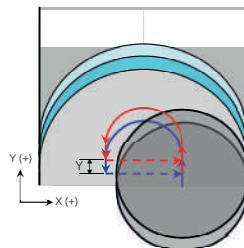
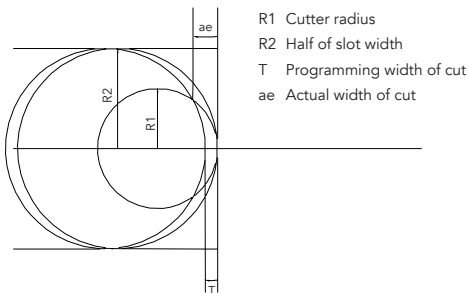
Down milling CNC programming is required.  
 "ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



HSS END-MILLS

CARBIDE BURRS

# HF445

weldon shank and reduced neck, 45° chamfer, roughing HR



OSAWA  
NORM

MG  
PV300

<40  
HRC

VH 36°/39°

C45°

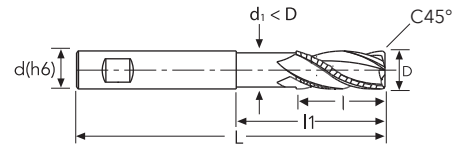
HR  
FINE

Z4 UP

INFO

P	M	K	N	S	H
★	★	★		★	

★ 1st choice ☆ suitable



CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D	D Tol.	C45°	C45° Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
6	0/-0.050	0.10	+/-0.020	6	13	20	5.80	57	4	HF445060	●
8	0/-0.050	0.20	+/-0.020	8	20	26	7.80	64	4	HF445080	●
10	0/-0.050	0.20	+/-0.020	10	22	30	9.80	72	4	HF445100	●
12	0/-0.050	0.20	+/-0.020	12	26	36	11.80	83	4	HF445120	●
14	0/-0.050	0.20	+/-0.020	14	26	36	13.70	83	4	HF445140	●
16	0/-0.050	0.30	+/-0.020	16	32	42	15.70	92	4	HF445160	●
20	0/-0.050	0.40	+/-0.020	20	38	50	19.70	104	4	HF445200	●

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# HF445

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.026	0.024	0.020	0.018
<b>8</b>	0.034	0.031	0.026	0.024
<b>10</b>	0.041	0.037	0.031	0.029
<b>12</b>	0.047	0.042	0.035	0.033
<b>14</b>	0.052	0.047	0.039	0.037
<b>16</b>	0.058	0.052	0.044	0.041
<b>20</b>	0.071	0.064	0.053	0.050

HSS  
DRILLS



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
ap x ae	<b>1.5D x D</b>	<b>1.5D x D</b>		
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>		
D (mm)	fz (mm/z)	fz (mm/z)		
<b>8</b>	0.027	0.024		
<b>10</b>	0.033	0.029		
<b>12</b>	0.037	0.034		
<b>14</b>	0.042	0.038		
<b>16</b>	0.047	0.042		
<b>20</b>	0.057	0.051		

CARBIDE  
END-MILLS



Material Group ISO 513	P1 P2 P7 K1			
Hardness/Rm	≤700 N/mm <sup>2</sup>			
ap x ae	<b>2D x D</b>			
Vc (m/min)	<b>60÷80</b>			
D (mm)	fz (mm/z)			
<b>10</b>	0.024			
<b>12</b>	0.028			
<b>14</b>	0.031			
<b>16</b>	0.035			
<b>20</b>	0.043			

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF444 PARAMETERS.



CUTTING PARAMETERS

HF445

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.2D x 0.3D</b>	<b>1.2D x 0.3D</b>
	Vc (m/min)	<b>130÷150</b>	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.031	0.028	0.025	0.035
	8	0.041	0.037	0.033	0.045
	10	0.049	0.044	0.039	0.054
	12	0.056	0.050	0.045	0.062
	14	0.063	0.057	0.050	0.069
16	0.070	0.063	0.056	0.077	
20	0.085	0.077	0.068	0.094	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>7° x 0.4D</b>	<b>5° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.018	0.017	0.016	0.015
	8	0.024	0.022	0.020	0.019
	10	0.029	0.027	0.025	0.023
	12	0.033	0.031	0.028	0.026
	14	0.037	0.034	0.032	0.029
16	0.041	0.038	0.035	0.033	
20	0.050	0.046	0.043	0.040	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	8	0.027	0.025	0.024	0.033
	10	0.033	0.030	0.029	0.039
	12	0.037	0.034	0.033	0.045
	14	0.042	0.039	0.037	0.050
	16	0.047	0.043	0.041	0.056
20	0.057	0.052	0.050	0.068	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF444 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF445

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>		
<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
<b>α° x ae</b>	<b>30° x D</b>	<b>15° x D</b>		
<b>Vc (m/min)</b>	<b>80÷100</b>	<b>50÷70</b>		
<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>		
<b>10</b>	0.027	0.024		
<b>12</b>	0.030	0.028		
<b>14</b>	0.034	0.031		
<b>16</b>	0.038	0.035		
<b>20</b>	0.046	0.042		



<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>			
<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>			
<b>α° x ae</b>	<b>45° x D</b>			
<b>Vc (m/min)</b>	<b>60÷80</b>			
<b>D (mm)</b>	<b>fz (mm/z)</b>			
<b>10</b>	0.026			
<b>12</b>	0.030			
<b>14</b>	0.034			
<b>16</b>	0.038			
<b>20</b>	0.046			

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
<b>ap x ae</b>	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
<b>Vc (m/min)</b>	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
<b>6</b>	0.026	0.024	0.020	0.018
<b>8</b>	0.034	0.031	0.026	0.024
<b>10</b>	0.041	0.037	0.031	0.029
<b>12</b>	0.047	0.042	0.035	0.033
<b>14</b>	0.052	0.047	0.039	0.037
<b>16</b>	0.058	0.052	0.044	0.041
<b>20</b>	0.071	0.064	0.053	0.050

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH


HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF444 PARAMETERS.

CUTTING PARAMETERS

HF445

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.066	0.059	0.052	0.072	
8	0.085	0.077	0.068	0.094	
10	0.102	0.092	0.082	0.112	
12	0.117	0.105	0.093	0.128	
14	0.131	0.118	0.105	0.144	
16	0.146	0.131	0.117	0.160	
20	0.177	0.160	0.142	0.195	

NOTES:

Down milling CNC programming is required.

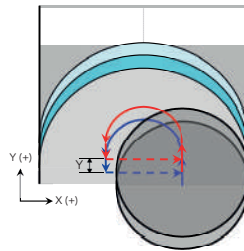
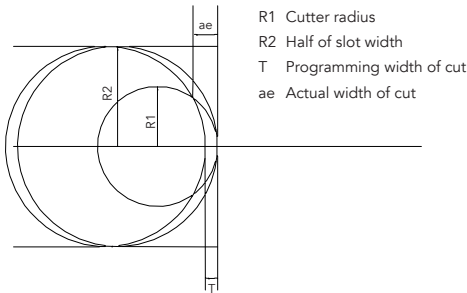
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF444 PARAMETERS.



CUTTING PARAMETERS

HF342

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.014	0.013	0.011	0.010
	<b>4</b>	0.019	0.017	0.014	0.013
	<b>5</b>	0.023	0.021	0.017	0.016
	<b>6</b>	0.027	0.024	0.020	0.019
	<b>8</b>	0.035	0.032	0.026	0.025
<b>10</b>	0.042	0.038	0.032	0.029	
<b>12</b>	0.048	0.043	0.036	0.034	
ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>160÷180</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.017	0.015	0.013	0.018
	<b>4</b>	0.022	0.020	0.018	0.024
	<b>5</b>	0.028	0.025	0.022	0.030
	<b>6</b>	0.032	0.029	0.026	0.036
	<b>8</b>	0.042	0.038	0.034	0.046
<b>10</b>	0.050	0.045	0.040	0.055	
<b>12</b>	0.058	0.052	0.046	0.063	
ap x ae	≤ D5	1.2D x 0.3D	1.2D x 0.3D	D x 0.2D	D x 0.2D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.010	0.010	0.008	0.008
	<b>4</b>	0.013	0.013	0.011	0.010
	<b>5</b>	0.017	0.016	0.014	0.013
	<b>6</b>	0.020	0.018	0.016	0.015
	<b>8</b>	0.025	0.024	0.021	0.020
<b>10</b>	0.031	0.029	0.025	0.024	
<b>12</b>	0.035	0.033	0.029	0.027	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

INFO

# HF342

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
Vc (m/min)	<b>120÷140</b>	<b>70÷90</b>	<b>55÷75</b>	<b>25÷45</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.022	0.020	0.019	0.026
<b>8</b>	0.028	0.026	0.024	0.034
<b>10</b>	0.034	0.031	0.029	0.040
<b>12</b>	0.038	0.035	0.034	0.046



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
Vc (m/min)	<b>120÷140</b>	<b>70÷90</b>	<b>55÷75</b>	<b>25÷45</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.027	0.024	0.020	0.019
<b>8</b>	0.035	0.032	0.026	0.025
<b>10</b>	0.042	0.038	0.032	0.029
<b>12</b>	0.048	0.043	0.036	0.034

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.007	0.006	0.006	0.008
<b>4</b>	0.009	0.008	0.007	0.010
<b>5</b>	0.012	0.010	0.009	0.013
<b>6</b>	0.014	0.012	0.011	0.015
<b>8</b>	0.018	0.016	0.014	0.019
<b>10</b>	0.021	0.019	0.017	0.023
<b>12</b>	0.024	0.022	0.019	0.026
ap x ae	<b>≤ D5</b>	0.5D x D	0.25D x D	0.25D x D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION



CUTTING PARAMETERS

INFO

# HF842

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>130÷150</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.014	0.013	0.011	0.010
4	0.019	0.017	0.014	0.013
5	0.023	0.021	0.017	0.016
6	0.027	0.024	0.020	0.019
8	0.035	0.032	0.026	0.025
10	0.042	0.038	0.032	0.029
12	0.048	0.043	0.036	0.034
14	0.054	0.049	0.041	0.038
16	0.060	0.054	0.045	0.042
18	0.066	0.059	0.050	0.046
20	0.073	0.066	0.055	0.051
ap x ae	≤ D5	0.5D x D	0.25D x D	0.25D x D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>160÷180</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.017	0.015	0.013	0.018
4	0.022	0.020	0.018	0.024
5	0.028	0.025	0.022	0.030
6	0.032	0.029	0.026	0.036
8	0.042	0.038	0.034	0.046
10	0.050	0.045	0.040	0.055
12	0.058	0.052	0.046	0.063
14	0.065	0.058	0.052	0.071
16	0.072	0.065	0.058	0.079
18	0.079	0.071	0.063	0.087
20	0.088	0.079	0.070	0.096
ap x ae	≤ D5	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.010	0.010	0.008	0.008
4	0.013	0.013	0.011	0.010
5	0.017	0.016	0.014	0.013
6	0.020	0.018	0.016	0.015
8	0.025	0.024	0.021	0.020
10	0.031	0.029	0.025	0.024
12	0.035	0.033	0.029	0.027
14	0.039	0.037	0.032	0.030
16	0.044	0.041	0.036	0.034
18	0.048	0.045	0.040	0.037
20	0.053	0.050	0.044	0.041
α° x ae	≤ D5	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION



CUTTING PARAMETERS

INFO

### HF842

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	15° x D	10° x D	5° x D	5° x D
	Vc (m/min)	130÷150	80÷100	60÷80	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.022	0.020	0.019	0.026
	8	0.028	0.026	0.024	0.034
	10	0.034	0.031	0.029	0.040
	12	0.038	0.035	0.034	0.046
	14	0.043	0.040	0.038	0.052
	16	0.048	0.044	0.042	0.058
18	0.053	0.048	0.046	0.063	
20	0.058	0.054	0.051	0.070	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	D x 0.4D	D x 0.4D	D x 0.25D	D x 0.25D
	Vc (m/min)	130÷150	80÷100	60÷80	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.027	0.024	0.020	0.019
	8	0.035	0.032	0.026	0.025
	10	0.042	0.038	0.032	0.029
	12	0.048	0.043	0.036	0.034
	14	0.054	0.049	0.041	0.038
	16	0.060	0.054	0.045	0.042
18	0.066	0.059	0.050	0.046	
20	0.073	0.066	0.055	0.051	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	D x D	D x D	0.5D x D	0.5D x D
	Vc (m/min)	100÷120	60÷80	45÷65	20÷40
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.007	0.006	0.006	0.008
	4	0.009	0.008	0.007	0.010
	5	0.012	0.010	0.009	0.013
	6	0.014	0.012	0.011	0.015
	8	0.018	0.016	0.014	0.019
	10	0.021	0.019	0.017	0.023
12	0.024	0.022	0.019	0.026	
14	0.027	0.024	0.022	0.030	
16	0.030	0.027	0.024	0.033	
18	0.033	0.030	0.026	0.036	
20	0.037	0.033	0.029	0.040	
ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D		

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

# HF842

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>190÷230</b>	<b>130÷150</b>	<b>100÷120</b>	<b>50÷70</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.035	0.032	0.028	0.039	
4	0.046	0.042	0.037	0.051	
5	0.058	0.052	0.046	0.063	
6	0.068	0.061	0.054	0.074	
8	0.088	0.079	0.070	0.096	
10	0.105	0.095	0.084	0.116	
12	0.120	0.108	0.096	0.132	
14	0.135	0.122	0.108	0.149	
16	0.150	0.135	0.120	0.165	
18	0.165	0.149	0.132	0.182	
20	0.183	0.164	0.146	0.201	
ap x ae	<b>≤ D5</b>	1.5D x 0.1D	1.5D x 0.1D		

**NOTES:**

Down milling CNC programming is required.

"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

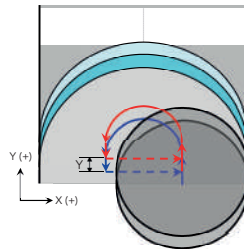
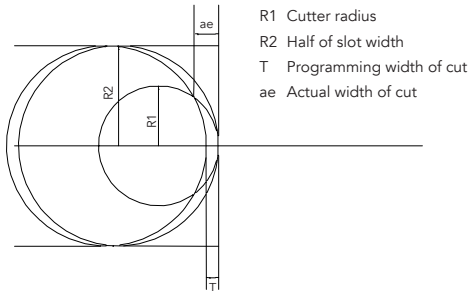
With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

HSS DRILLS

CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH



HSS END-MILLS

CARBIDE BURRS



INFO

# HF442

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.013	0.011	0.009	0.009	
4	0.017	0.015	0.012	0.012	
5	0.021	0.019	0.016	0.014	
6	0.024	0.022	0.018	0.017	
8	0.032	0.028	0.024	0.022	
10	0.038	0.034	0.028	0.026	
12	0.043	0.039	0.032	0.030	
14	0.049	0.044	0.036	0.034	
16	0.054	0.049	0.041	0.038	
20	0.066	0.059	0.049	0.046	
ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	
ap x ae	<b>1.5D x D</b>	<b>1.5D x D</b>			
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>			
D (mm)	fz (mm/z)	fz (mm/z)			
8	0.025	0.023			
10	0.030	0.027			
12	0.035	0.031			
14	0.039	0.035			
16	0.043	0.039			
20	0.053	0.047			

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>130÷150</b>	<b>90÷140</b>	<b>60÷80</b>	<b>40÷60</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.015	0.014	0.012	0.017	
4	0.020	0.018	0.016	0.022	
5	0.025	0.022	0.020	0.027	
6	0.029	0.026	0.023	0.032	
8	0.038	0.034	0.030	0.042	
10	0.045	0.041	0.036	0.050	
12	0.052	0.047	0.041	0.057	
14	0.058	0.052	0.047	0.064	
16	0.065	0.058	0.052	0.071	
20	0.079	0.071	0.063	0.087	
ap x ae	≤ D5	1.5D x 0.25D	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

HSS  
END-MILLS

CARBIDE  
BURRS

CUTTING PARAMETERS

INFO

### HF442

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	5° x 0.4D	4° x 0.4D	3° x 0.4D	3° x 0.4D
	Vc (m/min)	110÷130	70÷90	50÷70	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.009	0.009	0.008	0.007
	4	0.012	0.011	0.010	0.009
	5	0.015	0.014	0.012	0.012
	6	0.018	0.016	0.015	0.014
	8	0.023	0.021	0.019	0.018
	10	0.028	0.026	0.023	0.021
	12	0.031	0.029	0.026	0.024
	14	0.035	0.033	0.029	0.027
16	0.039	0.037	0.032	0.030	
20	0.048	0.045	0.039	0.037	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	15° x D	10° x D	5° x D	5° x D
	Vc (m/min)	100÷120	60÷80	45÷65	30÷40
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.019	0.018	0.017	0.023
	8	0.025	0.023	0.022	0.030
	10	0.030	0.028	0.026	0.036
	12	0.034	0.032	0.030	0.042
	14	0.039	0.036	0.034	0.047
	16	0.043	0.040	0.038	0.052
	20	0.052	0.048	0.046	0.063

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	α° x ae	30° x D	15° x D		
	Vc (m/min)	80÷100	50÷70		
	D (mm)	fz (mm/z)	fz (mm/z)		
	10	0.025	0.023		
	12	0.028	0.026		
	14	0.032	0.029		
	16	0.035	0.032		
	20	0.043	0.039		

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

INFO

# HF442

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.024	0.022	0.018	0.017
8	0.032	0.028	0.024	0.022
10	0.038	0.034	0.028	0.026
12	0.043	0.039	0.032	0.030
14	0.049	0.044	0.036	0.034
16	0.054	0.049	0.041	0.038
20	0.066	0.059	0.049	0.046

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.006	0.006	0.005	0.007
4	0.008	0.007	0.007	0.009
5	0.010	0.009	0.008	0.011
6	0.012	0.011	0.010	0.013
8	0.016	0.014	0.013	0.017
10	0.019	0.017	0.015	0.021
12	0.022	0.019	0.017	0.024
14	0.024	0.022	0.019	0.027
16	0.027	0.024	0.022	0.030
20	0.033	0.030	0.026	0.036
ap x ae	≤ D5	0.5D x D	0.25D x D	0.25D x D

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

**HF442**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
	Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.032	0.028	0.025	0.035	
<b>4</b>	0.042	0.037	0.033	0.046	
<b>5</b>	0.052	0.047	0.041	0.057	
<b>6</b>	0.061	0.055	0.049	0.067	
<b>8</b>	0.079	0.071	0.063	0.087	
<b>10</b>	0.095	0.085	0.076	0.104	
<b>12</b>	0.108	0.097	0.086	0.119	
<b>14</b>	0.122	0.109	0.097	0.134	
<b>16</b>	0.135	0.122	0.108	0.149	
<b>20</b>	0.164	0.148	0.131	0.181	
ap x ae	≤ <b>D5</b>	1.5D x 0.1D	1.5D x 0.1D		

NOTES:

Down milling CNC programming is required.

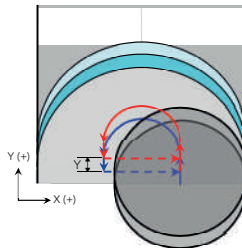
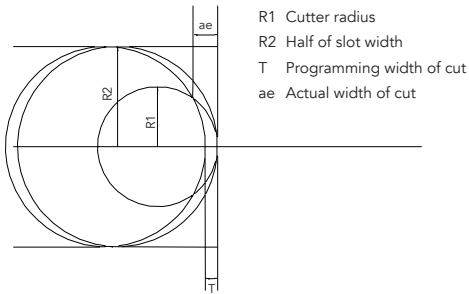
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



INFO

CARBIDE DRILLS

PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

HSS DRILLS

LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS

G2  
 MDTA  
**HFVH/UP**  
 MEF  
 ALU  
 MEX/MH  
 UH/MH

HSS END-MILLS

CARBIDE BURRS





CUTTING PARAMETERS

INFO

### HF443

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	<b>ap x ae</b>	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	<b>Vc (m/min)</b>	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>3</b>	0.013	0.011	0.009	0.009
	<b>4</b>	0.017	0.015	0.012	0.012
	<b>5</b>	0.021	0.019	0.016	0.014
	<b>6</b>	0.024	0.022	0.018	0.017
	<b>8</b>	0.032	0.028	0.024	0.022
	<b>10</b>	0.038	0.034	0.028	0.026
	<b>12</b>	0.043	0.039	0.032	0.030
	<b>14</b>	0.049	0.044	0.036	0.034
	<b>16</b>	0.054	0.049	0.041	0.038
<b>18</b>	0.059	0.053	0.045	0.042	
<b>20</b>	0.066	0.059	0.049	0.046	
<b>ap x ae</b>	<b>≤ D5</b>	0.5D x D	0.5D x D	0.25D x D	0.25D x D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>		
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	<b>ap x ae</b>	<b>1.5D x D</b>	<b>1.5D x D</b>		
	<b>Vc (m/min)</b>	<b>85÷105</b>	<b>55÷75</b>		
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>		
	<b>8</b>	0.025	0.023		
	<b>10</b>	0.030	0.027		
	<b>12</b>	0.035	0.031		
	<b>14</b>	0.039	0.035		
	<b>16</b>	0.043	0.039		
<b>18</b>	0.048	0.043			
<b>20</b>	0.053	0.047			

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>			
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>			
	<b>ap x ae</b>	<b>2D x D</b>			
	<b>Vc (m/min)</b>	<b>60÷80</b>			
	<b>D (mm)</b>	<b>fz (mm/z)</b>			
	<b>10</b>	0.023			
	<b>12</b>	0.026			
	<b>14</b>	0.029			
	<b>16</b>	0.032			
	<b>18</b>	0.036			
<b>20</b>	0.039				

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF442 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF443

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.2D x 0.3D</b>	<b>1.2D x 0.3D</b>
Vc (m/min)	<b>130÷150</b>	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.015	0.014	0.012	0.017
4	0.020	0.018	0.016	0.022
5	0.025	0.022	0.020	0.027
6	0.029	0.026	0.023	0.032
8	0.038	0.034	0.030	0.042
10	0.045	0.041	0.036	0.050
12	0.052	0.047	0.041	0.057
14	0.058	0.052	0.047	0.064
16	0.065	0.058	0.052	0.071
18	0.071	0.064	0.057	0.078
20	0.079	0.071	0.063	0.087
ap x ae	≤ D5	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.009	0.009	0.008	0.007
4	0.012	0.011	0.010	0.009
5	0.015	0.014	0.012	0.012
6	0.018	0.016	0.015	0.014
8	0.023	0.021	0.019	0.018
10	0.028	0.026	0.023	0.021
12	0.031	0.029	0.026	0.024
14	0.035	0.033	0.029	0.027
16	0.039	0.037	0.032	0.030
18	0.043	0.040	0.036	0.033
20	0.048	0.045	0.039	0.037
α° x ae	≤ D5	2° x 0.4D	1° x 0.4D	1° x 0.4D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.019	0.018	0.017	0.023
8	0.025	0.023	0.022	0.030
10	0.030	0.028	0.026	0.036
12	0.034	0.032	0.030	0.042
14	0.039	0.036	0.034	0.047
16	0.043	0.040	0.038	0.052
18	0.047	0.044	0.042	0.057
20	0.052	0.048	0.046	0.063

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF442 PARAMETERS.

CUTTING PARAMETERS

**HF443**

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>		
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	α° x ae	<b>30° x D</b>	<b>15° x D</b>		
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>		
	D (mm)	fz (mm/z)	fz (mm/z)		
	<b>10</b>	0.025	0.023		
	<b>12</b>	0.028	0.026		
	<b>14</b>	0.032	0.029		
	<b>16</b>	0.035	0.032		
	<b>18</b>	0.039	0.036		
<b>20</b>	0.043	0.039			

	Material Group ISO 513	<b>P1 P2 P7 K1</b>			
	Hardness/Rm	≤700 N/mm <sup>2</sup>			
	α° x ae	<b>45° x D</b>			
	Vc (m/min)	<b>60÷80</b>			
	D (mm)	fz (mm/z)			
	<b>10</b>	0.024			
	<b>12</b>	0.028			
	<b>14</b>	0.031			
	<b>16</b>	0.035			
	<b>18</b>	0.038			
<b>20</b>	0.042				

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>30÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.024	0.022	0.018	0.017
	<b>8</b>	0.032	0.028	0.024	0.022
	<b>10</b>	0.038	0.034	0.028	0.026
	<b>12</b>	0.043	0.039	0.032	0.030
	<b>14</b>	0.049	0.044	0.036	0.034
	<b>16</b>	0.054	0.049	0.041	0.038
	<b>18</b>	0.059	0.053	0.045	0.042
<b>20</b>	0.066	0.059	0.049	0.046	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF442 PARAMETERS.

INFO

# HF443

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	
Vc (m/min)	<b>85÷105</b>	<b>55÷75</b>	<b>40÷60</b>	<b>20÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
3	0.006	0.006	0.005	0.007	
4	0.008	0.007	0.007	0.009	
5	0.010	0.009	0.008	0.011	
6	0.012	0.011	0.010	0.013	
8	0.016	0.014	0.013	0.017	
10	0.019	0.017	0.015	0.021	
12	0.022	0.019	0.017	0.024	
14	0.024	0.022	0.019	0.027	
16	0.027	0.024	0.022	0.030	
18	0.030	0.027	0.024	0.033	
20	0.033	0.030	0.026	0.036	
ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



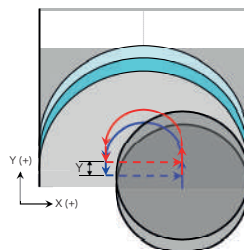
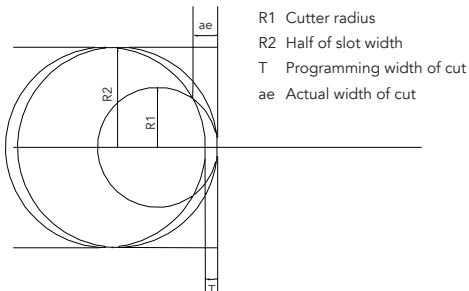
	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
		Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	
Vc (m/min)	<b>160÷200</b>	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
3	0.032	0.028	0.025	0.035	
4	0.042	0.037	0.033	0.046	
5	0.052	0.047	0.041	0.057	
6	0.061	0.055	0.049	0.067	
8	0.079	0.071	0.063	0.087	
10	0.095	0.085	0.076	0.104	
12	0.108	0.097	0.086	0.119	
14	0.122	0.109	0.097	0.134	
16	0.135	0.122	0.108	0.149	
18	0.149	0.134	0.119	0.163	
20	0.164	0.148	0.131	0.181	
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D		

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

**NOTES:**

Down milling CNC programming is required.  
 "ae" value max 0.2xD - "T" value max 0.1xD.  
 The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.  
 The cutting conditions are based on CNC programming with medium dynamic speed.  
 With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.  
 With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION. FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF442 PARAMETERS.

# HF542

cylindrical shank and reduced neck, long reach, corner radius



OSAWA  
NORM

MG  
PV300

<40  
HRC

VH 36°/39°

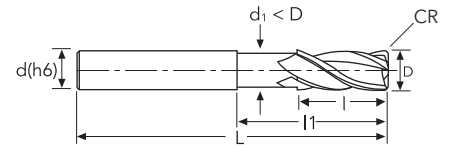
RADIUS

Z4 UP

INFO

P	M	K	N	S	H
★	★	★		★	

★ 1st choice ☆ suitable



CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
6	0/-0.030	0.30	+/-0.020	6	12	30	5.80	75	4	HF5420306075	●
6	0/-0.030	0.50	+/-0.020	6	12	30	5.80	75	4	HF5420506075	●
6	0/-0.030	1.00	+/-0.020	6	12	30	5.80	75	4	HF5421006075	●
6	0/-0.030	0.30	+/-0.020	6	12	30	5.80	100	4	HF54203060100	●
6	0/-0.030	0.50	+/-0.020	6	12	30	5.80	100	4	HF54205060100	●
6	0/-0.030	1.00	+/-0.020	6	12	30	5.80	100	4	HF54210060100	●
8	0/-0.030	0.50	+/-0.020	8	16	40	7.80	100	4	HF54205080100	●
8	0/-0.030	1.00	+/-0.020	8	16	40	7.80	100	4	HF54210080100	●
8	0/-0.030	2.00	+/-0.020	8	16	40	7.80	100	4	HF54220080100	●
10	0/-0.030	0.50	+/-0.020	10	20	50	9.80	125	4	HF54205100125	●
10	0/-0.030	1.00	+/-0.020	10	20	50	9.80	125	4	HF54210100125	●
10	0/-0.030	2.00	+/-0.020	10	20	50	9.80	125	4	HF54220100125	●
12	0/-0.030	0.50	+/-0.020	12	24	60	11.80	125	4	HF54205120125	●
12	0/-0.030	1.00	+/-0.020	12	24	60	11.80	125	4	HF54210120125	●
12	0/-0.030	2.00	+/-0.020	12	24	60	11.80	125	4	HF54220120125	●
12	0/-0.030	3.00	+/-0.020	12	24	60	11.80	125	4	HF54230120125	●
12	0/-0.030	0.50	+/-0.020	12	24	60	11.80	150	4	HF54205120150	●
12	0/-0.030	1.00	+/-0.020	12	24	60	11.80	150	4	HF54210120150	●
12	0/-0.030	2.00	+/-0.020	12	24	60	11.80	150	4	HF54220120150	●
12	0/-0.030	3.00	+/-0.020	12	24	60	11.80	150	4	HF54230120150	●
16	0/-0.030	0.50	+/-0.020	16	32	80	15.70	150	4	HF54205160150	●
16	0/-0.030	1.00	+/-0.020	16	32	80	15.70	150	4	HF54210160150	●
16	0/-0.030	2.00	+/-0.020	16	32	80	15.70	150	4	HF54220160150	●
16	0/-0.030	3.00	+/-0.020	16	32	80	15.70	150	4	HF54230160150	●
16	0/-0.030	4.00	+/-0.020	16	32	80	15.70	150	4	HF54240160150	●
20	0/-0.030	0.50	+/-0.020	20	40	100	19.70	150	4	HF54205200150	●
20	0/-0.030	1.00	+/-0.020	20	40	100	19.70	150	4	HF54210200150	●
20	0/-0.030	2.00	+/-0.020	20	40	100	19.70	150	4	HF54220200150	●
20	0/-0.030	3.00	+/-0.020	20	40	100	19.70	150	4	HF54230200150	●
20	0/-0.030	4.00	+/-0.020	20	40	100	19.70	150	4	HF54240200150	●

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

# HF542

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	<b>0.2D x D</b>
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.019	0.017	0.015	0.014
8	0.025	0.023	0.019	0.018
10	0.030	0.027	0.023	0.021
12	0.035	0.031	0.026	0.024
14	0.039	0.035	0.029	0.027
16	0.043	0.039	0.032	0.030
20	0.053	0.047	0.039	0.037



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.2D x 0.2D</b>	<b>1.2D x 0.2D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.023	0.021	0.019	0.026
8	0.030	0.027	0.024	0.033
10	0.036	0.033	0.029	0.040
12	0.041	0.037	0.033	0.046
14	0.047	0.042	0.037	0.051
16	0.052	0.047	0.041	0.057
20	0.063	0.057	0.050	0.069

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.015	0.014	0.012	0.012
8	0.019	0.018	0.015	0.016
10	0.023	0.022	0.018	0.019
12	0.026	0.025	0.021	0.022
14	0.029	0.028	0.023	0.025
16	0.033	0.031	0.026	0.027
20	0.040	0.038	0.032	0.033

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>7° x D</b>	<b>5° x D</b>	<b>3° x D</b>	<b>3° x D</b>
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>35÷55</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.016	0.015	0.015	0.021
8	0.021	0.020	0.019	0.027
10	0.025	0.024	0.023	0.032
12	0.029	0.027	0.027	0.037
14	0.033	0.031	0.030	0.041
16	0.036	0.034	0.033	0.046
20	0.044	0.041	0.040	0.056

HSS  
END-MILLS

- CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

# HF542

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>45÷55</b>	<b>20÷30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.019	0.017	0.015	0.014
	<b>8</b>	0.025	0.023	0.019	0.018
	<b>10</b>	0.030	0.027	0.023	0.021
	<b>12</b>	0.035	0.031	0.026	0.024
	<b>14</b>	0.039	0.035	0.029	0.027
<b>16</b>	0.043	0.039	0.032	0.030	
<b>20</b>	0.053	0.047	0.039	0.037	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>70÷90</b>	<b>50÷60</b>	<b>35÷45</b>	<b>20÷30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.010	0.009	0.008	0.011
	<b>8</b>	0.013	0.011	0.010	0.014
	<b>10</b>	0.015	0.014	0.012	0.017
	<b>12</b>	0.017	0.016	0.014	0.019
	<b>14</b>	0.019	0.017	0.016	0.021
<b>16</b>	0.022	0.019	0.017	0.024	
<b>20</b>	0.026	0.024	0.021	0.029	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS





CUTTING PARAMETERS

HF942

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.2D x 0.2D</b>	<b>1.2D x 0.2D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.016	0.015	0.013	0.018
	5	0.021	0.019	0.017	0.023
	6	0.026	0.023	0.021	0.029
	8	0.031	0.028	0.025	0.034
	10	0.036	0.033	0.029	0.040
12	0.041	0.037	0.033	0.045	
16	0.047	0.042	0.038	0.052	
20	0.063	0.057	0.051	0.070	
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	1.2D x 0.1D	1.2D x 0.1D

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
	Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.010	0.010	0.008	0.009
	5	0.013	0.013	0.011	0.011
	6	0.016	0.016	0.013	0.014
	8	0.019	0.018	0.015	0.016
	10	0.023	0.022	0.018	0.019
12	0.026	0.025	0.021	0.022	
16	0.030	0.028	0.024	0.025	
20	0.040	0.038	0.032	0.033	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

# HF942

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	5° x D	5° x D	3° x D	3° x D
Vc (m/min)	80÷100	50÷70	35÷55	20÷30
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.012	0.011	0.010	0.014
5	0.015	0.014	0.014	0.019
6	0.019	0.017	0.017	0.023
8	0.022	0.020	0.020	0.027
10	0.027	0.024	0.023	0.032
12	0.030	0.027	0.026	0.036
16	0.034	0.031	0.030	0.041
20	0.046	0.042	0.041	0.056

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	D x 0.4D	D x 0.4D	D x 0.25D	D x 0.25D
Vc (m/min)	80÷100	50÷70	35÷55	20÷30
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.014	0.012	0.010	0.010
5	0.018	0.016	0.013	0.012
6	0.022	0.019	0.016	0.015
8	0.026	0.023	0.019	0.018
10	0.030	0.027	0.023	0.021
12	0.034	0.031	0.026	0.024
16	0.039	0.035	0.029	0.027
20	0.053	0.048	0.040	0.037

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	D x 0.5D	D x 0.5D
Vc (m/min)	70÷90	50÷60	35÷45	20÷30
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.007	0.006	0.005	0.007
5	0.009	0.008	0.007	0.010
6	0.011	0.010	0.009	0.012
8	0.013	0.012	0.010	0.014
10	0.015	0.014	0.012	0.017
12	0.017	0.015	0.014	0.019
16	0.020	0.018	0.016	0.022
20	0.026	0.024	0.021	0.029

HSS END-MILLS

ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D
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CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

**HF942**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
	Vc (m/min)	<b>140÷160</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>4</b>	0.034	0.031	0.027	0.037	
<b>5</b>	0.044	0.040	0.035	0.048	
<b>6</b>	0.054	0.049	0.043	0.059	
<b>8</b>	0.064	0.058	0.051	0.070	
<b>10</b>	0.076	0.068	0.061	0.084	
<b>12</b>	0.086	0.077	0.069	0.095	
<b>16</b>	0.098	0.088	0.078	0.108	
<b>20</b>	0.132	0.119	0.106	0.145	
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	1.2D x 0.05D	1.2D x 0.05D

**NOTES:**

Down milling CNC programming is required.

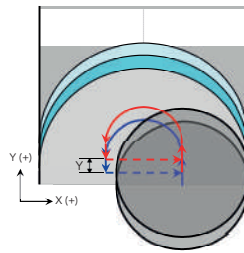
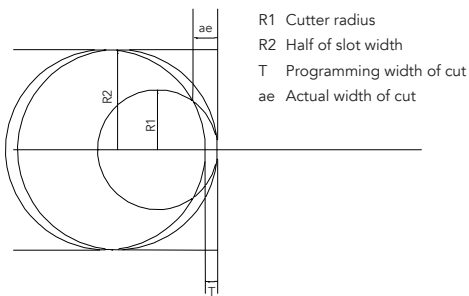
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

**HF943**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.2D x 0.2D</b>	<b>1.2D x 0.2D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.016	0.015	0.013	0.018
	5	0.021	0.019	0.017	0.023
	6	0.026	0.023	0.021	0.029
	8	0.031	0.028	0.025	0.034
	10	0.036	0.033	0.029	0.040
12	0.041	0.037	0.033	0.045	
16	0.047	0.042	0.038	0.052	
20	0.063	0.057	0.051	0.070	
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	1.2D x 0.1D	1.2D x 0.1D

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
	Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.010	0.010	0.008	0.009
	5	0.013	0.013	0.011	0.011
	6	0.016	0.016	0.013	0.014
	8	0.019	0.018	0.015	0.016
	10	0.023	0.022	0.018	0.019
12	0.026	0.025	0.021	0.022	
16	0.030	0.028	0.024	0.025	
20	0.040	0.038	0.032	0.033	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF942 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF943

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>5° x D</b>	<b>5° x D</b>	<b>3° x D</b>	<b>3° x D</b>
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>35÷55</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>4</b>	0.012	0.011	0.010	0.014
<b>5</b>	0.015	0.014	0.014	0.019
<b>6</b>	0.019	0.017	0.017	0.023
<b>8</b>	0.022	0.020	0.020	0.027
<b>10</b>	0.027	0.024	0.023	0.032
<b>12</b>	0.030	0.027	0.026	0.036
<b>16</b>	0.034	0.031	0.030	0.041
<b>20</b>	0.046	0.042	0.041	0.056

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>35÷55</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>4</b>	0.014	0.012	0.010	0.010
<b>5</b>	0.018	0.016	0.013	0.012
<b>6</b>	0.022	0.019	0.016	0.015
<b>8</b>	0.026	0.023	0.019	0.018
<b>10</b>	0.030	0.027	0.023	0.021
<b>12</b>	0.034	0.031	0.026	0.024
<b>16</b>	0.039	0.035	0.029	0.027
<b>20</b>	0.053	0.048	0.040	0.037

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x 0.5D</b>	<b>D x 0.5D</b>
Vc (m/min)	<b>70÷90</b>	<b>50÷60</b>	<b>35÷45</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>4</b>	0.007	0.006	0.005	0.007
<b>5</b>	0.009	0.008	0.007	0.010
<b>6</b>	0.011	0.010	0.009	0.012
<b>8</b>	0.013	0.012	0.010	0.014
<b>10</b>	0.015	0.014	0.012	0.017
<b>12</b>	0.017	0.015	0.014	0.019
<b>16</b>	0.020	0.018	0.016	0.022
<b>20</b>	0.026	0.024	0.021	0.029

HSS END-MILLS

ap x ae	≤ D5	0.5D x D	0.5D x D	0.25D x D	0.25D x D
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CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF942 PARAMETERS.

CUTTING PARAMETERS

**HF943**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
	Vc (m/min)	<b>140÷160</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>4</b>	0.034	0.031	0.027	0.037	
<b>5</b>	0.044	0.040	0.035	0.048	
<b>6</b>	0.054	0.049	0.043	0.059	
<b>8</b>	0.064	0.058	0.051	0.070	
<b>10</b>	0.076	0.068	0.061	0.084	
<b>12</b>	0.086	0.077	0.069	0.095	
<b>16</b>	0.098	0.088	0.078	0.108	
<b>20</b>	0.132	0.119	0.106	0.145	
<b>ap x ae</b>	<b>≤ D5</b>	1.5D x 0.1D	1.5D x 0.1D	1.2D x 0.05D	1.2D x 0.05D

**NOTES:**

Down milling CNC programming is required.

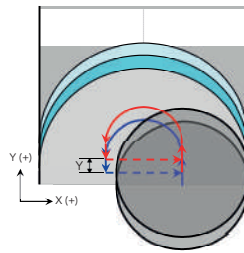
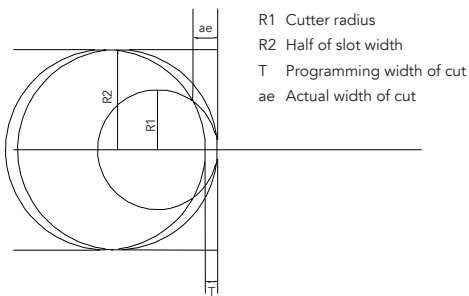
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF942 PARAMETERS.





CUTTING PARAMETERS

INFO

### HF642

SIDE MILLING	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.2D x 0.3D</b>	<b>1.2D x 0.3D</b>
	Vc (m/min)	<b>160÷180</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.019	0.017	0.015	0.021
	5	0.023	0.021	0.019	0.026
	6	0.028	0.025	0.022	0.030
	8	0.036	0.032	0.029	0.039
	10	0.043	0.039	0.034	0.047
12	0.049	0.044	0.039	0.054	
14	0.055	0.050	0.044	0.061	
16	0.061	0.055	0.049	0.067	
20	0.074	0.067	0.060	0.082	
ap x ae	≤ D5	1.5D x 0.3D	1.5D x 0.3D	1.2D x 0.2D	1.2D x 0.2D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HELICAL	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.011	0.011	0.009	0.009
	5	0.014	0.013	0.012	0.011
	6	0.017	0.016	0.014	0.013
	8	0.022	0.020	0.018	0.017
	10	0.026	0.024	0.021	0.020
12	0.030	0.028	0.024	0.023	
14	0.033	0.031	0.028	0.026	
16	0.037	0.035	0.031	0.029	
20	0.045	0.042	0.037	0.035	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

RAMPING	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.018	0.017	0.016	0.022
	8	0.024	0.022	0.021	0.029
	10	0.028	0.026	0.025	0.034
	12	0.033	0.030	0.029	0.039
	14	0.037	0.034	0.032	0.044
16	0.041	0.037	0.036	0.049	
20	0.050	0.046	0.043	0.060	

HSS END-MILLS

CARBIDE BURRS

INFO

# HF642

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.023	0.021	0.017	0.016	
<b>8</b>	0.030	0.027	0.022	0.021	
<b>10</b>	0.036	0.032	0.027	0.025	
<b>12</b>	0.041	0.037	0.031	0.029	
<b>14</b>	0.046	0.041	0.034	0.032	
<b>16</b>	0.051	0.046	0.038	0.036	
<b>20</b>	0.062	0.056	0.047	0.043	

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
	Vc (m/min)	<b>190÷230</b>	<b>130÷150</b>	<b>100÷120</b>	<b>50÷70</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>4</b>	0.039	0.035	0.031	0.043	
<b>5</b>	0.049	0.044	0.039	0.054	
<b>6</b>	0.057	0.052	0.046	0.063	
<b>8</b>	0.074	0.067	0.060	0.082	
<b>10</b>	0.089	0.080	0.071	0.098	
<b>12</b>	0.102	0.092	0.082	0.112	
<b>14</b>	0.115	0.103	0.092	0.126	
<b>16</b>	0.128	0.115	0.102	0.140	
<b>20</b>	0.155	0.140	0.124	0.171	
ap x ae	<b>≤ D5</b>	1.5D x 0.1D	1.5D x 0.1D	D x 0.1D	D x 0.1D

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

**NOTES:**

Down milling CNC programming is required.

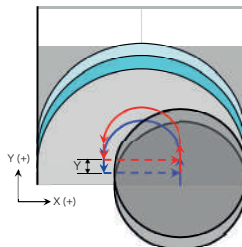
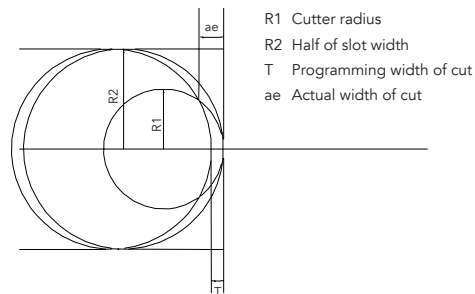
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



HSS END-MILLS

CARBIDE BURRS



INFO

# HF643

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.2D x 0.3D</b>	<b>1.2D x 0.3D</b>
Vc (m/min)	<b>160÷180</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.019	0.017	0.015	0.021
5	0.023	0.021	0.019	0.026
6	0.028	0.025	0.022	0.030
8	0.036	0.032	0.029	0.039
10	0.043	0.039	0.034	0.047
12	0.049	0.044	0.039	0.054
14	0.055	0.050	0.044	0.061
16	0.061	0.055	0.049	0.067
20	0.074	0.067	0.060	0.082
ap x ae	≤ D5	1.5D x 0.3D	1.5D x 0.3D	1.2D x 0.2D

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
4	0.011	0.011	0.009	0.009
5	0.014	0.013	0.012	0.011
6	0.017	0.016	0.014	0.013
8	0.022	0.020	0.018	0.017
10	0.026	0.024	0.021	0.020
12	0.030	0.028	0.024	0.023
14	0.033	0.031	0.028	0.026
16	0.037	0.035	0.031	0.029
20	0.045	0.042	0.037	0.035
α° x ae	≤ D5	2° x 0.4D	1° x 0.4D	1° x 0.4D

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.018	0.017	0.016	0.022
8	0.024	0.022	0.021	0.029
10	0.028	0.026	0.025	0.034
12	0.033	0.030	0.029	0.039
14	0.037	0.034	0.032	0.044
16	0.041	0.037	0.036	0.049
20	0.050	0.046	0.043	0.060

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF642 PARAMETERS.

CUTTING PARAMETERS

HF643

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.023	0.021	0.017	0.016
	8	0.030	0.027	0.022	0.021
	10	0.036	0.032	0.027	0.025
	12	0.041	0.037	0.031	0.029
	14	0.046	0.041	0.034	0.032
16	0.051	0.046	0.038	0.036	
20	0.062	0.056	0.047	0.043	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
	Vc (m/min)	<b>190÷230</b>	<b>130÷150</b>	<b>100÷120</b>	<b>50÷70</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.039	0.035	0.031	0.043
	5	0.049	0.044	0.039	0.054
	6	0.057	0.052	0.046	0.063
	8	0.074	0.067	0.060	0.082
	10	0.089	0.080	0.071	0.098
12	0.102	0.092	0.082	0.112	
14	0.115	0.103	0.092	0.126	
16	0.128	0.115	0.102	0.140	
20	0.155	0.140	0.124	0.171	
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	D x 0.1D	D x 0.1D

NOTES:

Down milling CNC programming is required.

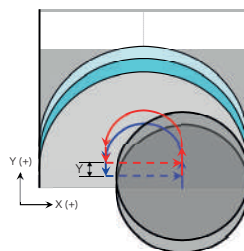
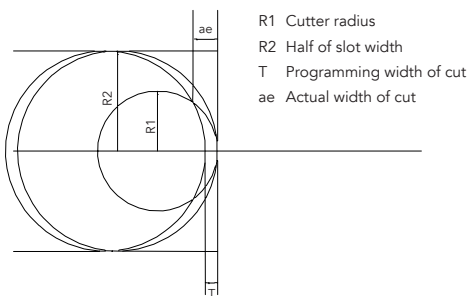
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF642 PARAMETERS.



CUTTING PARAMETERS

HF742

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.2D x 0.2D</b>	<b>1.2D x 0.2D</b>
	Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.023	0.021	0.019	0.026
	8	0.028	0.025	0.022	0.030
	10	0.033	0.030	0.026	0.036
	12	0.037	0.033	0.030	0.041
	16	0.042	0.038	0.034	0.047
20	0.057	0.051	0.046	0.063	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
	Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.016	0.016	0.013	0.014
	8	0.019	0.018	0.015	0.016
	10	0.023	0.022	0.018	0.019
	12	0.026	0.025	0.021	0.022
	16	0.030	0.028	0.024	0.025
20	0.040	0.038	0.032	0.033	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>5° x D</b>	<b>4° x D</b>	<b>3° x D</b>	<b>3° x D</b>
	Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>35÷55</b>	<b>20÷30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.017	0.016	0.015	0.021
	8	0.020	0.019	0.018	0.024
	10	0.024	0.022	0.021	0.029
	12	0.027	0.025	0.024	0.033
	16	0.031	0.029	0.027	0.037
20	0.042	0.039	0.037	0.050	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

INFO

# HF742

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>80±100</b>	<b>50±70</b>	<b>35±55</b>	<b>20±30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.022	0.019	0.016	0.015
	8	0.026	0.023	0.019	0.018
	10	0.030	0.027	0.023	0.021
	12	0.034	0.031	0.026	0.024
	16	0.039	0.035	0.029	0.027
20	0.053	0.048	0.040	0.037	

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>3D x 0.1D</b>	<b>3D x 0.1D</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>
	Vc (m/min)	<b>130±170</b>	<b>100±120</b>	<b>70±90</b>	<b>40±60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.054	0.049	0.043	0.059
	8	0.064	0.058	0.051	0.070
	10	0.076	0.068	0.061	0.084
	12	0.086	0.077	0.069	0.095
	16	0.098	0.088	0.078	0.108
20	0.132	0.119	0.106	0.145	

**NOTES:**

Down milling CNC programming is required.

"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

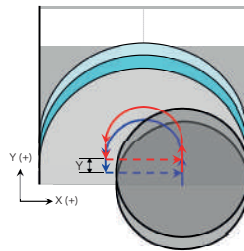
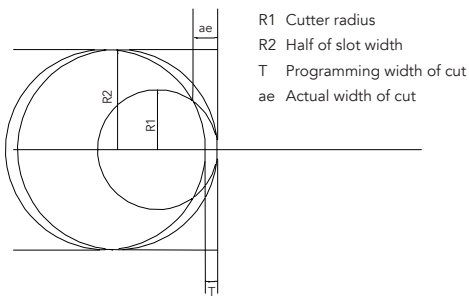
The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION





CUTTING PARAMETERS

INFO

# HF743

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.2D x 0.2D</b>	<b>1.2D x 0.2D</b>
Vc (m/min)	<b>110÷130</b>	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.023	0.021	0.019	0.026
<b>8</b>	0.028	0.025	0.022	0.030
<b>10</b>	0.033	0.030	0.026	0.036
<b>12</b>	0.037	0.033	0.030	0.041
<b>16</b>	0.042	0.038	0.034	0.047
<b>20</b>	0.057	0.051	0.046	0.063



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.016	0.016	0.013	0.014
<b>8</b>	0.019	0.018	0.015	0.016
<b>10</b>	0.023	0.022	0.018	0.019
<b>12</b>	0.026	0.025	0.021	0.022
<b>16</b>	0.030	0.028	0.024	0.025
<b>20</b>	0.040	0.038	0.032	0.033

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>5° x D</b>	<b>4° x D</b>	<b>3° x D</b>	<b>3° x D</b>
Vc (m/min)	<b>80÷100</b>	<b>50÷70</b>	<b>35÷55</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.017	0.016	0.015	0.021
<b>8</b>	0.020	0.019	0.018	0.024
<b>10</b>	0.024	0.022	0.021	0.029
<b>12</b>	0.027	0.025	0.024	0.033
<b>16</b>	0.031	0.029	0.027	0.037
<b>20</b>	0.042	0.039	0.037	0.050

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF742 PARAMETERS.

CUTTING PARAMETERS

**HF743**

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>80±100</b>	<b>50±70</b>	<b>35±55</b>	<b>20±30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.022	0.019	0.016	0.015
	<b>8</b>	0.026	0.023	0.019	0.018
	<b>10</b>	0.030	0.027	0.023	0.021
	<b>12</b>	0.034	0.031	0.026	0.024
	<b>16</b>	0.039	0.035	0.029	0.027
<b>20</b>	0.053	0.048	0.040	0.037	

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>3D x 0.1D</b>	<b>3D x 0.1D</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>
	Vc (m/min)	<b>130±170</b>	<b>100±120</b>	<b>70±90</b>	<b>40±60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.054	0.049	0.043	0.059
	<b>8</b>	0.064	0.058	0.051	0.070
	<b>10</b>	0.076	0.068	0.061	0.084
	<b>12</b>	0.086	0.077	0.069	0.095
	<b>16</b>	0.098	0.088	0.078	0.108
<b>20</b>	0.132	0.119	0.106	0.145	

**NOTES:**

Down milling CNC programming is required.

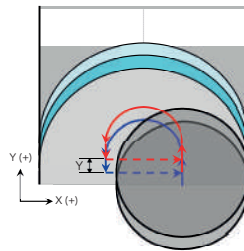
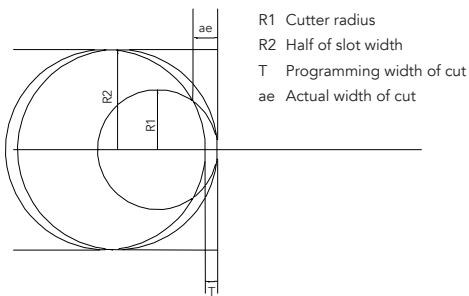
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF742 PARAMETERS.



CUTTING PARAMETERS

**HF871**

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	<b>ap x ae</b>	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	<b>Vc (m/min)</b>	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>1</b>	0.005	0.005	0.004	0.004
	<b>2</b>	0.010	0.009	0.008	0.007
	<b>3</b>	0.014	0.013	0.011	0.010
	<b>4</b>	0.019	0.017	0.014	0.013
	<b>5</b>	0.023	0.021	0.017	0.016
	<b>6</b>	0.027	0.024	0.020	0.019
	<b>8</b>	0.035	0.032	0.026	0.025
	<b>10</b>	0.042	0.038	0.032	0.029
	<b>12</b>	0.048	0.043	0.036	0.034
	<b>14</b>	0.054	0.049	0.041	0.038
<b>16</b>	0.060	0.054	0.045	0.042	
<b>18</b>	0.066	0.059	0.050	0.046	
<b>20</b>	0.073	0.066	0.055	0.051	
<b>ap x ae</b>	<b>D1</b>	0.25D x D	0.25D x D	0.2D x D	0.2D x D
<b>ap x ae</b>	<b>≤ D3</b>	0.5D x D	0.5D x D	0.25D x D	0.25D x D

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>		
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	<b>ap x ae</b>	<b>1.5D x D</b>	<b>1.5D x D</b>		
	<b>Vc (m/min)</b>	<b>100÷120</b>	<b>60÷80</b>		
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>		
	<b>8</b>	0.028	0.025		
	<b>10</b>	0.034	0.030		
	<b>12</b>	0.038	0.035		
	<b>14</b>	0.043	0.039		
	<b>16</b>	0.048	0.043		
<b>18</b>	0.053	0.048			
<b>20</b>	0.058	0.053			

	<b>Material Group ISO 513</b>	<b>P1 P2 P7 K1</b>			
	<b>Hardness/Rm</b>	≤700 N/mm <sup>2</sup>			
	<b>ap x ae</b>	<b>2D x D</b>			
	<b>Vc (m/min)</b>	<b>75÷95</b>			
	<b>D (mm)</b>	<b>fz (mm/z)</b>			
	<b>10</b>	0.025			
	<b>12</b>	0.029			
	<b>14</b>	0.032			
	<b>16</b>	0.036			
	<b>18</b>	0.040			
<b>20</b>	0.044				

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF840 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF871

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.2D x 0.3D</b>	<b>1.2D x 0.3D</b>
Vc (m/min)	<b>160÷180</b>	<b>100÷120</b>	<b>70÷90</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.006	0.005	0.005	0.007
2	0.012	0.011	0.010	0.013
3	0.017	0.015	0.013	0.018
4	0.022	0.020	0.018	0.024
5	0.028	0.025	0.022	0.030
6	0.032	0.029	0.026	0.036
8	0.042	0.038	0.034	0.046
10	0.050	0.045	0.040	0.055
12	0.058	0.052	0.046	0.063
14	0.065	0.058	0.052	0.071
16	0.072	0.065	0.058	0.079
18	0.079	0.071	0.063	0.087
20	0.088	0.079	0.070	0.096
ap x ae	≤ D3	1.5D x 0.1D	1.2D x 0.1D	1.2D x 0.1D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>3° x 0.4D</b>
Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.004	0.003	0.003	0.003
2	0.007	0.007	0.006	0.006
3	0.010	0.010	0.008	0.008
4	0.013	0.013	0.011	0.010
5	0.017	0.016	0.014	0.013
6	0.020	0.018	0.016	0.015
8	0.025	0.024	0.021	0.020
10	0.031	0.029	0.025	0.024
12	0.035	0.033	0.029	0.027
14	0.039	0.037	0.032	0.030
16	0.044	0.041	0.036	0.034
18	0.048	0.045	0.040	0.037
20	0.053	0.050	0.044	0.041
α° x ae	≤ D3	1° x 0.4D	1° x 0.4D	1° x 0.4D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF840 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF871

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	α° x ae	<b>15° x D</b>	<b>10° x D</b>	<b>5° x D</b>	<b>5° x D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.022	0.020	0.019	0.026
	<b>8</b>	0.028	0.026	0.024	0.034
	<b>10</b>	0.034	0.031	0.029	0.040
	<b>12</b>	0.038	0.035	0.034	0.046
	<b>14</b>	0.043	0.040	0.038	0.052
	<b>16</b>	0.048	0.044	0.042	0.058
<b>18</b>	0.053	0.048	0.046	0.063	
<b>20</b>	0.058	0.054	0.051	0.070	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>		
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>		
	α° x ae	<b>30° x D</b>	<b>15° x D</b>		
	Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>		
	D (mm)	fz (mm/z)	fz (mm/z)		
	<b>10</b>	0.025	0.023		
	<b>12</b>	0.028	0.026		
	<b>14</b>	0.032	0.029		
	<b>16</b>	0.035	0.032		
	<b>18</b>	0.039	0.036		
	<b>20</b>	0.043	0.039		

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	<b>P1 P2 P7 K1</b>	<b>P3 P4 M1 K2 K3</b>	<b>P5 M2 M3 K4 S1 S4</b>	<b>S2 S3 S5</b>
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>130÷150</b>	<b>80÷100</b>	<b>60÷80</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.027	0.024	0.020	0.019
	<b>8</b>	0.035	0.032	0.026	0.025
	<b>10</b>	0.042	0.038	0.032	0.029
	<b>12</b>	0.048	0.043	0.036	0.034
	<b>14</b>	0.054	0.049	0.041	0.038
	<b>16</b>	0.060	0.054	0.045	0.042
<b>18</b>	0.066	0.059	0.050	0.046	
<b>20</b>	0.073	0.066	0.055	0.051	

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF840 PARAMETERS.

INFO

# HF871

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.003	0.002	0.002	0.003
2	0.005	0.005	0.004	0.006
3	0.007	0.006	0.006	0.008
4	0.009	0.008	0.007	0.010
5	0.012	0.010	0.009	0.013
6	0.014	0.012	0.011	0.015
8	0.018	0.016	0.014	0.019
10	0.021	0.019	0.017	0.023
12	0.024	0.022	0.019	0.026
14	0.027	0.024	0.022	0.030
16	0.030	0.027	0.024	0.033
18	0.033	0.030	0.026	0.036
20	0.037	0.033	0.029	0.040
ap x ae	≤ D3	0.5D x D	0.25D x D	0.25D x D

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷1000 N/mm <sup>2</sup>	≤35 HRC	≤40 HRC
ap x ae	<b>2D x 0.2D</b>	<b>2D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
Vc (m/min)	<b>190÷230</b>	<b>130÷150</b>	<b>100÷120</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.013	0.011	0.010	0.014
2	0.025	0.023	0.020	0.028
3	0.035	0.032	0.028	0.039
4	0.046	0.042	0.037	0.051
5	0.058	0.052	0.046	0.063
6	0.068	0.061	0.054	0.074
8	0.088	0.079	0.070	0.096
10	0.105	0.095	0.084	0.116
12	0.120	0.108	0.096	0.132
14	0.135	0.122	0.108	0.149
16	0.150	0.135	0.120	0.165
18	0.165	0.149	0.132	0.182
20	0.183	0.164	0.146	0.201
ap x ae	<b>D1</b>	1.5D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
ap x ae	≤ D3	1.5D x 0.1D	1.5D x 0.1D	1.5D x 0.1D

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

**NOTES:**

Down milling CNC programming is required.

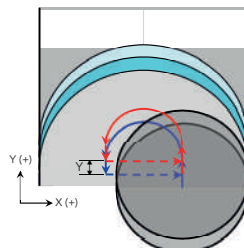
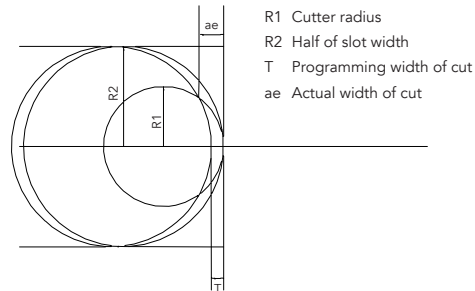
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF840 PARAMETERS.





INFO

# HF850

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
ap x ae		<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>
Vc (m/min)		<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.012	0.011	0.009	0.008	
4	0.016	0.014	0.012	0.011	
5	0.020	0.018	0.015	0.014	
6	0.023	0.021	0.017	0.016	
8	0.030	0.027	0.022	0.021	
10	0.036	0.032	0.027	0.025	
12	0.041	0.037	0.031	0.029	
14	0.046	0.041	0.034	0.032	
16	0.051	0.046	0.038	0.036	
20	0.062	0.056	0.047	0.043	
ap x ae	≤ D5	0.3D x D	0.3D x D	0.2D x D	0.1D x D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
ap x ae		<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>1.2D x 0.2D</b>	<b>D x 0.1D</b>
Vc (m/min)		<b>100÷120</b>	<b>70÷90</b>	<b>50÷70</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.014	0.013	0.011	0.016	
4	0.019	0.017	0.015	0.021	
5	0.023	0.021	0.019	0.026	
6	0.028	0.025	0.022	0.030	
8	0.036	0.032	0.029	0.039	
10	0.043	0.039	0.034	0.047	
12	0.049	0.044	0.039	0.054	
14	0.055	0.050	0.044	0.061	
16	0.061	0.055	0.049	0.067	
20	0.074	0.067	0.060	0.082	
ap x ae	≤ D5	1.2D x 0.2D	1.2D x 0.1D	D x 0.1D	D x 0.05D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
α° x ae		<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
Vc (m/min)		<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.009	0.008	0.007	0.008	
4	0.011	0.011	0.009	0.010	
5	0.014	0.013	0.012	0.012	
6	0.017	0.016	0.014	0.015	
8	0.022	0.020	0.018	0.019	
10	0.026	0.024	0.021	0.023	
12	0.030	0.028	0.024	0.026	
14	0.033	0.031	0.028	0.029	
16	0.037	0.035	0.031	0.032	
20	0.045	0.042	0.037	0.039	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

### HF850

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
	Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
	α° x ae	<b>5° x D</b>	<b>4° x D</b>	<b>3° x D</b>	<b>2° x D</b>
	Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.020	0.019	0.018	0.027
	<b>8</b>	0.026	0.024	0.023	0.035
	<b>10</b>	0.031	0.029	0.027	0.043
	<b>12</b>	0.036	0.033	0.031	0.049
	<b>14</b>	0.040	0.037	0.035	0.055
<b>16</b>	0.045	0.042	0.039	0.061	
<b>20</b>	0.054	0.051	0.048	0.074	

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
	Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.023	0.021	0.017	0.016
	<b>8</b>	0.030	0.027	0.022	0.021
	<b>10</b>	0.036	0.032	0.027	0.025
	<b>12</b>	0.041	0.037	0.031	0.029
	<b>14</b>	0.046	0.041	0.034	0.032
<b>16</b>	0.051	0.046	0.038	0.036	
<b>20</b>	0.062	0.056	0.047	0.043	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# HF850

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
Hardness/Rm					
ap x ae	<b>1-5D x 0.1D</b>	<b>1-5D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>	
Vc (m/min)	<b>130÷150</b>	<b>100÷120</b>	<b>60÷80</b>	<b>50÷70</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
3	0.027	0.024	0.021	0.029	
4	0.035	0.032	0.028	0.039	
5	0.044	0.040	0.035	0.048	
6	0.052	0.046	0.041	0.057	
8	0.067	0.060	0.054	0.074	
10	0.080	0.072	0.064	0.088	
12	0.092	0.083	0.073	0.101	
14	0.103	0.093	0.083	0.114	
16	0.115	0.103	0.092	0.126	
20	0.140	0.126	0.112	0.154	

**NOTES:**

Down milling CNC programming is required.

"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

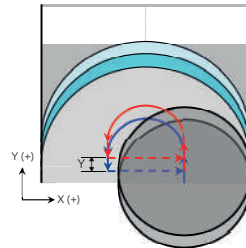
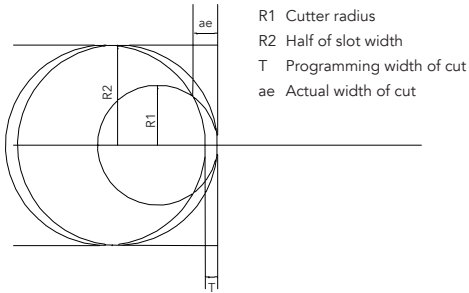
The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

# HF450

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.011	0.010	0.008	0.007	
4	0.014	0.013	0.011	0.010	
5	0.018	0.016	0.013	0.012	
6	0.021	0.019	0.015	0.014	
8	0.027	0.024	0.020	0.019	
10	0.032	0.029	0.024	0.022	
12	0.037	0.033	0.028	0.026	
14	0.041	0.037	0.031	0.029	
16	0.046	0.041	0.034	0.032	
20	0.056	0.050	0.042	0.039	
ap x ae	≤ D5	0.3D x D	0.3D x D	0.2D x D	0.1D x D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>1.2D x 0.2D</b>	<b>D x 0.1D</b>	
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.013	0.012	0.010	0.014	
4	0.017	0.015	0.014	0.019	
5	0.021	0.019	0.017	0.023	
6	0.025	0.022	0.020	0.027	
8	0.032	0.029	0.026	0.035	
10	0.039	0.035	0.031	0.042	
12	0.044	0.040	0.035	0.048	
14	0.050	0.045	0.040	0.055	
16	0.055	0.050	0.044	0.061	
20	0.067	0.060	0.054	0.074	
ap x ae	≤ D5	1.2D x 0.2D	1.2D x 0.2D	D x 0.1D	D x 0.05D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>	
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.008	0.007	0.006	0.007	
4	0.010	0.010	0.008	0.009	
5	0.013	0.012	0.011	0.011	
6	0.015	0.014	0.012	0.013	
8	0.019	0.018	0.016	0.017	
10	0.023	0.022	0.019	0.020	
12	0.027	0.025	0.022	0.023	
14	0.030	0.028	0.025	0.026	
16	0.033	0.031	0.028	0.029	
20	0.041	0.038	0.034	0.035	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

HF450

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
	Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
	α° x ae	5° x D	4° x D	3° x D	2° x D
	Vc (m/min)	60÷80	50÷60	30÷40	20÷30
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.018	0.017	0.016	0.025
	8	0.023	0.022	0.021	0.032
	10	0.028	0.026	0.025	0.038
	12	0.032	0.030	0.028	0.044
	14	0.036	0.034	0.032	0.049
16	0.040	0.037	0.035	0.055	
20	0.049	0.045	0.043	0.067	

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
	Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
	ap x ae	D x 0.4D	D x 0.4D	D x 0.25D	D x 0.25D
	Vc (m/min)	60÷80	50÷60	30÷40	20÷30
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.021	0.019	0.015	0.014
	8	0.027	0.024	0.020	0.019
	10	0.032	0.029	0.024	0.022
	12	0.037	0.033	0.028	0.026
	14	0.041	0.037	0.031	0.029
16	0.046	0.041	0.034	0.032	
20	0.056	0.050	0.042	0.039	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

# HF450

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
	Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>
Vc (m/min)	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.027	0.024	0.021	0.029
4	0.035	0.032	0.028	0.039
5	0.044	0.040	0.035	0.048
6	0.052	0.046	0.041	0.057
8	0.067	0.060	0.054	0.074
10	0.080	0.072	0.064	0.088
12	0.092	0.083	0.073	0.101
14	0.103	0.093	0.083	0.114
16	0.115	0.103	0.092	0.126
20	0.140	0.126	0.112	0.154

**NOTES:**

Down milling CNC programming is required.

"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

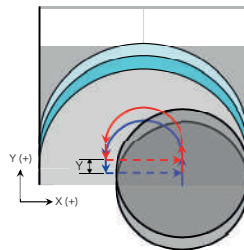
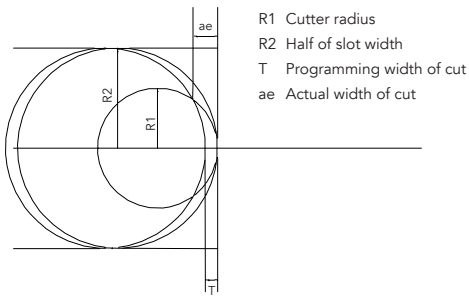
The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS





CUTTING PARAMETERS

INFO

# HF451

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
ap x ae		<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>
Vc (m/min)		<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.011	0.010	0.008	0.007	
4	0.014	0.013	0.011	0.010	
5	0.018	0.016	0.013	0.012	
6	0.021	0.019	0.015	0.014	
8	0.027	0.024	0.020	0.019	
10	0.032	0.029	0.024	0.022	
12	0.037	0.033	0.028	0.026	
14	0.041	0.037	0.031	0.029	
16	0.046	0.041	0.034	0.032	
20	0.056	0.050	0.042	0.039	
ap x ae	≤ D5	0.3D x D	0.3D x D	0.2D x D	0.1D x D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
ap x ae		<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>1.2D x 0.2D</b>	<b>D x 0.1D</b>
Vc (m/min)		<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.013	0.012	0.010	0.014	
4	0.017	0.015	0.014	0.019	
5	0.021	0.019	0.017	0.023	
6	0.025	0.022	0.020	0.027	
8	0.032	0.029	0.026	0.035	
10	0.039	0.035	0.031	0.042	
12	0.044	0.040	0.035	0.048	
14	0.050	0.045	0.040	0.055	
16	0.055	0.050	0.044	0.061	
20	0.067	0.060	0.054	0.074	
ap x ae	≤ D5	1.2D x 0.2D	1.2D x 0.1D	D x 0.1D	D x 0.05D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
α° x ae		<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>
Vc (m/min)		<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.008	0.007	0.006	0.007	
4	0.010	0.010	0.008	0.009	
5	0.013	0.012	0.011	0.011	
6	0.015	0.014	0.012	0.013	
8	0.019	0.018	0.016	0.017	
10	0.023	0.022	0.019	0.020	
12	0.027	0.025	0.022	0.023	
14	0.030	0.028	0.025	0.026	
16	0.033	0.031	0.028	0.029	
20	0.041	0.038	0.034	0.035	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF450 PARAMETERS.

CUTTING PARAMETERS

**HF451**

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
	Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
	α° x ae	<b>5° x D</b>	<b>4° x D</b>	<b>3° x D</b>	<b>2° x D</b>
	Vc (m/min)	<b>60÷80</b>	<b>50÷60</b>	<b>30÷40</b>	<b>20÷30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.018	0.017	0.016	0.025
	<b>8</b>	0.023	0.022	0.021	0.032
	<b>10</b>	0.028	0.026	0.025	0.038
	<b>12</b>	0.032	0.030	0.028	0.044
	<b>14</b>	0.036	0.034	0.032	0.049
<b>16</b>	0.040	0.037	0.035	0.055	
<b>20</b>	0.049	0.045	0.043	0.067	

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
	Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
	ap x ae	<b>D x 0.4D</b>	<b>D x 0.4D</b>	<b>D x 0.25D</b>	<b>D x 0.25D</b>
	Vc (m/min)	<b>60÷80</b>	<b>50÷60</b>	<b>30÷40</b>	<b>20÷30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.021	0.019	0.015	0.014
	<b>8</b>	0.027	0.024	0.020	0.019
	<b>10</b>	0.032	0.029	0.024	0.022
	<b>12</b>	0.037	0.033	0.028	0.026
	<b>14</b>	0.041	0.037	0.031	0.029
<b>16</b>	0.046	0.041	0.034	0.032	
<b>20</b>	0.056	0.050	0.042	0.039	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
**HFVH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF450 PARAMETERS.

CUTTING PARAMETERS

INFO

# HF451

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
Hardness/Rm					
ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>	
Vc (m/min)	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>	<b>40÷60</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.027	0.024	0.021	0.029	
4	0.035	0.032	0.028	0.039	
5	0.044	0.040	0.035	0.048	
6	0.052	0.046	0.041	0.057	
8	0.067	0.060	0.054	0.074	
10	0.080	0.072	0.064	0.088	
12	0.092	0.083	0.073	0.101	
14	0.103	0.093	0.083	0.114	
16	0.115	0.103	0.092	0.126	
20	0.140	0.126	0.112	0.154	

NOTES:

Down milling CNC programming is required.

"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

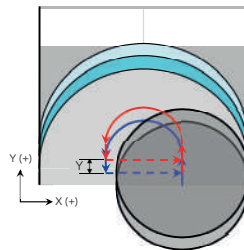
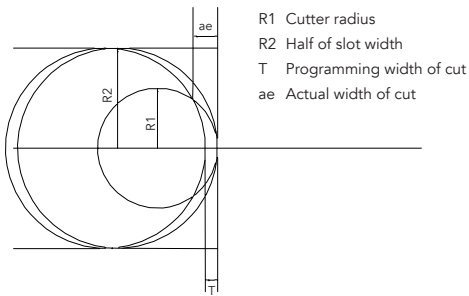
The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP**
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHING CONDITION.  
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF450 PARAMETERS.



CUTTING PARAMETERS

INFO

# HF852

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	<b>0.2D x D</b>
Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.012	0.011	0.009	0.008	
4	0.016	0.014	0.012	0.011	
5	0.020	0.018	0.015	0.014	
6	0.023	0.021	0.017	0.016	
8	0.030	0.027	0.022	0.021	
10	0.036	0.032	0.027	0.025	
12	0.041	0.037	0.031	0.029	
14	0.046	0.041	0.034	0.032	
16	0.051	0.046	0.038	0.036	
20	0.062	0.056	0.047	0.043	
ap x ae	≤ D5	0.3D x D	0.3D x D	0.2D x D	0.1D x D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>1.2D x 0.2D</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>
Vc (m/min)	<b>100÷120</b>	<b>70÷90</b>	<b>50÷70</b>	<b>40÷60</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.014	0.013	0.011	0.016	
4	0.019	0.017	0.015	0.021	
5	0.023	0.021	0.019	0.026	
6	0.028	0.025	0.022	0.030	
8	0.036	0.032	0.029	0.039	
10	0.043	0.039	0.034	0.047	
12	0.049	0.044	0.039	0.054	
14	0.055	0.050	0.044	0.061	
16	0.061	0.055	0.049	0.067	
20	0.074	0.067	0.060	0.082	
ap x ae	≤ D5	1.2D x 0.2D	1.2D x 0.2D	D x 0.1D	D x 0.05D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>	<b>2° x 0.4D</b>
Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.009	0.008	0.007	0.008	
4	0.011	0.011	0.009	0.010	
5	0.014	0.013	0.012	0.012	
6	0.017	0.016	0.014	0.015	
8	0.022	0.020	0.018	0.019	
10	0.026	0.024	0.021	0.023	
12	0.030	0.028	0.024	0.026	
14	0.033	0.031	0.028	0.029	
16	0.037	0.035	0.031	0.032	
20	0.045	0.042	0.037	0.039	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

HF852

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
	Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
	α° x ae	5° x D	4° x D	3° x D	2° x D
	Vc (m/min)	80÷100	60÷80	40÷60	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.020	0.019	0.018	0.027
	8	0.026	0.024	0.023	0.035
	10	0.031	0.029	0.027	0.043
	12	0.036	0.033	0.031	0.049
	14	0.040	0.037	0.035	0.055
16	0.045	0.042	0.039	0.061	
20	0.054	0.051	0.048	0.074	

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
	Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
	ap x ae	D x 0.4D	D x 0.4D	D x 0.25D	D x 0.25D
	Vc (m/min)	80÷100	60÷80	40÷60	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.023	0.021	0.017	0.016
	8	0.030	0.027	0.022	0.021
	10	0.036	0.032	0.027	0.025
	12	0.041	0.037	0.031	0.029
	14	0.046	0.041	0.034	0.032
16	0.051	0.046	0.038	0.036	
20	0.062	0.056	0.047	0.043	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# HF852

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
	Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>
Vc (m/min)	<b>130÷150</b>	<b>100÷120</b>	<b>60÷80</b>	<b>50÷70</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.027	0.024	0.021	0.029
4	0.035	0.032	0.028	0.039
5	0.044	0.040	0.035	0.048
6	0.052	0.046	0.041	0.057
8	0.067	0.060	0.054	0.074
10	0.080	0.072	0.064	0.088
12	0.092	0.083	0.073	0.101
14	0.103	0.093	0.083	0.114
16	0.115	0.103	0.092	0.126
20	0.140	0.126	0.112	0.154

**NOTES:**

Down milling CNC programming is required.

"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

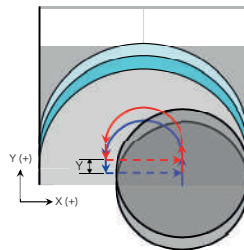
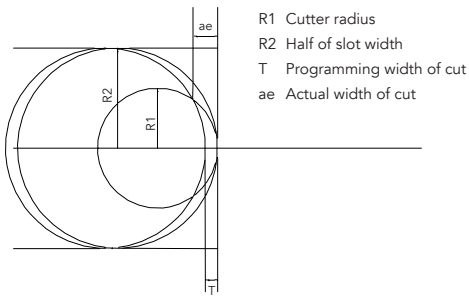
The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS





CUTTING PARAMETERS

INFO

# HF452

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	<b>0.2D x D</b>
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.011	0.010	0.008	0.007	
4	0.014	0.013	0.011	0.010	
5	0.018	0.016	0.013	0.012	
6	0.021	0.019	0.015	0.014	
8	0.027	0.024	0.020	0.019	
10	0.032	0.029	0.024	0.022	
12	0.037	0.033	0.028	0.026	
14	0.041	0.037	0.031	0.029	
16	0.046	0.041	0.034	0.032	
20	0.056	0.050	0.042	0.039	
ap x ae	≤ D5	0.3D x D	0.3D x D	0.2D x D	0.1D x D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>1.2D x 0.2D</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>
Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.013	0.012	0.010	0.014	
4	0.017	0.015	0.014	0.019	
5	0.021	0.019	0.017	0.023	
6	0.025	0.022	0.020	0.027	
8	0.032	0.029	0.026	0.035	
10	0.039	0.035	0.031	0.042	
12	0.044	0.040	0.035	0.048	
14	0.050	0.045	0.040	0.055	
16	0.055	0.050	0.044	0.061	
20	0.067	0.060	0.054	0.074	
ap x ae	≤ D5	1.2D x 0.2D	1.2D x 0.1D	D x 0.1D	D x 0.05D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC
α° x ae	<b>5° x 0.4D</b>	<b>4° x 0.4D</b>	<b>3° x 0.4D</b>	<b>2° x 0.4D</b>	<b>2° x 0.4D</b>
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.008	0.007	0.006	0.007	
4	0.010	0.010	0.008	0.009	
5	0.013	0.012	0.011	0.011	
6	0.015	0.014	0.012	0.013	
8	0.019	0.018	0.016	0.017	
10	0.023	0.022	0.019	0.020	
12	0.027	0.025	0.022	0.023	
14	0.030	0.028	0.025	0.026	
16	0.033	0.031	0.028	0.029	
20	0.041	0.038	0.034	0.035	
α° x ae	≤ D5	2° x 0.4D	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

HF452

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
	Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
	α° x ae	5° x D	4° x D	3° x D	2° x D
	Vc (m/min)	60÷80	50÷60	30÷40	20÷30
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.018	0.017	0.016	0.025
	8	0.023	0.022	0.021	0.032
	10	0.028	0.026	0.025	0.038
	12	0.032	0.030	0.028	0.044
	14	0.036	0.034	0.032	0.049
16	0.040	0.037	0.035	0.055	
20	0.049	0.045	0.043	0.067	

	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
	Hardness/Rm	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
	ap x ae	D x 0.4D	D x 0.4D	D x 0.25D	D x 0.25D
	Vc (m/min)	60÷80	50÷60	30÷40	20÷30
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.021	0.019	0.015	0.014
	8	0.027	0.024	0.020	0.019
	10	0.032	0.029	0.024	0.022
	12	0.037	0.033	0.028	0.026
	14	0.041	0.037	0.031	0.029
16	0.046	0.041	0.034	0.032	
20	0.056	0.050	0.042	0.039	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# HF452

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P4 M3 K4	P4 P5 P8 M3 K4 S1	P5 P8 P8 K4 S2 S3	H1 H4 H5
		800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>	35÷45 HRC	≤55 HRC
Hardness/Rm					
ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>	
Vc (m/min)	<b>110÷130</b>	<b>80÷100</b>	<b>50÷70</b>	<b>40÷60</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.027	0.024	0.021	0.029	
4	0.035	0.032	0.028	0.039	
5	0.044	0.040	0.035	0.048	
6	0.052	0.046	0.041	0.057	
8	0.067	0.060	0.054	0.074	
10	0.080	0.072	0.064	0.088	
12	0.092	0.083	0.073	0.101	
14	0.103	0.093	0.083	0.114	
16	0.115	0.103	0.092	0.126	
20	0.140	0.126	0.112	0.154	

**NOTES:**

Down milling CNC programming is required.

"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

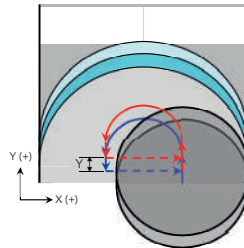
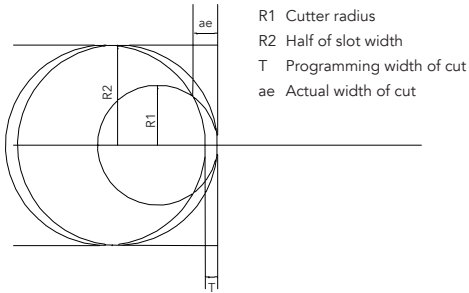
The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO



CARBIDE END-MILLS

G2  
MDTA  
**HF VH/UP**  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

## MEF

STAINLESS STEEL AND SUPER ALLOYS

🇬🇧 Ultra-fine micrograin and Endless Black coating for high performance machining on stainless steel, HRSA and titanium alloy, carbon and low alloy steel. The unique design of the cutting geometry and the Endless Black coating are specifically developed to control the cutting friction delivering longer tool life through the reduction of the heat generation.

🇮🇹 Micrograna ultrafine e rivestimento Endless Black per la lavorazione ad alto rendimento di acciai al carbonio, acciai inossidabili, HRSA e leghe di titanio. La geometria e il rivestimento specifici consentono di generare bassi sforzi di taglio e l'abbassamento del coefficiente di attrito, garantendo una riduzione dello sviluppo del calore con conseguente rallentamento del processo di usura del tagliente.

🇩🇪 Besonders feine Mikrokörnung und Beschichtung Endless Black für Hochleistungsbearbeitungen von Kohlenstoffstahl, Edelstahl, HRSA und Titanlegierungen. Dank der speziellen Geometrie und der spezifischen Beschichtung wird ein niedriger Schneiddruck erzeugt und der Reibungsfaktor gesenkt, wodurch die Hitzeentwicklung reduziert und in Folge die Abnutzung der Schneidkante verzögert werden.

🇫🇷 Ultra Micrograin et revêtement Endless Black pour l'usage à haute performance pour les aciers au carbone, aciers inoxydables, HRSA et alliages de titane. La géométrie et le revêtement spécifiques permettent de générer peu d'efforts de coupe et de réduire le coefficient de frottement, en garantissant une diminution du développement de la chaleur et le ralentissement consécutif du processus d'usure de l'arête.

🇪🇸 Micrograno ultrafino y revestimiento Endless Black para el mecanizado a alto rendimiento de aceros al carbono, aceros inoxidables, HRSA y aleaciones de titanio. La geometría y revestimiento específicos permiten generar bajos esfuerzos de corte y reducción del coeficiente de rozamiento, garantizando una reducción del desarrollo de calor con la consiguiente ralentización del proceso de desgaste del filo.

🇷🇺 Микрозернистая супермелкая структура твердого сплава и покрытие Endless Black служат для высокоэффективной обработки нержавеющей стали, жаропрочных и титановых сплавов, низко- и высокоуглеродистых сталей. Специальные геометрия и покрытие позволяют снизить трение и тепловыделение при резании и, тем самым, увеличить стойкость инструмента.

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
**MEF**  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



CUTTING PARAMETERS

INFO

MEFCS2

	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	700÷1000 N/mm <sup>2</sup>	≤35 HRC	≤45 HRC
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>
	Vc (m/min)	<b>90÷110</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>1</b>	0.005	0.004	0.004	0.004
	<b>2</b>	0.009	0.008	0.007	0.007
	<b>3</b>	0.012	0.010	0.009	0.009
	<b>4</b>	0.017	0.015	0.014	0.014
	<b>5</b>	0.023	0.020	0.018	0.018
	<b>6</b>	0.029	0.024	0.023	0.023
	<b>8</b>	0.035	0.029	0.028	0.028
	<b>10</b>	0.040	0.034	0.032	0.032
	<b>12</b>	0.046	0.039	0.037	0.037
<b>14</b>	0.052	0.044	0.041	0.041	
<b>16</b>	0.058	0.049	0.046	0.046	

< D3 mm: ap = 0.1D ÷ 0.2D

	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	700÷1000 N/mm <sup>2</sup>	≤35 HRC	≤45 HRC
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>D x 0.3D</b>	<b>D x 0.1D</b>
	Vc (m/min)	<b>90÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>1</b>	0.006	0.005	0.004	0.004
	<b>2</b>	0.011	0.009	0.009	0.009
	<b>3</b>	0.014	0.012	0.011	0.011
	<b>4</b>	0.021	0.018	0.017	0.017
	<b>5</b>	0.028	0.023	0.022	0.022
	<b>6</b>	0.035	0.029	0.028	0.028
	<b>8</b>	0.041	0.035	0.033	0.033
	<b>10</b>	0.048	0.041	0.039	0.039
	<b>12</b>	0.055	0.047	0.044	0.044
<b>14</b>	0.062	0.053	0.050	0.050	
<b>16</b>	0.069	0.059	0.055	0.055	

< D3 mm: ap = 0.1D ÷ 0.2D

	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	700÷1000 N/mm <sup>2</sup>	≤35 HRC	≤45 HRC
	ap x ae	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>	<b>0.2D x D</b>
	Vc (m/min)	<b>90÷110</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>1</b>	0.003	0.002	0.002	0.002
	<b>2</b>	0.006	0.005	0.004	0.004
	<b>3</b>	0.007	0.006	0.006	0.006
	<b>4</b>	0.010	0.009	0.008	0.008
	<b>5</b>	0.014	0.012	0.011	0.011
	<b>6</b>	0.017	0.015	0.014	0.014
	<b>8</b>	0.021	0.018	0.017	0.017
	<b>10</b>	0.024	0.021	0.019	0.019
	<b>12</b>	0.028	0.023	0.022	0.022
<b>14</b>	0.031	0.026	0.025	0.025	
<b>16</b>	0.035	0.029	0.028	0.028	

< D3 mm: ap = 0.1D ÷ 0.2D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS








## CUTTING PARAMETERS


INFO

## MEFCSH3

 SLOTTING	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	700÷1000 N/mm <sup>2</sup>	≤35 HRC	≤45 HRC
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>
	Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.022	0.013	0.012	0.012
	8	0.029	0.017	0.015	0.016
	10	0.036	0.021	0.019	0.020
	12	0.046	0.027	0.024	0.026
	14	0.053	0.031	0.028	0.030
16	0.065	0.038	0.034	0.036	
18	0.075	0.044	0.039	0.042	
20	0.086	0.051	0.045	0.048	

CARBIDE DRILLS

 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

 SIDE MILLING	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	700÷1000 N/mm <sup>2</sup>	≤35 HRC	≤45 HRC
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>
	Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.026	0.015	0.014	0.014
	8	0.035	0.020	0.019	0.019
	10	0.043	0.026	0.024	0.024
	12	0.055	0.033	0.031	0.031
	14	0.064	0.038	0.036	0.036
16	0.078	0.046	0.043	0.043	
18	0.090	0.053	0.050	0.050	
20	0.104	0.061	0.058	0.058	

HSS DRILLS

 LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS

 G2  
 MDTA  
 HF-VH/UP  
**MEF**  
 ALU  
 MEX/MH  
 UH/MH


HSS END-MILLS

CARBIDE BURRS



## CUTTING PARAMETERS

## MEFCS4

	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	700÷1000 N/mm <sup>2</sup>	≤35 HRC	≤45 HRC
	ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>
	Vc (m/min)	<b>90±110</b>	<b>60±80</b>	<b>40±60</b>	<b>30±50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.012	0.010	0.010	0.010
	<b>4</b>	0.015	0.013	0.012	0.012
	<b>5</b>	0.018	0.015	0.014	0.014
	<b>6</b>	0.023	0.020	0.018	0.018
	<b>8</b>	0.030	0.026	0.024	0.024
<b>10</b>	0.038	0.032	0.030	0.030	
<b>12</b>	0.045	0.038	0.036	0.036	
<b>14</b>	0.052	0.044	0.042	0.042	
<b>16</b>	0.058	0.049	0.046	0.046	
<b>18</b>	0.066	0.056	0.053	0.053	
<b>20</b>	0.075	0.064	0.060	0.060	


INFO

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF-VH/UP  
**MEF**  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS



## CUTTING PARAMETERS

## MEF600

	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	700÷1000 N/mm <sup>2</sup>	≤35 HRC	≤45 HRC
	ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.05D</b>
	Vc (m/min)	<b>100÷140</b>	<b>70÷110</b>	<b>50÷80</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.015	0.013	0.012	0.012
	<b>8</b>	0.020	0.017	0.016	0.016
	<b>10</b>	0.025	0.021	0.020	0.020
	<b>12</b>	0.030	0.026	0.024	0.024
	<b>14</b>	0.035	0.030	0.028	0.028
<b>16</b>	0.040	0.034	0.032	0.032	
<b>20</b>	0.050	0.043	0.040	0.040	


INFO

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF-VH/UP  
**MEF**  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS



## CUTTING PARAMETERS

## MEF901

	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	700÷1000 N/mm <sup>2</sup>	≤35 HRC	≤45 HRC
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>D x 0.1D</b>
	Vc (m/min)	<b>100÷140</b>	<b>70÷90</b>	<b>50÷70</b>	<b>40÷60</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>4</b>	0.018	0.015	0.014	0.014
	<b>5</b>	0.022	0.019	0.018	0.018
	<b>6</b>	0.028	0.024	0.022	0.022
	<b>8</b>	0.035	0.030	0.028	0.028
	<b>10</b>	0.040	0.034	0.032	0.032
<b>12</b>	0.045	0.038	0.036	0.036	
<b>14</b>	0.050	0.043	0.040	0.040	
<b>16</b>	0.057	0.048	0.046	0.046	
<b>20</b>	0.073	0.062	0.058	0.058	

INFO


CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF-VH/UP  
**MEF**  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS





## CUTTING PARAMETERS

## MEF902

	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm <sup>2</sup>	700÷1000 N/mm <sup>2</sup>	≤35 HRC	≤45 HRC
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>	<b>D x 0.1D</b>
	Vc (m/min)	<b>100÷120</b>	<b>60÷80</b>	<b>45÷65</b>	<b>35÷45</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.027	0.023	0.021	0.021
	<b>8</b>	0.033	0.028	0.027	0.027
	<b>10</b>	0.038	0.032	0.030	0.030
	<b>12</b>	0.043	0.036	0.034	0.034
	<b>14</b>	0.048	0.040	0.038	0.038
<b>16</b>	0.054	0.046	0.043	0.043	
<b>20</b>	0.069	0.059	0.055	0.055	

INFO

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF-VH/UP  
**MEF**  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS





INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

## ALU

NON-FERROUS MATERIALS

✚ Uncoated micrograin carbide and cutting geometry specifically developed for non-ferrous machining. Lapped cutting edges and ad-hoc profile of the chip pocket for low cutting forces and outstanding finishing quality. Also available in the HF ALU version with unequal pitch (UP) with a specific design allowing mirror finishing and DxD machining, even in the 4-flutes version.

🇮🇹 Micrograna non rivestita e geometria di taglio sviluppata specificamente per la lavorazione di materiali non-ferrosi. Taglienti lappati e particolare profilo del vano truciolo per bassi sforzi di taglio e un'eccellente finitura superficiale. Disponibile anche la versione HF Alu con passo differenziato (UP) con un particolare design che permette finiture a specchio e lavorazioni DxD, anche nella versione a 4 taglienti.

🇩🇪 Unbeschichtete Mikrokörnung und eigens für die Bearbeitung von NE-Metallen entwickelte Schnittgeometrie. Dank der geläpften Schneiden und der besonderen Form der Nuten ist die aufzubringende Schnittkraft gering, bei gleichzeitig ausgezeichnetem Oberflächenfinish. Auch in der Version HF Alu mit ungleicher Teilung (UP) und besonderer Form erhältlich, die auch in der Version mit 4 Schneiden ein spiegelblankes Oberflächenfinish und DxD-Bearbeitungen ermöglicht.

🇫🇷 Micrograin non revêtu et géométrie de coupe développée spécifiquement pour l'usinage de matériaux non ferreux. Arêtes de coupe polies et profil particulier de la goujure pour de faibles efforts de coupe et une excellente finition superficielle. Également disponible la version HF Alu à pas décalé(UP), avec un design particulier qui permet des finitions glacées et des usinages DxD, aussi dans la version à 4 arêtes de coupe.

🇪🇸 Micrograna no revestida y geometría de corte desarrollada específicamente para la elaboración de materiales no ferrosos. Filos de corte lapeados y perfil especial del compartimento de virutas, para bajos esfuerzos de corte y un excelente acabado de la superficie. También está disponible la versión HF Alu con paso diferenciado (UP) con un diseño especial que permite acabados a espejo y elaboraciones D x D, incluso en la versión de 4 filos.

🇷🇺 Мелкозернистый твердый сплав без покрытия со специально разработанной геометрией для обработки цветных металлов. Доведенные режущие кромки и специальный профиль стружечных канавок снижают силы резания и улучшают качество обработанной поверхности. Также доступна версия HF Alu с неравномерным шагом (UP) и специальной геометрией, позволяющая получать зеркальную поверхность и работать в режиме DxD, в том числе для версии с 4-мя зубьями.

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

INFO

# HFAL4

cylindrical shank, 4 flutes

OSAWA  
NORM

ALU

MG  
BR

40°

SQUARE

Z4 UP



CARBIDE  
DRILLS

PU-HPU

TA-4HTA

SUH

ALH

HRC

SUH MINI

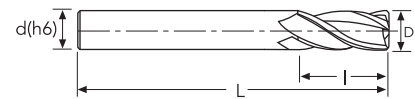
HL

HSD

C-SD-TA



★ 1st choice ☆ suitable



D	D Tol.	C	C Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
3	0/-0.025			6	9		57	4	HFAL4030	●
4	0/-0.025			6	12		57	4	HFAL4040	●
5	0/-0.025			6	13		57	4	HFAL4050	●
6	0/-0.025			6	13		57	4	HFAL4060	●
8	0/-0.030			8	20		64	4	HFAL4080	●
10	0/-0.030			10	22		72	4	HFAL4100	●
12	0/-0.030			12	26		83	4	HFAL4120	●
14	0/-0.030			14	32		90	4	HFAL4140	●
16	0/-0.030			16	32		92	4	HFAL4160	●
20	0/-0.030			20	38		104	4	HFAL4200	●

HSS  
DRILLS

LFTA

SUTA

HSS-HSS/CO

CARBIDE  
END-MILLS

G2

MDTA

HF VH/UP

MEF

**ALU**

MEX/MH

UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

### HFAL4

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	D x D	D x D	D x D	D x D
	Vc (m/min)	300+500	200+400	150+350	600+1000
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.030	0.025	0.021	0.033
	4	0.040	0.034	0.028	0.044
	5	0.050	0.042	0.035	0.054
	6	0.059	0.050	0.041	0.064
	8	0.077	0.066	0.054	0.085
	10	0.095	0.080	0.066	0.104
	12	0.108	0.092	0.076	0.119
	14	0.126	0.107	0.088	0.139
	16	0.144	0.122	0.101	0.158
18	0.158	0.135	0.111	0.174	
20	0.176	0.149	0.123	0.193	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.5D
	Vc (m/min)	300+600	200+500	200+400	600+1000
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.036	0.032	0.029	0.039
	4	0.048	0.043	0.038	0.052
	5	0.059	0.053	0.048	0.065
	6	0.070	0.063	0.056	0.077
	8	0.093	0.084	0.074	0.102
	10	0.113	0.102	0.091	0.125
	12	0.130	0.117	0.104	0.143
	14	0.151	0.136	0.121	0.166
	16	0.173	0.156	0.138	0.190
18	0.190	0.171	0.152	0.209	
20	0.211	0.190	0.168	0.232	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	8° x 0.5D	5° x 0.5D	5° x 0.5D	8° x 0.5D
	Vc (m/min)	300+600	200+500	200+400	600+1000
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.021	0.018	0.015	0.023
	4	0.027	0.025	0.020	0.030
	5	0.034	0.031	0.025	0.038
	6	0.040	0.036	0.030	0.044
	8	0.054	0.048	0.039	0.059
	10	0.065	0.058	0.048	0.072
	12	0.075	0.067	0.055	0.082
	14	0.087	0.078	0.064	0.096
	16	0.100	0.089	0.073	0.110
18	0.110	0.098	0.081	0.120	
20	0.121	0.109	0.089	0.133	

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

# HFAL4

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	15° x D	10° x D	7° x D	15° x D
Vc (m/min)	300+500	200+400	200+300	600+1000
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.020	0.017	0.015	0.022
4	0.026	0.023	0.019	0.029
5	0.033	0.029	0.024	0.036
6	0.039	0.034	0.029	0.043
8	0.051	0.045	0.038	0.057
10	0.063	0.055	0.046	0.069
12	0.072	0.062	0.053	0.079
14	0.084	0.073	0.062	0.092
16	0.096	0.083	0.071	0.105
18	0.105	0.092	0.078	0.116
20	0.117	0.101	0.086	0.128

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	D x 0.4D	D x 0.4D	D x 0.4D	D x 0.4D
Vc (m/min)	300+500	200+400	150+350	600+1000
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.030	0.027	0.024	0.033
4	0.040	0.036	0.032	0.044
5	0.050	0.045	0.040	0.054
6	0.059	0.053	0.047	0.064
8	0.077	0.070	0.062	0.085
10	0.095	0.085	0.076	0.104
12	0.108	0.097	0.086	0.119
14	0.126	0.113	0.101	0.139
16	0.144	0.130	0.115	0.158
18	0.158	0.143	0.127	0.174
20	0.176	0.158	0.140	0.193

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	D x D	D x D	0.5D x D	0.5D x D
Vc (m/min)	300+500	200+400	150+350	600+1000
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.015	0.013	0.012	0.016
4	0.020	0.018	0.016	0.022
5	0.025	0.022	0.020	0.027
6	0.029	0.026	0.023	0.032
8	0.039	0.035	0.031	0.043
10	0.047	0.043	0.038	0.052
12	0.054	0.049	0.043	0.059
14	0.063	0.057	0.050	0.069
16	0.072	0.065	0.058	0.079
18	0.079	0.071	0.063	0.087
20	0.088	0.079	0.070	0.097

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION



INFO

### HFAL3

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	D x D	D x D	D x D	D x D
Vc (m/min)	300÷500	200÷400	150÷350	600÷900
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.022	0.019	0.015	0.024
3	0.033	0.028	0.023	0.036
4	0.044	0.037	0.031	0.048
5	0.055	0.047	0.039	0.061
6	0.065	0.055	0.046	0.072
8	0.086	0.073	0.060	0.095
10	0.105	0.089	0.074	0.116
12	0.120	0.102	0.084	0.132
14	0.140	0.119	0.098	0.154
16	0.160	0.136	0.112	0.176
18	0.176	0.150	0.123	0.194
20	0.195	0.166	0.137	0.215

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.5D
Vc (m/min)	300÷600	200÷500	200÷400	600÷1000
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.026	0.024	0.021	0.029
3	0.040	0.036	0.032	0.044
4	0.053	0.048	0.042	0.058
5	0.066	0.059	0.053	0.073
6	0.078	0.070	0.062	0.086
8	0.103	0.093	0.083	0.114
10	0.126	0.113	0.101	0.139
12	0.144	0.130	0.115	0.158
14	0.168	0.151	0.134	0.185
16	0.192	0.173	0.154	0.211
18	0.211	0.190	0.169	0.232
20	0.234	0.211	0.187	0.257

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	8° x 0.5D	5° x 0.5D	5° x 0.5D	8° x 0.5D
Vc (m/min)	300÷500	200÷400	150÷350	600÷900
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.015	0.014	0.011	0.017
3	0.023	0.020	0.017	0.025
4	0.030	0.027	0.022	0.033
5	0.038	0.034	0.028	0.042
6	0.045	0.040	0.033	0.049
8	0.059	0.053	0.044	0.065
10	0.073	0.065	0.054	0.080
12	0.083	0.074	0.061	0.091
14	0.097	0.087	0.071	0.106
16	0.111	0.099	0.082	0.122
18	0.122	0.109	0.090	0.134
20	0.135	0.121	0.099	0.148

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION



CUTTING PARAMETERS

### HFAL3

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	15° x D	10° x D	7° x D	15° x D
	Vc (m/min)	300÷500	200÷400	150÷350	600÷900
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.015	0.013	0.011	0.016	
3	0.022	0.019	0.016	0.024	
4	0.029	0.025	0.022	0.032	
5	0.037	0.032	0.027	0.040	
6	0.043	0.038	0.032	0.048	
8	0.057	0.050	0.042	0.063	
10	0.070	0.061	0.051	0.077	
12	0.080	0.069	0.059	0.088	
14	0.093	0.081	0.069	0.102	
16	0.106	0.092	0.078	0.117	
18	0.117	0.102	0.086	0.129	
20	0.130	0.113	0.096	0.143	

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	D x 0.4D	D x 0.4D	D x 0.4D	D x 0.4D
	Vc (m/min)	300÷500	200÷400	150÷350	600÷900
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.022	0.020	0.018	0.024	
3	0.033	0.030	0.026	0.036	
4	0.044	0.040	0.035	0.048	
5	0.055	0.050	0.044	0.061	
6	0.065	0.059	0.052	0.072	
8	0.086	0.077	0.069	0.095	
10	0.105	0.095	0.084	0.116	
12	0.120	0.108	0.096	0.132	
14	0.140	0.126	0.112	0.154	
16	0.160	0.144	0.128	0.176	
18	0.176	0.158	0.141	0.194	
20	0.195	0.176	0.156	0.215	

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	D x D	D x D	0.5D x D	0.5D x D
	Vc (m/min)	270÷370	190÷290	150÷250	500÷700
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.011	0.010	0.009	0.012	
3	0.017	0.015	0.013	0.018	
4	0.022	0.020	0.018	0.024	
5	0.028	0.025	0.022	0.030	
6	0.033	0.029	0.026	0.036	
8	0.043	0.039	0.034	0.047	
10	0.053	0.047	0.042	0.058	
12	0.060	0.054	0.048	0.066	
14	0.070	0.063	0.056	0.077	
16	0.080	0.072	0.064	0.088	
18	0.088	0.079	0.070	0.097	
20	0.098	0.088	0.078	0.107	

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

- INFO
- CARBIDE DRILLS
  - PU-HPU
  - TA-4HTA
  - SUH
  - ALH
  - HRC
  - SUH MINI
  - HL
  - HSD
  - C-SD-TA
- HSS DRILLS
  - LFTA
  - SUTA
  - HSS-HSS/CO
- CARBIDE END-MILLS
  - G2
  - MDTA
  - HF-VH/UP
  - MEF
  - ALU
  - MEX/MH
  - UH/MH
- HSS END-MILLS
- CARBIDE BURRS

INFO

# HFA53

cylindrical shank, reduced neck, 3 flutes, long reach, corner radius



CARBIDE DRILLS

PU-HPU

TA-4HTA

SUH

ALH

HRC

SUH MINI

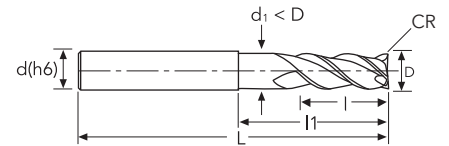
HL

HSD

C-SD-TA



★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
3	0/-0.030	0.2	+/-0.010	6	5	18	2.80	60	3	HFA5302030	●
3	0/-0.030	0.5	+/-0.010	6	5	18	2.80	60	3	HFA5305030	●
4	0/-0.030	0.5	+/-0.010	6	6	22	3.80	60	3	HFA5305040	●
4	0/-0.030	1.0	+/-0.010	6	6	22	3.80	60	3	HFA5310040	●
5	0/-0.030	0.5	+/-0.010	6	8	24	4.80	60	3	HFA5305050	●
5	0/-0.030	1.0	+/-0.010	6	8	24	4.80	60	3	HFA5310050	●
6	0/-0.030	0.5	+/-0.010	6	9	29	5.80	65	3	HFA5305060	●
6	0/-0.030	1.0	+/-0.010	6	9	29	5.80	65	3	HFA5310060	●
6	0/-0.030	2.0	+/-0.010	6	9	29	5.80	65	3	HFA5320060	●
8	0/-0.030	0.5	+/-0.010	8	12	39	7.80	75	3	HFA5305080	●
8	0/-0.030	1.0	+/-0.010	8	12	39	7.80	75	3	HFA5310080	●
8	0/-0.030	2.0	+/-0.010	8	12	39	7.80	75	3	HFA5320080	●
8	0/-0.030	3.0	+/-0.010	8	12	39	7.80	75	3	HFA5330080	●
10	0/-0.030	0.5	+/-0.010	10	15	52	9.80	100	3	HFA5305100	●
10	0/-0.030	1.0	+/-0.010	10	15	52	9.80	100	3	HFA5310100	●
10	0/-0.030	2.0	+/-0.010	10	15	52	9.80	100	3	HFA5320100	●
10	0/-0.030	3.0	+/-0.010	10	15	52	9.80	100	3	HFA5330100	●
10	0/-0.030	4.0	+/-0.010	10	15	52	9.80	100	3	HFA5340100	●
12	0/-0.030	0.5	+/-0.010	12	18	62	11.80	120	3	HFA5305120	●
12	0/-0.030	1.0	+/-0.010	12	18	62	11.80	120	3	HFA5310120	●
12	0/-0.030	2.0	+/-0.010	12	18	62	11.80	120	3	HFA5320120	●
12	0/-0.030	3.0	+/-0.010	12	18	62	11.80	120	3	HFA5330120	●
12	0/-0.030	4.0	+/-0.010	12	18	62	11.80	120	3	HFA5340120	●
16	0/-0.030	0.5	+/-0.010	16	24	82	15.70	130	3	HFA5305160	●
16	0/-0.030	1.0	+/-0.010	16	24	82	15.70	130	3	HFA5310160	●
16	0/-0.030	2.0	+/-0.010	16	24	82	15.70	130	3	HFA5320160	●
16	0/-0.030	3.0	+/-0.010	16	24	82	15.70	130	3	HFA5330160	●
16	0/-0.030	4.0	+/-0.010	16	24	82	15.70	130	3	HFA5340160	●
20	0/-0.030	0.5	+/-0.010	20	30	100	19.70	150	3	HFA5305200	●
20	0/-0.030	1.0	+/-0.010	20	30	100	19.70	150	3	HFA5310200	●
20	0/-0.030	2.0	+/-0.010	20	30	100	19.70	150	3	HFA5320200	●
20	0/-0.030	3.0	+/-0.010	20	30	100	19.70	150	3	HFA5330200	●
20	0/-0.030	4.0	+/-0.010	20	30	100	19.70	150	3	HFA5340200	●

● stock standard ○ non-standard stock ▽ stock exhaustion

CARBIDE END-MILLS

G2

MDTA

HFVH/UP

MEF

ALU

MEX/MH

UH/MH

HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

INFO

### HFA53

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>200+500</b>	<b>150+350</b>	<b>150+250</b>	<b>500+900</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.026	0.022	0.018	0.029
	<b>4</b>	0.035	0.030	0.025	0.039
	<b>5</b>	0.044	0.037	0.031	0.048
	<b>6</b>	0.052	0.044	0.036	0.057
	<b>8</b>	0.069	0.058	0.048	0.076
	<b>10</b>	0.084	0.071	0.059	0.092
	<b>12</b>	0.096	0.082	0.067	0.106
	<b>14</b>	0.112	0.095	0.078	0.123
	<b>16</b>	0.128	0.109	0.090	0.141
<b>18</b>	0.141	0.120	0.099	0.155	
<b>20</b>	0.156	0.133	0.109	0.172	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>
	Vc (m/min)	<b>300+500</b>	<b>200+400</b>	<b>150+350</b>	<b>600+900</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.032	0.029	0.025	0.035
	<b>4</b>	0.042	0.038	0.034	0.046
	<b>5</b>	0.053	0.048	0.042	0.058
	<b>6</b>	0.062	0.056	0.050	0.069
	<b>8</b>	0.083	0.074	0.066	0.091
	<b>10</b>	0.101	0.091	0.081	0.111
	<b>12</b>	0.115	0.104	0.092	0.127
	<b>14</b>	0.134	0.121	0.108	0.148
	<b>16</b>	0.154	0.138	0.123	0.169
<b>18</b>	0.169	0.152	0.135	0.186	
<b>20</b>	0.187	0.168	0.150	0.206	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	<b>8° x 0.5D</b>	<b>5° x 0.5D</b>	<b>5° x 0.5D</b>	<b>8° x 0.5D</b>
	Vc (m/min)	<b>200+500</b>	<b>150+350</b>	<b>200+400</b>	<b>500+900</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>3</b>	0.018	0.016	0.013	0.020
	<b>4</b>	0.024	0.022	0.018	0.027
	<b>5</b>	0.030	0.027	0.022	0.033
	<b>6</b>	0.036	0.032	0.027	0.040
	<b>8</b>	0.048	0.043	0.035	0.052
	<b>10</b>	0.058	0.052	0.043	0.064
	<b>12</b>	0.066	0.059	0.049	0.073
	<b>14</b>	0.077	0.069	0.057	0.085
	<b>16</b>	0.088	0.079	0.065	0.097
<b>18</b>	0.097	0.087	0.072	0.107	
<b>20</b>	0.108	0.097	0.080	0.119	

HSS END-MILLS

CARBIDE BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

### HFA53

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	15° x D	10° x D	7° x D	15° x D
Vc (m/min)	200+500	150+350	200+400	500+900
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.018	0.014	0.013	0.019
4	0.023	0.018	0.017	0.026
5	0.029	0.023	0.022	0.032
6	0.035	0.027	0.025	0.038
8	0.046	0.036	0.034	0.050
10	0.056	0.044	0.041	0.061
12	0.064	0.050	0.047	0.070
14	0.074	0.058	0.055	0.082
16	0.085	0.067	0.063	0.094
18	0.094	0.073	0.069	0.103
20	0.104	0.081	0.076	0.114

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	D x 0.4D	D x 0.4D	D x 0.4D	D x 0.4D
Vc (m/min)	200+500	150+350	150+250	500+900
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.026	0.024	0.021	0.029
4	0.035	0.032	0.028	0.039
5	0.044	0.040	0.035	0.048
6	0.052	0.047	0.042	0.057
8	0.069	0.062	0.055	0.076
10	0.084	0.076	0.067	0.092
12	0.096	0.086	0.077	0.106
14	0.112	0.101	0.090	0.123
16	0.128	0.115	0.102	0.141
18	0.141	0.127	0.113	0.155
20	0.156	0.140	0.125	0.172

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
Vc (m/min)	230+330	150+250	110+210	510+610
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.013	0.012	0.011	0.015
4	0.018	0.016	0.014	0.019
5	0.022	0.020	0.018	0.024
6	0.026	0.023	0.021	0.029
8	0.034	0.031	0.028	0.038
10	0.042	0.038	0.034	0.046
12	0.048	0.043	0.038	0.053
14	0.056	0.050	0.045	0.062
16	0.064	0.058	0.051	0.070
18	0.070	0.063	0.056	0.077
20	0.078	0.070	0.062	0.086

HSS  
END-MILLS

CARBIDE  
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION



INFO

### MDCSA1

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>300+500</b>	<b>200+400</b>	<b>150+350</b>	<b>400+600</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.023	0.019	0.016	0.023
3	0.030	0.026	0.021	0.030
4	0.039	0.033	0.027	0.039
5	0.049	0.041	0.034	0.049
6	0.058	0.049	0.040	0.058
8	0.079	0.067	0.055	0.079
10	0.098	0.083	0.068	0.098
12	0.116	0.099	0.081	0.116

< D3 ap x ae D x 0.25D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	<b>D x 0.5D</b>	<b>D x 0.5D</b>	<b>D x 0.5D</b>	<b>D x 0.5D</b>
Vc (m/min)	<b>300+600</b>	<b>200+500</b>	<b>200+400</b>	<b>400+800</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.030	0.026	0.021	0.030
3	0.040	0.034	0.028	0.040
4	0.052	0.044	0.036	0.052
5	0.065	0.055	0.046	0.065
6	0.077	0.065	0.054	0.077
8	0.105	0.089	0.074	0.105
10	0.130	0.111	0.091	0.130
12	0.155	0.132	0.109	0.155

< D3 ap x ae D x 0.25D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>300+400</b>	<b>150+350</b>	<b>100+300</b>	<b>300+500</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.011	0.010	0.008	0.011
3	0.015	0.013	0.011	0.015
4	0.020	0.017	0.014	0.020
5	0.024	0.021	0.017	0.024
6	0.029	0.025	0.020	0.029
8	0.039	0.033	0.028	0.039
10	0.049	0.041	0.034	0.049
12	0.058	0.049	0.041	0.058

< D3 ap x ae 0.5D x D

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

### MDCSA2

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
Vc (m/min)	300÷600	150÷350	150÷250	500÷900
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.011	0.010	0.008	0.011
1.5	0.017	0.014	0.012	0.017
2	0.022	0.019	0.016	0.022
3	0.028	0.024	0.020	0.028
4	0.038	0.032	0.026	0.038
5	0.047	0.040	0.033	0.047
6	0.056	0.048	0.039	0.056
8	0.075	0.064	0.052	0.075
10	0.094	0.080	0.066	0.094
12	0.112	0.095	0.078	0.112
14	0.130	0.111	0.091	0.130
16	0.148	0.126	0.103	0.148
18	0.166	0.141	0.116	0.166
20	0.185	0.157	0.129	0.185

< D3 ap x ae 0.25D x D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	D x 0.5D	D x 0.5D	D x 0.5D	D x 0.5D
Vc (m/min)	300÷500	200÷400	150÷350	600÷1000
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.013	0.011	0.009	0.013
1.5	0.020	0.017	0.014	0.020
2	0.027	0.023	0.019	0.027
3	0.034	0.029	0.024	0.034
4	0.045	0.038	0.032	0.045
5	0.056	0.048	0.040	0.056
6	0.068	0.057	0.047	0.068
8	0.090	0.076	0.063	0.090
10	0.112	0.096	0.079	0.112
12	0.134	0.114	0.094	0.134
14	0.157	0.133	0.110	0.157
16	0.177	0.151	0.124	0.177
18	0.200	0.170	0.140	0.200
20	0.222	0.188	0.155	0.222

< D3 ap x ae D x 0.5D

HSS  
END-MILLS


CARBIDE  
BURRS



CUTTING PARAMETERS

INFO

### MDCSA2

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>200÷400</b>	<b>150÷350</b>	<b>150÷350</b>	<b>500÷900</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.006	0.005	0.004	0.006	
<b>1.5</b>	0.008	0.007	0.006	0.008	
<b>2</b>	0.011	0.010	0.008	0.011	
<b>3</b>	0.014	0.012	0.010	0.014	
<b>4</b>	0.019	0.016	0.013	0.019	
<b>5</b>	0.024	0.020	0.016	0.024	
<b>6</b>	0.028	0.024	0.020	0.028	
<b>8</b>	0.037	0.032	0.026	0.037	
<b>10</b>	0.047	0.040	0.033	0.047	
<b>12</b>	0.056	0.048	0.039	0.056	
<b>14</b>	0.065	0.055	0.046	0.065	
<b>16</b>	0.074	0.063	0.052	0.074	
<b>18</b>	0.083	0.071	0.058	0.083	
<b>20</b>	0.092	0.079	0.065	0.092	

< D3 ap x ae 0.25D x D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
**ALU**  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

INFO

### MDCSA3

	Material Group ISO 513	<b>N1</b>	<b>N2 N3</b>	<b>N4</b>	<b>N5</b>
	Hardness/Rm				
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>200÷600</b>	<b>150÷350</b>	<b>150÷250</b>	<b>500÷900</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>1</b>	0.010	0.009	0.007	0.010
	<b>1.5</b>	0.015	0.013	0.011	0.015
	<b>2</b>	0.020	0.017	0.014	0.020
	<b>3</b>	0.025	0.022	0.018	0.025
	<b>4</b>	0.034	0.029	0.024	0.034
	<b>5</b>	0.042	0.036	0.030	0.042
	<b>6</b>	0.051	0.043	0.035	0.051
	<b>8</b>	0.067	0.057	0.047	0.067
	<b>10</b>	0.084	0.072	0.059	0.084
	<b>12</b>	0.101	0.086	0.071	0.101
	<b>14</b>	0.117	0.100	0.082	0.117
<b>16</b>	0.133	0.113	0.093	0.133	
<b>18</b>	0.150	0.127	0.105	0.150	
<b>20</b>	0.166	0.141	0.116	0.166	

< D3 ap x ae 0.25D x D

	Material Group ISO 513	<b>N1</b>	<b>N2 N3</b>	<b>N4</b>	<b>N5</b>
	Hardness/Rm				
	ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
	Vc (m/min)	<b>300÷500</b>	<b>200÷400</b>	<b>150÷350</b>	<b>600÷1000</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>1</b>	0.012	0.010	0.008	0.012
	<b>1.5</b>	0.018	0.015	0.013	0.018
	<b>2</b>	0.024	0.021	0.017	0.024
	<b>3</b>	0.030	0.026	0.021	0.030
	<b>4</b>	0.041	0.034	0.028	0.041
	<b>5</b>	0.051	0.043	0.036	0.051
	<b>6</b>	0.061	0.052	0.043	0.061
	<b>8</b>	0.081	0.069	0.057	0.081
	<b>10</b>	0.101	0.086	0.071	0.101
	<b>12</b>	0.121	0.103	0.085	0.121
	<b>14</b>	0.141	0.120	0.099	0.141
<b>16</b>	0.160	0.136	0.112	0.160	
<b>18</b>	0.180	0.153	0.126	0.180	
<b>20</b>	0.200	0.170	0.140	0.200	

< D3 ap x ae D x 0.1D

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
**ALU**  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# MDA310-11-12

cylindrical shank, 3 flutes polished, long



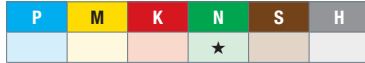
MDA310



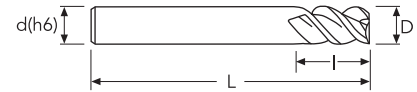
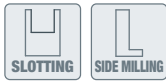
MDA311 - MDA312

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



★ 1st choice ☆ suitable



D	D Tol.	C	C Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
3	0/-0.030			6	12		75	3	MDA310030	●
4	0/-0.030			6	16		75	3	MDA310040	●
5	0/-0.030			6	20		75	3	MDA310050	●
6	0/-0.030			6	25		75	3	MDA310060	●
3	0/-0.030			6	15		100	3	MDA311030	●
4	0/-0.030			6	20		100	3	MDA311040	●
5	0/-0.030			6	25		100	3	MDA311050	●
6	0/-0.030			6	30		100	3	MDA311060	●
8	0/-0.035			8	35		100	3	MDA311080	●
10	0/-0.035			10	40		100	3	MDA311100	●
12	0/-0.035			12	45		100	3	MDA311120	●
8	0/-0.035			8	40		150	3	MDA312080	●
10	0/-0.035			10	50		150	3	MDA312100	●
12	0/-0.035			12	50		150	3	MDA312120	●
16	0/-0.040			16	70		150	3	MDA312160	●
20	0/-0.040			20	80		150	3	MDA312200	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
**ALU**  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

### MDA310

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	0.3D x D	0.3D x D	0.3D x D	0.3D x D
	Vc (m/min)	220+340	150+250	100+200	400+700
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.023	0.019	0.016	0.023
	4	0.030	0.026	0.021	0.030
	5	0.038	0.032	0.027	0.038
6	0.046	0.039	0.032	0.046	

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	1.5D x 0.1D	1.5D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
	Vc (m/min)	270+370	200+300	150+250	500+800
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.027	0.023	0.019	0.027
	4	0.036	0.031	0.026	0.036
	5	0.046	0.039	0.032	0.046
6	0.055	0.047	0.038	0.055	

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

### MDA311

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	0.3D x D	0.3D x D	0.3D x D	0.3D x D
	Vc (m/min)	180+280	110+210	100+160	350+550
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.019	0.016	0.013	0.019
	4	0.025	0.022	0.018	0.025
	5	0.032	0.027	0.022	0.032
	6	0.038	0.032	0.027	0.038
	8	0.051	0.043	0.035	0.051
	10	0.063	0.054	0.044	0.063
	12	0.076	0.064	0.053	0.076

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	2D x 0.05D	2D x 0.05D	2D x 0.05D	2D x 0.05D
	Vc (m/min)	210+310	150+250	110+210	420+620
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.023	0.019	0.016	0.023
	4	0.030	0.026	0.021	0.030
	5	0.038	0.032	0.027	0.038
	6	0.046	0.039	0.032	0.046
	8	0.061	0.052	0.042	0.061
	10	0.076	0.064	0.053	0.076
	12	0.091	0.077	0.064	0.091

HSS END-MILLS

CARBIDE BURRS



INFO

# MDA312

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	<b>0.1D x D</b>	<b>0.1D x D</b>	<b>0.1D x D</b>	<b>0.1D x D</b>
Vc (m/min)	<b>130÷230</b>	<b>100÷160</b>	<b>80÷120</b>	<b>250÷450</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>8</b>	0.040	0.034	0.028	0.040
<b>10</b>	0.051	0.043	0.035	0.051
<b>12</b>	0.060	0.051	0.042	0.060
<b>16</b>	0.080	0.068	0.056	0.080
<b>20</b>	0.100	0.085	0.070	0.100



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	<b>2.5D x 0.05D</b>	<b>2.5D x 0.05D</b>	<b>2.5D x 0.05D</b>	<b>2.5D x 0.05D</b>
Vc (m/min)	<b>150÷250</b>	<b>100÷200</b>	<b>100÷160</b>	<b>300÷500</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>8</b>	0.048	0.041	0.034	0.048
<b>10</b>	0.061	0.052	0.042	0.061
<b>12</b>	0.073	0.062	0.051	0.073
<b>16</b>	0.096	0.081	0.067	0.096
<b>20</b>	0.120	0.102	0.084	0.120

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
**ALU**  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# MDCSAM

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm			
ap x ae	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>
Vc (m/min)	<b>600÷1000</b>	<b>400÷800</b>	<b>300÷700</b>	<b>900÷1300</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.050	0.043	0.035	0.050
<b>8</b>	0.067	0.057	0.047	0.067
<b>10</b>	0.084	0.071	0.059	0.084
<b>12</b>	0.100	0.085	0.070	0.100
<b>20</b>	0.120	0.102	0.084	0.120

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
**ALU**  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS





INFO

# MCA212R

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>200÷600</b>	<b>200÷400</b>	<b>150÷350</b>	<b>600÷1000</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>2</b>	0.030	0.025	0.021	0.033
<b>3</b>	0.040	0.034	0.028	0.044
<b>4</b>	0.050	0.042	0.035	0.054
<b>5</b>	0.059	0.050	0.041	0.064
<b>6</b>	0.077	0.066	0.054	0.085
<b>8</b>	0.095	0.080	0.066	0.104
<b>10</b>	0.108	0.092	0.076	0.119
<b>12</b>	0.126	0.107	0.088	0.139

< D3 ap x ae 0.25D x D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	N1	N2 N3	N4	N5
Hardness/Rm				
ap x ae	<b>D x 0.5D</b>	<b>D x 0.5D</b>	<b>D x 0.5D</b>	<b>D x 0.5D</b>
Vc (m/min)	<b>300÷600</b>	<b>250÷450</b>	<b>200÷400</b>	<b>600÷1000</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>2</b>	0.027	0.023	0.019	0.027
<b>3</b>	0.034	0.029	0.024	0.034
<b>4</b>	0.045	0.038	0.032	0.045
<b>5</b>	0.056	0.048	0.040	0.056
<b>6</b>	0.068	0.057	0.047	0.068
<b>8</b>	0.090	0.076	0.063	0.090
<b>10</b>	0.112	0.096	0.079	0.112
<b>12</b>	0.134	0.114	0.094	0.134

< D3 ap x ae D x 0.5D

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
**ALU**  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# MDCAB2

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513		N1	N2 N3	N4	N5
Hardness/Rm					
ap x ae		<b>0.2D x 0.4D</b>	<b>0.2D x 0.4D</b>	<b>0.2D x 0.4D</b>	<b>0.2D x 0.4D</b>
Vc (m/min)		<b>200÷600</b>	<b>250÷450</b>	<b>200÷400</b>	<b>600÷1000</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	<b>0.80</b>	0.013	0.011	0.010	0.013
<b>1.5</b>	<b>1.20</b>	0.017	0.015	0.013	0.017
<b>2</b>	<b>1.60</b>	0.017	0.015	0.013	0.017
<b>2.5</b>	<b>2.00</b>	0.021	0.019	0.017	0.021
<b>3</b>	<b>2.40</b>	0.025	0.023	0.020	0.025
<b>4</b>	<b>3.20</b>	0.035	0.032	0.028	0.035
<b>5</b>	<b>4.00</b>	0.045	0.040	0.036	0.045
<b>6</b>	<b>4.80</b>	0.053	0.048	0.043	0.053
<b>8</b>	<b>6.40</b>	0.067	0.060	0.054	0.067
<b>10</b>	<b>8.00</b>	0.080	0.072	0.064	0.080
<b>12</b>	<b>9.60</b>	0.094	0.084	0.075	0.094

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU**
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

## MEX AND MH

STEEL AND HARDENED STEEL  
30÷55 HRC (MEX) AND 30÷70 HRC (MH)

✚ MEX: Ultra-fine micrograin and Endless Orange coating for high performance machining on 30÷55 HRC materials. MH: Wide range of tools available for general milling, copying and super finishing (30÷70 HRC).

🇮🇹 MEX: Micrograna ultrafine e rivestimento Endless Orange per lavorazione ad alto rendimento di materiali con durezza compresa tra 30÷55 HRC. MH: Ampia gamma per soddisfare applicazioni di copiatura e super finitura (30÷70 HRC).

🇩🇪 MEX: Besonders feine Mikrokörnung und Beschichtung Endless Orange für Hochleistungsbearbeitungen von Materialien mit einer Härte zwischen 30 und 55 HRC. MH: Große Produktpalette für Anwendungen zum Fräsen im Allgemeinen, Kopierfräsen und Schlichtbearbeitung (30÷70 HRC).

🇫🇷 MEX: Ultra Micrograin et revêtement Endless Orange pour un usinage à rendement élevé de matériaux ayant une dureté comprise entre 30÷55 HRC. MH: Une large gamme pour satisfaire les applications de fraisage général, copiage et super finition (30÷70 HRC).

🇪🇸 MEX: Micrograno ultrafino y revestimiento Endless Orange para el mecanizado a alto rendimiento de materiales con una dureza comprendida entre 30 y 55 HRC. MH: Amplia gama para satisfacer aplicaciones de fresado general, copiado y súper acabado (30÷70 HRC).

🇷🇺 MEX: Микрозернистая структура твердого сплава и покрытие Endless Orange служат для высокоэффективной обработки материалов с твердостью 30÷55 HRC. MH: Широкий ассортимент для профилированной и суперфинишной обработки (30 ÷ 70 HRC).

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



CUTTING PARAMETERS

**MEXM2**

	Material Group ISO 513		P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm		≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
	ap x ae		<b>ap x D</b>	<b>ap x D</b>	<b>ap x D</b>	<b>ap x D</b>
	Vc (m/min)		<b>70÷90</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>
	D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>0.3</b>	0.02	0.004	0.004	0.003	0.003
	<b>0.4</b>	0.02	0.006	0.005	0.005	0.004
	<b>0.5</b>	0.03	0.007	0.006	0.006	0.005
	<b>0.6</b>	0.03	0.008	0.007	0.006	0.006
	<b>0.8</b>	0.04	0.010	0.009	0.008	0.007
	<b>1</b>	0.05	0.012	0.011	0.010	0.008
	<b>1.2</b>	0.06	0.022	0.020	0.018	0.015
	<b>1.4</b>	0.07	0.024	0.022	0.019	0.017
<b>1.5</b>	0.08	0.025	0.023	0.020	0.018	
<b>1.6</b>	0.08	0.026	0.023	0.021	0.018	
<b>1.8</b>	0.09	0.028	0.025	0.022	0.020	
<b>2</b>	0.10	0.030	0.027	0.024	0.021	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS END-MILLS

CARBIDE BURRS





CUTTING PARAMETERS

**MEXM2SC**

	<b>Material Group ISO 513</b>		P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	<b>Hardness/Rm</b>		≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
	<b>ap x ae</b>		<b>ap x D</b>	<b>ap x D</b>	<b>ap x D</b>	<b>ap x D</b>
	<b>Vc (m/min)</b>		<b>70÷110</b>	<b>50÷90</b>	<b>40÷60</b>	<b>20÷40</b>
	<b>D (mm)</b>	<b>ap (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>0.2</b>	0.01	0.003	0.003	0.002	0.002
	<b>0.3</b>	0.02	0.004	0.004	0.003	0.003
	<b>0.4</b>	0.02	0.006	0.005	0.005	0.004
	<b>0.5</b>	0.03	0.007	0.006	0.006	0.005
	<b>0.6</b>	0.03	0.008	0.007	0.006	0.006
<b>0.8</b>	0.04	0.010	0.009	0.008	0.007	
<b>0.9</b>	0.05	0.012	0.011	0.010	0.008	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

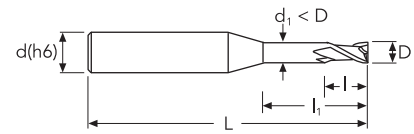
HSS END-MILLS

CARBIDE BURRS

INFO

# MEXLN2

cylindrical shank, 2 flutes, extended and reduced neck

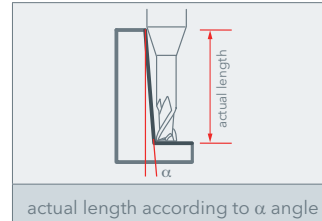


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★		★			★

★ 1st choice ☆ suitable



HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

D	D Tol.	C	C Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
0.2	0/-0.010			4	0.3	0.5	0.16	50	2	0.57	0.59	0.61	0.63	0.68	MEXLN2002005	●
0.2	0/-0.010			4	0.3	1	0.16	50	2	1.09	1.12	1.16	1.21	1.30	MEXLN200201	●
0.2	0/-0.010			4	0.3	1.5	0.16	50	2	1.60	1.66	1.72	1.78	1.91	MEXLN2002015	●
0.3	0/-0.010			4	0.4	1	0.26	50	2	1.09	1.12	1.16	1.21	1.30	MEXLN200301	●
0.3	0/-0.010			4	0.4	2	0.26	50	2	2.12	2.19	2.27	2.35	2.53	MEXLN200302	●
0.3	0/-0.010			4	0.4	3	0.26	50	2	3.15	3.26	3.38	3.50	3.76	MEXLN200303	●
0.4	0/-0.010			4	0.6	2	0.37	50	2	2.12	2.19	2.27	2.35	2.53	MEXLN200402	●
0.4	0/-0.010			4	0.6	3	0.37	50	2	3.15	3.26	3.38	3.50	3.76	MEXLN200403	●
0.4	0/-0.010			4	0.6	4	0.37	50	2	4.19	4.33	4.49	4.65	5.00	MEXLN200404	●
0.4	0/-0.010			4	0.6	5	0.37	50	2	5.22	5.40	5.59	5.79	6.23	MEXLN200405	●
0.5	0/-0.010			4	0.7	2	0.45	50	2	2.16	2.23	2.31	2.40	2.57	MEXLN200502	●
0.5	0/-0.010			4	0.7	4	0.45	50	2	4.23	4.37	4.53	4.69	5.04	MEXLN200504	●
0.5	0/-0.010			4	0.7	6	0.45	50	2	6.29	6.51	6.74	6.98	7.51	MEXLN200506	●
0.5	0/-0.010			4	0.7	8	0.45	50	2	8.36	8.65	8.96	9.28	9.98	MEXLN200508	●
0.6	0/-0.010			4	0.9	2	0.55	50	2	2.16	2.23	2.31	2.40	2.57	MEXLN200602	●
0.6	0/-0.010			4	0.9	4	0.55	50	2	4.23	4.37	4.53	4.69	5.04	MEXLN200604	●
0.6	0/-0.010			4	0.9	6	0.55	50	2	6.29	6.51	6.74	6.98	7.51	MEXLN200606	●
0.6	0/-0.010			4	0.9	8	0.55	50	2	8.36	8.65	8.96	9.28	9.98	MEXLN200608	●
0.6	0/-0.010			4	0.9	10	0.55	50	2	10.43	10.79	11.17	11.57	12.44	MEXLN200610	●
0.7	0/-0.010			4	1.0	2	0.65	50	2	2.16	2.23	2.31	2.40	2.57	MEXLN200702	●
0.7	0/-0.010			4	1.0	4	0.65	50	2	4.23	4.37	4.53	4.69	5.04	MEXLN200704	●
0.7	0/-0.010			4	1.0	6	0.65	50	2	6.29	6.51	6.74	6.98	7.51	MEXLN200706	●
0.7	0/-0.010			4	1.0	8	0.65	50	2	8.36	8.65	8.96	9.28	9.98	MEXLN200708	●
0.7	0/-0.010			4	1.0	10	0.65	50	2	10.43	10.79	11.17	11.57	12.44	MEXLN200710	●
0.8	0/-0.010			4	1.2	4	0.75	50	2	4.23	4.37	4.53	4.69	5.04	MEXLN200804	●
0.8	0/-0.010			4	1.2	6	0.75	50	2	6.29	6.51	6.74	6.98	7.51	MEXLN200806	●
0.8	0/-0.010			4	1.2	8	0.75	50	2	8.36	8.65	8.96	9.28	9.98	MEXLN200808	●
0.8	0/-0.010			4	1.2	10	0.75	50	2	10.43	10.79	11.17	11.57	12.44	MEXLN200810	●
0.8	0/-0.010			4	1.2	12	0.75	50	2	12.49	12.93	13.38	13.87	14.91	MEXLN200812	●
0.9	0/-0.010			4	1.4	6	0.85	50	2	6.29	6.51	6.74	6.98	7.51	MEXLN200906	●
0.9	0/-0.010			4	1.4	8	0.85	50	2	8.36	8.65	8.96	9.28	9.98	MEXLN200908	●
0.9	0/-0.010			4	1.4	10	0.85	50	2	10.43	10.79	11.17	11.57	12.44	MEXLN200910	●
0.9	0/-0.010			4	1.4	15	0.85	50	2	15.6	16.14	16.71	17.31	18.61	MEXLN200915	●
1.0	0/-0.015			4	1.5	6	0.95	50	2	6.39	6.61	6.84	7.09	7.62	MEXLN201006	●
1.0	0/-0.015			4	1.5	8	0.95	50	2	8.46	8.75	9.06	9.38	10.09	MEXLN201008	●
1.0	0/-0.015			4	1.5	10	0.95	50	2	10.52	10.89	11.27	11.68	12.56	MEXLN201010	●
1.0	0/-0.015			4	1.5	12	0.95	50	2	12.59	13.03	13.49	13.97	15.02	MEXLN201012	●
1.0	0/-0.015			4	1.5	14	0.95	50	2	14.66	15.17	15.70	16.27	17.49	MEXLN201014	●
1.0	0/-0.015			4	1.5	16	0.95	50	2	16.73	17.3	17.92	18.56	19.96	MEXLN201016	●

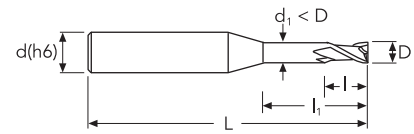
● stock standard ○ non-stock standard ▽ stock exhaustion

# MEXLN2

cylindrical shank, 2 flutes, extended and reduced neck

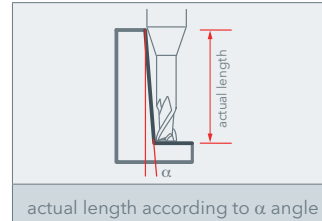


INFO



P	M	K	N	S	H
★		★			★

★ 1st choice ☆ suitable



D	D Tol.	C	C Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
1.2	0/-0.015			4	1.8	6	1.15	50	2	6.39	6.61	6.84	7.09	7.62	MEXLN201206	●
1.2	0/-0.015			4	1.8	8	1.15	50	2	8.46	8.75	9.06	9.38	10.09	MEXLN201208	●
1.2	0/-0.015			4	1.8	10	1.15	50	2	10.52	10.89	11.27	11.68	12.56	MEXLN201210	●
1.2	0/-0.015			4	1.8	12	1.15	50	2	12.59	13.03	13.49	13.97	15.02	MEXLN201212	●
1.4	0/-0.015			4	2.1	6	1.35	50	2	6.39	6.61	6.84	7.09	7.62	MEXLN201406	●
1.4	0/-0.015			4	2.1	8	1.35	50	2	8.46	8.75	9.06	9.38	10.09	MEXLN201408	●
1.4	0/-0.015			4	2.1	10	1.35	50	2	10.52	10.89	11.27	11.68	12.56	MEXLN201410	●
1.4	0/-0.015			4	2.1	12	1.35	50	2	12.59	13.03	13.49	13.97	15.02	MEXLN201412	●
1.4	0/-0.015			4	2.1	16	1.35	50	2	16.73	17.3	17.92	18.56	19.96	MEXLN201416	●
1.5	0/-0.015			4	2.3	6	1.45	50	2	6.39	6.61	6.84	7.09	7.62	MEXLN201506	●
1.5	0/-0.015			4	2.3	8	1.45	50	2	8.46	8.75	9.06	9.38	10.09	MEXLN201508	●
1.5	0/-0.015			4	2.3	10	1.45	50	2	10.52	10.89	11.27	11.68	12.56	MEXLN201510	●
1.5	0/-0.015			4	2.3	12	1.45	50	2	12.59	13.03	13.49	13.97	15.02	MEXLN201512	●
1.5	0/-0.015			4	2.3	14	1.45	50	2	14.66	15.17	15.70	16.27	17.49	MEXLN201514	●
1.5	0/-0.015			4	2.3	16	1.45	50	2	16.73	17.30	17.92	18.56	19.96	MEXLN201516	●
1.5	0/-0.015			4	2.3	18	1.45	60	2	18.79	19.44	20.13	20.86	22.43	MEXLN201518	●
1.5	0/-0.015			4	2.3	20	1.45	60	2	20.86	21.58	22.35	23.15	-	MEXLN201520	●
1.6	0/-0.015			4	2.4	6	1.55	50	2	6.39	6.61	6.84	7.09	7.62	MEXLN201606	●
1.6	0/-0.015			4	2.4	8	1.55	50	2	8.46	8.75	9.06	9.38	10.09	MEXLN201608	●
1.6	0/-0.015			4	2.4	10	1.55	50	2	10.52	10.89	11.27	11.68	12.56	MEXLN201610	●
1.6	0/-0.015			4	2.4	12	1.55	50	2	12.59	13.03	13.49	13.97	15.02	MEXLN201612	●
1.6	0/-0.015			4	2.4	14	1.55	50	2	14.66	15.17	15.70	16.27	17.49	MEXLN201614	●
1.6	0/-0.015			4	2.4	16	1.55	50	2	16.73	17.30	17.92	18.56	19.96	MEXLN201616	●
1.6	0/-0.015			4	2.4	18	1.55	60	2	18.79	19.44	20.13	20.86	22.43	MEXLN201618	●
1.6	0/-0.015			4	2.4	20	1.55	60	2	20.86	21.58	22.35	23.15	-	MEXLN201620	●
1.8	0/-0.015			4	2.7	6	1.75	50	2	6.39	6.61	6.84	7.09	7.62	MEXLN201806	●
1.8	0/-0.015			4	2.7	8	1.75	50	2	8.46	8.75	9.06	9.38	10.09	MEXLN201808	●
1.8	0/-0.015			4	2.7	10	1.75	50	2	10.52	10.89	11.27	11.68	12.56	MEXLN201810	●
1.8	0/-0.015			4	2.7	12	1.75	50	2	12.59	13.03	13.49	13.97	15.02	MEXLN201812	●
1.8	0/-0.015			4	2.7	16	1.75	50	2	16.73	17.30	17.92	18.56	19.96	MEXLN201816	●
1.8	0/-0.015			4	2.7	20	1.75	60	2	20.86	21.58	22.35	23.15	-	MEXLN201820	●
2	0/-0.015			4	3	6	1.95	50	2	6.39	6.61	6.84	7.09	7.62	MEXLN202006	●
2	0/-0.015			4	3	8	1.95	50	2	8.46	8.75	9.06	9.38	10.09	MEXLN202008	●
2	0/-0.015			4	3	10	1.95	50	2	10.52	10.89	11.27	11.68	12.56	MEXLN202010	●
2	0/-0.015			4	3	12	1.95	50	2	12.59	13.03	13.49	13.97	15.02	MEXLN202012	●
2	0/-0.015			4	3	14	1.95	50	2	14.66	15.17	15.70	16.27	17.49	MEXLN202014	●
2	0/-0.015			4	3	16	1.95	50	2	16.73	17.30	17.92	18.56	-	MEXLN202016	●
2	0/-0.015			4	3	18	1.95	60	2	18.79	19.44	20.13	20.86	-	MEXLN202018	●
2	0/-0.015			4	3	20	1.95	60	2	20.86	21.58	22.35	23.15	-	MEXLN202020	●

CARBIDE DRILLS  
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA

HSS DRILLS  
 LFTA  
 SUTA  
 HSS-HSS/CO

CARBIDE END-MILLS  
 G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
**MEX/MH**  
 UH/MH

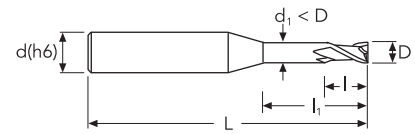
HSS END-MILLS

CARBIDE BURRS

INFO

# MEXLN2

cylindrical shank, 2 flutes, extended and reduced neck

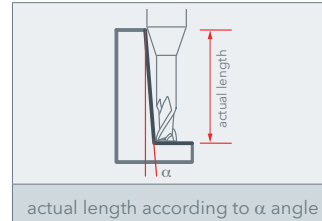


CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
★		★			★

★ 1st choice ☆ suitable



HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

D	D Tol.	C	C Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
2	0/-0.015			4	3	25	1.95	75	2	26.03	26.93	27.88	-	-	MEXLN202025	●
2	0/-0.015			4	3	30	1.95	75	2	31.20	32.28	33.42	-	-	MEXLN202030	●
2.5	0/-0.020			4	3.7	8	2.40	50	2	8.46	8.75	9.06	9.38	10.09	MEXLN202508	●
2.5	0/-0.020			4	3.7	10	2.40	50	2	10.52	10.89	11.27	11.68	12.56	MEXLN202510	●
2.5	0/-0.020			4	3.7	12	2.40	50	2	12.59	13.03	13.49	13.97	-	MEXLN202512	●
2.5	0/-0.020			4	3.7	16	2.40	50	2	16.73	17.3	17.92	18.56	-	MEXLN202516	●
2.5	0/-0.020			4	3.7	20	2.40	60	2	20.86	21.58	22.35	-	-	MEXLN202520	●
2.5	0/-0.020			4	3.7	25	2.40	60	2	26.03	26.93	27.88	-	-	MEXLN202525	●
2.5	0/-0.020			4	3.7	30	2.40	75	2	31.20	32.28	-	-	-	MEXLN202530	●
3	0/-0.025			6	4.5	8	2.85	50	2	8.65	8.95	9.26	9.60	10.31	MEXLN203008	●
3	0/-0.025			6	4.5	10	2.85	50	2	10.72	11.09	11.48	11.89	12.78	MEXLN203010	●
3	0/-0.025			6	4.5	12	2.85	50	2	12.78	13.23	13.69	14.18	15.25	MEXLN203012	●
3	0/-0.025			6	4.5	14	2.85	50	2	14.85	15.36	15.91	16.48	17.72	MEXLN203014	●
3	0/-0.025			6	4.5	16	2.85	60	2	16.92	17.50	18.12	18.77	20.18	MEXLN203016	●
3	0/-0.025			6	4.5	18	2.85	60	2	18.99	19.64	20.34	21.07	22.65	MEXLN203018	●
3	0/-0.025			6	4.5	20	2.85	60	2	21.05	21.78	22.55	23.36	25.12	MEXLN203020	●
3	0/-0.025			6	4.5	25	2.85	75	2	26.22	27.13	28.09	29.10	-	MEXLN203025	●
4	0/-0.025			6	4.5	10	3.85	60	2	10.91	11.29	11.68	12.10	13.00	MEXLN204010	●
4	0/-0.025			6	4.5	15	3.85	60	2	16.08	16.63	17.22	17.84	19.17	MEXLN204015	●
4	0/-0.025			6	4.5	20	3.85	60	2	21.25	21.98	22.76	23.57	-	MEXLN204020	●
4	0/-0.025			6	4.5	25	3.85	75	2	26.41	27.33	28.29	-	-	MEXLN204025	●
4	0/-0.025			6	4.5	30	3.85	75	2	31.58	32.67	33.83	-	-	MEXLN204030	●
4	0/-0.025			6	4.5	40	3.85	75	2	41.92	43.37	-	-	-	MEXLN204040	●

● stock standard ○ non-stock standard ▽ stock exhaustion

CUTTING PARAMETERS

**MEXLN2**

Material Group ISO 513			P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5	
Hardness/Rm			≤1000 N/mm <sup>2</sup>		≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae			ap x D		ap x D	ap x D	ap x D
Vc (m/min)			70÷110		50÷90	40÷60	20÷40
D (mm)	l1 (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
0.2	≤ 6D	0.01	0.003	0.003	0.002	0.002	
	≤ 8D	0.01	0.003	0.002	0.002	0.002	
	≤ 10D	0.01	0.002	0.002	0.002	0.001	
	≤ 12D	0.01	0.002	0.001	0.001	0.001	
0.3	≤ 6D	0.02	0.004	0.004	0.003	0.003	
	≤ 8D	0.01	0.004	0.003	0.003	0.003	
	≤ 10D	0.01	0.003	0.003	0.003	0.002	
	≤ 12D	0.01	0.003	0.003	0.002	0.002	
0.4	≤ 6D	0.02	0.006	0.005	0.005	0.004	
	≤ 8D	0.02	0.005	0.005	0.004	0.004	
	≤ 10D	0.01	0.005	0.004	0.004	0.003	
	≤ 12D	0.01	0.004	0.004	0.003	0.003	
0.5	≤ 6D	0.03	0.007	0.006	0.006	0.005	
	≤ 8D	0.02	0.006	0.006	0.005	0.004	
	≤ 10D	0.02	0.006	0.005	0.004	0.004	
	≤ 12D	0.01	0.005	0.004	0.004	0.003	
0.6	≤ 6D	0.03	0.008	0.007	0.006	0.006	
	≤ 8D	0.03	0.007	0.006	0.006	0.005	
	≤ 10D	0.02	0.006	0.006	0.005	0.004	
	≤ 12D	0.02	0.006	0.005	0.004	0.004	
0.8	≤ 6D	0.04	0.010	0.009	0.008	0.007	
	≤ 8D	0.03	0.009	0.008	0.007	0.006	
	≤ 10D	0.03	0.008	0.007	0.006	0.006	
	≤ 12D	0.02	0.007	0.006	0.006	0.005	
1	≤ 6D	0.05	0.012	0.011	0.010	0.008	
	≤ 8D	0.04	0.011	0.010	0.009	0.008	
	≤ 10D	0.04	0.010	0.009	0.008	0.007	
	≤ 12D	0.03	0.008	0.008	0.007	0.006	
1.2	≤ 6D	0.06	0.022	0.020	0.018	0.015	
	≤ 8D	0.05	0.020	0.018	0.016	0.014	
	≤ 10D	0.04	0.018	0.016	0.014	0.012	
	≤ 12D	0.03	0.015	0.014	0.012	0.011	
1.4	≤ 6D	0.07	0.024	0.022	0.019	0.017	
	≤ 8D	0.06	0.022	0.019	0.017	0.015	
	≤ 10D	0.05	0.019	0.017	0.015	0.013	
	≤ 12D	0.04	0.017	0.015	0.013	0.012	
	≤ 15D	0.03	0.014	0.013	0.012	0.010	
≥ 15D	0.02	0.012	0.011	0.010	0.008		
1.5	≤ 6D	0.08	0.025	0.023	0.020	0.018	
	≤ 8D	0.06	0.023	0.020	0.018	0.016	
	≤ 10D	0.05	0.020	0.018	0.016	0.014	
	≤ 12D	0.04	0.018	0.016	0.014	0.012	
	≤ 15D	0.03	0.015	0.014	0.012	0.011	
≥ 15D	0.02	0.013	0.011	0.010	0.009		
1.6	≤ 6D	0.08	0.026	0.023	0.021	0.018	
	≤ 8D	0.07	0.023	0.021	0.019	0.016	
	≤ 10D	0.06	0.021	0.019	0.017	0.015	
	≤ 12D	0.04	0.018	0.016	0.015	0.013	
	≤ 15D	0.04	0.016	0.014	0.012	0.011	
≥ 15D	0.02	0.013	0.012	0.010	0.009		



- INFO
- CARBIDE DRILLS
  - PU-HPU
  - TA-4HTA
  - SUH
  - ALH
  - HRC
  - SUH MINI
  - HL
  - HSD
  - C-SD-TA
- HSS DRILLS
  - LFTA
  - SUTA
  - HSS-HSS/CO
- CARBIDE END-MILLS
  - G2
  - MDTA
  - HF-VH/UP
  - MEF
  - ALU
  - MEX/MH
  - UH/MH
- HSS END-MILLS
- CARBIDE BURRS

INFO

# MEXLN2

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

Material Group ISO 513			P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm			≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae			<b>ap x D</b>	<b>ap x D</b>	<b>ap x D</b>	<b>ap x D</b>
Vc (m/min)			<b>70÷110</b>	<b>50÷90</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	l1 (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1.8	≤ 6D	0.09	0.028	0.025	0.022	0.020
	≤ 8D	0.08	0.025	0.023	0.020	0.018
	≤ 10D	0.06	0.022	0.020	0.018	0.016
	≤ 12D	0.05	0.020	0.018	0.016	0.014
	≤ 15D	0.04	0.017	0.015	0.013	0.012
	≥ 15D	0.03	0.014	0.013	0.011	0.010
2	≤ 6D	0.10	0.030	0.027	0.024	0.021
	≤ 8D	0.09	0.027	0.024	0.022	0.019
	≤ 10D	0.07	0.024	0.022	0.019	0.017
	≤ 12D	0.06	0.021	0.019	0.017	0.015
	≤ 15D	0.05	0.018	0.016	0.014	0.013
	≥ 15D	0.03	0.018	0.016	0.014	0.013
2.5	≤ 6D	0.13	0.035	0.032	0.028	0.025
	≤ 8D	0.11	0.032	0.028	0.025	0.022
	≤ 10D	0.09	0.028	0.025	0.022	0.020
	≤ 12D	0.07	0.025	0.022	0.020	0.017
	≤ 15D	0.06	0.021	0.019	0.017	0.015
	≥ 15D	0.04	0.021	0.019	0.017	0.015
3	≤ 6D	0.15	0.040	0.036	0.032	0.028
	≤ 8D	0.13	0.036	0.032	0.029	0.025
	≤ 10D	0.11	0.032	0.029	0.026	0.022
	≤ 12D	0.08	0.028	0.025	0.022	0.020
	≤ 15D	0.07	0.024	0.022	0.019	0.017
	≥ 15D	0.05	0.024	0.022	0.019	0.017
4	≤ 6D	0.20	0.050	0.045	0.040	0.035
	≤ 8D	0.17	0.045	0.041	0.036	0.032
	≤ 10D	0.14	0.040	0.036	0.032	0.028
	≤ 12D	0.11	0.035	0.032	0.028	0.025
	≤ 15D	0.09	0.030	0.027	0.024	0.021
	≥ 15D	0.06	0.030	0.027	0.024	0.021



INFO

## MEXCS2

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	<b>0.1D x D</b>	
Vc (m/min)	<b>70÷110</b>	<b>50÷90</b>	<b>40÷60</b>	<b>20÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.006	0.005	0.005	0.004	
<b>2</b>	0.010	0.009	0.008	0.007	
<b>3</b>	0.014	0.013	0.012	0.010	
<b>4</b>	0.020	0.018	0.016	0.014	
<b>5</b>	0.026	0.023	0.020	0.018	
<b>6</b>	0.032	0.029	0.026	0.023	
<b>8</b>	0.038	0.034	0.031	0.027	
<b>10</b>	0.046	0.041	0.037	0.032	
<b>12</b>	0.055	0.050	0.044	0.039	
<b>14</b>	0.064	0.057	0.051	0.045	
<b>16</b>	0.072	0.065	0.058	0.051	
<b>18</b>	0.082	0.074	0.066	0.058	
<b>20</b>	0.094	0.084	0.075	0.065	

< D3 mm: ap = 0.1D ÷ 0.2D

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS





INFO

## MEXCL2

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
		Hardness/Rm	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC
ap x ae	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	<b>0.1D x D</b>	
Vc (m/min)	<b>70÷110</b>	<b>50÷90</b>	<b>40÷60</b>	<b>20÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
<b>1</b>	0.005	0.005	0.004	0.004	
<b>1.5</b>	0.006	0.005	0.005	0.004	
<b>2</b>	0.009	0.008	0.007	0.006	
<b>3</b>	0.012	0.011	0.010	0.008	
<b>4</b>	0.018	0.016	0.014	0.013	
<b>5</b>	0.024	0.022	0.019	0.017	
<b>6</b>	0.029	0.026	0.023	0.020	
<b>8</b>	0.035	0.032	0.028	0.025	
<b>10</b>	0.041	0.037	0.033	0.029	
<b>12</b>	0.050	0.045	0.040	0.035	

≤ D3 mm: ap = 0.4 mm

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# MEX400

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>
Vc (m/min)	<b>120÷160</b>	<b>100÷140</b>	<b>90÷120</b>	<b>80÷100</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.007	0.006			0.006
<b>2</b>	0.010	0.010		0.010	0.010
<b>3</b>	0.016	0.016		0.016	0.016
<b>4</b>	0.027	0.027		0.027	0.027
<b>5</b>	0.036	0.036		0.036	0.036
<b>6</b>	0.043	0.043		0.043	0.043
<b>8</b>	0.060	0.060		0.060	0.060
<b>10</b>	0.085	0.085		0.085	0.085
<b>12</b>	0.100	0.100		0.100	0.100
<b>14</b>	0.120	0.120		0.120	0.120
<b>16</b>	0.150	0.150		0.150	0.150
<b>18</b>	0.175	0.175		0.175	0.175
<b>20</b>	0.200	0.200		0.200	0.200
<b>22</b>	0.215	0.215		0.215	0.215
<b>25</b>	0.225	0.225		0.225	0.225

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# MEXCL4

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>
Vc (m/min)	<b>60÷100</b>	<b>50÷70</b>	<b>30÷50</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>2</b>	0.014	0.013	0.012	0.010
<b>3</b>	0.022	0.020	0.017	0.015
<b>4</b>	0.029	0.026	0.023	0.020
<b>5</b>	0.033	0.029	0.026	0.023
<b>6</b>	0.036	0.033	0.029	0.025
<b>8</b>	0.047	0.042	0.038	0.033
<b>10</b>	0.060	0.054	0.048	0.042
<b>12</b>	0.072	0.065	0.058	0.051
<b>14</b>	0.083	0.075	0.066	0.058
<b>16</b>	0.094	0.084	0.075	0.065
<b>20</b>	0.119	0.107	0.095	0.083
<b>25</b>	0.150	0.135	0.120	0.105

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# MEXCSHM

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.1D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	
Vc (m/min)	<b>120÷160</b>	<b>90÷130</b>	<b>60÷100</b>	<b>50÷70</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
<b>3</b>	0.008	0.008	0.007	0.006	
<b>4</b>	0.012	0.011	0.010	0.008	
<b>5</b>	0.014	0.013	0.012	0.010	
<b>6</b>	0.018	0.016	0.014	0.013	
<b>8</b>	0.028	0.025	0.022	0.019	
<b>10</b>	0.034	0.030	0.027	0.024	
<b>12</b>	0.041	0.037	0.033	0.029	
<b>14</b>	0.048	0.043	0.038	0.034	
<b>16</b>	0.056	0.051	0.045	0.039	
<b>18</b>	0.065	0.059	0.052	0.046	
<b>20</b>	0.073	0.066	0.058	0.051	

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS





INFO

# MEXCLHM

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
		≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>
Vc (m/min)	<b>80÷120</b>	<b>50÷90</b>	<b>40÷60</b>	<b>20÷40</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.007	0.006	0.006	0.005	
<b>4</b>	0.010	0.009	0.008	0.007	
<b>5</b>	0.012	0.011	0.010	0.009	
<b>6</b>	0.015	0.014	0.012	0.011	
<b>8</b>	0.023	0.021	0.019	0.016	
<b>10</b>	0.029	0.026	0.023	0.020	
<b>12</b>	0.035	0.031	0.028	0.024	
<b>14</b>	0.041	0.037	0.033	0.029	
<b>16</b>	0.048	0.043	0.038	0.034	
<b>18</b>	0.055	0.050	0.044	0.039	
<b>20</b>	0.063	0.057	0.050	0.044	

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

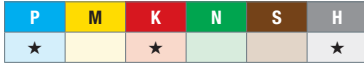
CARBIDE  
BURRS

# MEXCSFR

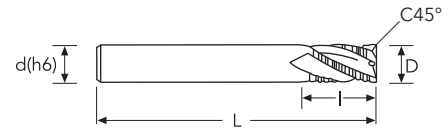
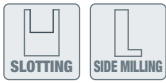
cylindrical shank, roughing



INFO



★ 1st choice ☆ suitable



CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

D	D Tol.	C45°	C45° Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
6	0/-0.048	0.40	+/-0.020	6	15		60	3	MEXCSFR060	●
8	0/-0.058	0.40	+/-0.020	8	20		65	3	MEXCSFR080	●
10	0/-0.058	0.50	+/-0.020	10	25		70	4	MEXCSFR100	●
12	0/-0.070	0.50	+/-0.020	12	30		80	4	MEXCSFR120	●
14	0/-0.070	0.50	+/-0.020	14	25		100	4	MEXCSFR140	●
16	0/-0.070	0.50	+/-0.020	16	40		100	4	MEXCSFR160	●
20	0/-0.084	0.50	+/-0.020	20	50		100	4	MEXCSFR200	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

## MEXCSFR

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>	<b>0.1D x D</b>
Vc (m/min)	<b>70÷90</b>	<b>50÷70</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.043	0.038	0.034	0.030
8	0.055	0.050	0.044	0.039
10	0.071	0.064	0.057	0.050
12	0.085	0.077	0.068	0.060
14	0.098	0.088	0.078	0.068
16	0.110	0.099	0.088	0.077
20	0.140	0.126	0.112	0.098

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC
ap x ae	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>D x 0.1D</b>	<b>D x 0.05D</b>
Vc (m/min)	<b>80÷100</b>	<b>60÷80</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.047	0.042	0.037	0.033
8	0.061	0.055	0.049	0.043
10	0.078	0.070	0.062	0.055
12	0.094	0.084	0.075	0.065
14	0.108	0.097	0.086	0.075
16	0.121	0.109	0.097	0.085
20	0.154	0.139	0.123	0.108

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

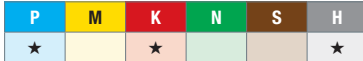
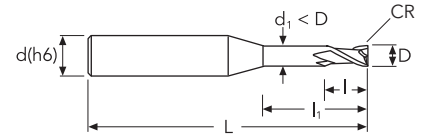
CARBIDE  
BURRS

# MEXLN2R

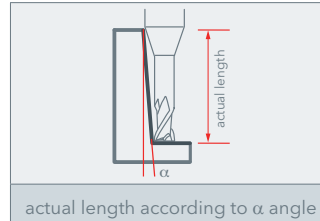
cylindrical shank, 2 flutes, extended and reduced neck, corner radius



INFO



★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	30°	1°	1°30'	2°	3°	EDP No.	Stock
0.3	0/-0.010	0.05	0/-0.010	4	0.4	1	0.26	50	2	1,08	1,12	1,15	1,19	1,25	MEXLN20030001	●
0.3	0/-0.010	0.05	0/-0.010	4	0.4	1.5	0.26	50	2	1,60	1,65	1,70	1,75	1,85	MEXLN20030065	●
0.3	0/-0.010	0.05	0/-0.010	4	0.4	2	0.26	50	2	2,12	2,19	2,25	2,32	2,46	MEXLN20030002	●
0.3	0/-0.010	0.05	0/-0.010	4	0.4	3	0.26	50	2	3,15	3,25	3,35	3,46	3,66	MEXLN20030003	●
0.3	0/-0.010	0.10	0/-0.010	4	0.4	1	0.26	50	2	1,08	1,12	1,15	1,18	1,24	MEXLN20030101	●
0.3	0/-0.010	0.10	0/-0.010	4	0.4	1.5	0.26	50	2	1,60	1,65	1,70	1,75	1,84	MEXLN20030165	●
0.3	0/-0.010	0.10	0/-0.010	4	0.4	2	0.26	50	2	2,12	2,18	2,25	2,31	2,45	MEXLN20030102	●
0.3	0/-0.010	0.10	0/-0.010	4	0.4	3	0.26	50	2	3,15	3,25	3,35	3,45	3,65	MEXLN20030103	●
0.4	0/-0.010	0.05	0/-0.010	4	0.6	1	0.37	50	2	1,08	1,12	1,15	1,19	1,25	MEXLN20040001	●
0.4	0/-0.010	0.05	0/-0.010	4	0.6	2	0.37	50	2	2,12	2,19	2,25	2,32	2,46	MEXLN20040002	●
0.4	0/-0.010	0.05	0/-0.010	4	0.6	3	0.37	50	2	3,15	3,25	3,35	3,46	3,66	MEXLN20040003	●
0.4	0/-0.010	0.05	0/-0.010	4	0.6	4	0.37	50	2	4,19	4,32	4,46	4,59	4,86	MEXLN20040004	●
0.4	0/-0.010	0.10	0/-0.010	4	0.6	1	0.37	50	2	1,08	1,12	1,15	1,18	1,24	MEXLN20040101	●
0.4	0/-0.010	0.10	0/-0.010	4	0.6	2	0.37	50	2	2,12	2,18	2,25	2,31	2,45	MEXLN20040102	●
0.4	0/-0.010	0.10	0/-0.010	4	0.6	3	0.37	50	2	3,15	3,25	3,35	3,45	3,65	MEXLN20040103	●
0.4	0/-0.010	0.10	0/-0.010	4	0.6	4	0.37	50	2	4,18	4,32	4,45	4,58	4,85	MEXLN20040104	●
0.5	0/-0.010	0.05	0/-0.010	4	0.7	2	0.45	50	2	2,16	2,23	2,29	2,36	2,50	MEXLN20050002	●
0.5	0/-0.010	0.05	0/-0.010	4	0.7	4	0.45	50	2	4,22	4,36	4,50	4,63	4,90	MEXLN20050004	●
0.5	0/-0.010	0.05	0/-0.010	4	0.7	6	0.45	50	2	6,29	6,49	6,70	6,90	7,31	MEXLN20050006	●
0.5	0/-0.010	0.10	0/-0.010	4	0.7	2	0.45	50	2	2,16	2,22	2,29	2,36	2,49	MEXLN20050102	●
0.5	0/-0.010	0.10	0/-0.010	4	0.7	4	0.45	50	2	4,22	4,36	4,49	4,63	4,89	MEXLN20050104	●
0.5	0/-0.010	0.10	0/-0.010	4	0.7	6	0.45	50	2	6,29	6,49	6,69	6,89	7,30	MEXLN20050106	●
0.6	0/-0.010	0.10	0/-0.010	4	0.9	2	0.55	50	2	2,16	2,22	2,29	2,36	2,49	MEXLN20060102	●
0.6	0/-0.010	0.10	0/-0.010	4	0.9	4	0.55	50	2	4,22	4,36	4,49	4,63	4,89	MEXLN20060104	●
0.6	0/-0.010	0.10	0/-0.010	4	0.9	6	0.55	50	2	6,29	6,49	6,69	6,89	7,30	MEXLN20060106	●
0.7	0/-0.010	0.10	0/-0.010	4	1.0	4	0.65	50	2	4,22	4,36	4,49	4,63	4,89	MEXLN20070104	●
0.7	0/-0.010	0.10	0/-0.010	4	1.0	6	0.65	50	2	6,29	6,49	6,69	6,89	7,30	MEXLN20070106	●
0.8	0/-0.010	0.05	0/-0.010	4	1.2	4	0.75	50	2	4,22	4,36	4,50	4,63	4,90	MEXLN20080004	●
0.8	0/-0.010	0.05	0/-0.010	4	1.2	6	0.75	50	2	6,29	6,49	6,70	6,90	7,31	MEXLN20080006	●
0.8	0/-0.010	0.05	0/-0.010	4	1.2	8	0.75	50	2	8,36	8,63	8,90	9,17	9,71	MEXLN20080008	●
0.8	0/-0.010	0.10	0/-0.010	4	1.2	4	0.75	50	2	4,22	4,36	4,49	4,63	4,89	MEXLN20080104	●
0.8	0/-0.010	0.10	0/-0.010	4	1.2	6	0.75	50	2	6,29	6,49	6,69	6,89	7,30	MEXLN20080106	●
0.8	0/-0.010	0.10	0/-0.010	4	1.2	8	0.75	50	2	8,36	8,63	8,89	9,16	9,70	MEXLN20080108	●
0.9	0/-0.010	0.10	0/-0.010	4	1.4	8	0.85	50	2	8,36	8,63	8,89	9,16	9,70	MEXLN20090108	●
0.9	0/-0.010	0.10	0/-0.010	4	1.4	15	0.85	50	2	15,59	16,10	16,60	17,11	18,12	MEXLN20090115	●
1	0/-0.015	0.10	0/-0.010	4	1.5	4	0.95	50	2	4,32	4,46	4,59	4,73	5,01	MEXLN20100104	●
1	0/-0.015	0.10	0/-0.010	4	1.5	6	0.95	50	2	6,39	6,59	6,80	7,00	7,41	MEXLN20100106	●
1	0/-0.015	0.10	0/-0.010	4	1.5	8	0.95	50	2	8,45	8,73	9,00	9,27	9,81	MEXLN20100108	●
1	0/-0.015	0.10	0/-0.010	4	1.5	10	0.95	50	2	10,52	10,86	11,20	11,54	12,22	MEXLN20100110	●

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

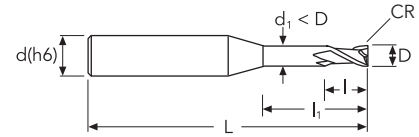
HSS END-MILLS

CARBIDE BURRS

INFO

# MEXLN2R

cylindrical shank, 2 flutes, extended and reduced neck, corner radius

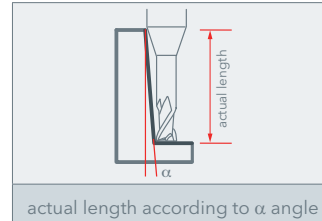


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★		★			★

★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	30°	1°	1°30'	2°	3°	EDP No.	Stock
1	0/-0.015	0.10	0/-0.010	4	1.5	12	0.95	50	2	12,59	12,99	13,40	13,81	14,62	MEXLN20100112	●
1	0/-0.015	0.10	0/-0.010	4	1.5	16	0.95	50	2	16,72	17,26	17,80	18,35	19,43	MEXLN20100116	●
1	0/-0.015	0.10	0/-0.010	4	1.5	20	0.95	50	2	20,86	21,53	22,21	22,88	24,24	MEXLN20100120	●
1	0/-0.015	0.20	0/-0.010	4	1.5	4	0.95	50	2	4,32	4,45	4,58	4,72	4,99	MEXLN20100204	●
1	0/-0.015	0.20	0/-0.010	4	1.5	6	0.95	50	2	6,38	6,58	6,79	6,99	7,39	MEXLN20100206	●
1	0/-0.015	0.20	0/-0.010	4	1.5	8	0.95	50	2	8,45	8,72	8,99	9,26	9,79	MEXLN20100208	●
1	0/-0.015	0.20	0/-0.010	4	1.5	10	0.95	50	2	10,52	10,85	11,19	11,52	12,20	MEXLN20100210	●
1	0/-0.015	0.20	0/-0.010	4	1.5	12	0.95	50	2	12,58	12,99	13,39	13,79	14,60	MEXLN20100212	●
1	0/-0.015	0.20	0/-0.010	4	1.5	16	0.95	50	2	16,72	17,26	17,79	18,33	19,41	MEXLN20100216	●
1	0/-0.015	0.20	0/-0.010	4	1.5	20	0.95	50	2	20,85	21,53	22,20	22,87	24,22	MEXLN20100220	●
1	0/-0.015	0.30	0/-0.010	4	1.5	6	0.95	50	2	6,38	6,58	6,78	6,97	7,37	MEXLN20100306	●
1	0/-0.015	0.30	0/-0.010	4	1.5	10	0.95	50	2	10,51	10,85	11,18	11,51	12,18	MEXLN20100310	●
1	0/-0.015	0.30	0/-0.010	4	1.5	16	0.95	50	2	16,72	17,25	17,78	18,32	19,39	MEXLN20100316	●
1	0/-0.015	0.30	0/-0.010	4	1.5	20	0.95	50	2	20,85	21,52	22,19	22,86	24,20	MEXLN20100320	●
1.2	0/-0.015	0.10	0/-0.010	4	1.8	6	1.15	50	2	6,39	6,59	6,80	7,00	7,41	MEXLN20120106	●
1.2	0/-0.015	0.10	0/-0.010	4	1.8	8	1.15	50	2	8,45	8,73	9,00	9,27	9,81	MEXLN20120108	●
1.2	0/-0.015	0.10	0/-0.010	4	1.8	10	1.15	50	2	10,52	10,86	11,20	11,54	12,22	MEXLN20120110	●
1.2	0/-0.015	0.10	0/-0.010	4	1.8	12	1.15	50	2	12,59	12,99	13,40	13,81	14,62	MEXLN20120112	●
1.4	0/-0.015	0.10	0/-0.010	4	2.1	6	1.35	50	2	6,39	6,59	6,80	7,00	7,41	MEXLN20140106	●
1.4	0/-0.015	0.10	0/-0.010	4	2.1	8	1.35	50	2	8,45	8,73	9,00	9,27	9,81	MEXLN20140108	●
1.4	0/-0.015	0.10	0/-0.010	4	2.1	10	1.35	50	2	10,52	10,86	11,20	11,54	12,22	MEXLN20140110	●
1.4	0/-0.015	0.10	0/-0.010	4	2.1	12	1.35	50	2	12,59	12,99	13,40	13,81	14,62	MEXLN20140112	●
1.4	0/-0.015	0.10	0/-0.010	4	2.1	16	1.35	50	2	16,72	17,26	17,80	18,35	19,43	MEXLN20140116	●
1.5	0/-0.015	0.10	0/-0.010	4	2.3	4	1.45	50	2	4,32	4,46	4,59	4,73	5,01	MEXLN20150104	●
1.5	0/-0.015	0.10	0/-0.010	4	2.3	8	1.45	50	2	8,45	8,73	9,00	9,27	9,81	MEXLN20150108	●
1.5	0/-0.015	0.10	0/-0.010	4	2.3	12	1.45	50	2	12,59	12,99	13,40	13,81	14,62	MEXLN20150112	●
1.5	0/-0.015	0.10	0/-0.010	4	2.3	16	1.45	50	2	16,72	17,26	17,80	18,35	19,43	MEXLN20150116	●
1.5	0/-0.015	0.10	0/-0.010	4	2.3	20	1.45	60	2	20,86	21,53	22,21	22,88	24,24	MEXLN20150120	●
1.5	0/-0.015	0.20	0/-0.010	4	2.3	8	1.45	50	2	8,45	8,72	8,99	9,26	9,79	MEXLN20150208	●
1.5	0/-0.015	0.20	0/-0.010	4	2.3	10	1.45	50	2	10,52	10,85	11,19	11,52	12,20	MEXLN20150210	●
1.5	0/-0.015	0.20	0/-0.010	4	2.3	12	1.45	50	2	12,58	12,99	13,39	13,79	14,60	MEXLN20150212	●
1.5	0/-0.015	0.20	0/-0.010	4	2.3	16	1.45	50	2	16,72	17,26	17,79	18,33	19,41	MEXLN20150216	●
1.5	0/-0.015	0.20	0/-0.010	4	2.3	20	1.45	60	2	20,85	21,53	22,20	22,87	24,22	MEXLN20150220	●
1.5	0/-0.015	0.30	0/-0.010	4	2.3	8	1.45	50	2	8,45	8,71	8,98	9,24	9,77	MEXLN20150308	●
1.5	0/-0.015	0.30	0/-0.010	4	2.3	16	1.45	50	2	16,72	17,25	17,78	18,32	19,39	MEXLN20150316	●
1.5	0/-0.015	0.30	0/-0.010	4	2.3	20	1.45	60	2	20,85	21,52	22,19	22,86	24,20	MEXLN20150320	●
1.6	0/-0.015	0.10	0/-0.010	4	2.4	8	1.55	50	2	8,45	8,73	9,00	9,27	9,81	MEXLN20160108	●
1.6	0/-0.015	0.10	0/-0.010	4	2.4	12	1.55	50	2	12,59	12,99	13,40	13,81	14,62	MEXLN20160112	●
1.6	0/-0.015	0.10	0/-0.010	4	2.4	16	1.55	50	2	16,72	17,26	17,80	18,35	19,43	MEXLN20160116	●

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

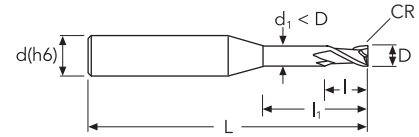
CARBIDE BURRS

# MEXLN2R

cylindrical shank, 2 flutes, extended and reduced neck, corner radius

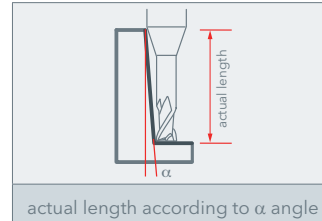


INFO



P	M	K	N	S	H
★		★			★

★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
1.8	0/-0.015	0.20	0/-0.010	4	2.7	8	1.75	50	2	8,45	8,72	8,99	9,26	9,79	MEXLN20180208	●
1.8	0/-0.015	0.20	0/-0.010	4	2.7	12	1.75	50	2	12,58	12,99	13,39	13,79	14,60	MEXLN20180212	●
1.8	0/-0.015	0.20	0/-0.010	4	2.7	16	1.75	50	2	16,72	17,26	17,79	18,33	19,41	MEXLN20180216	●
2	0/-0.015	0.20	0/-0.010	4	3	6	1.95	50	2	6,38	6,58	6,79	6,99	7,39	MEXLN20200206	●
2	0/-0.015	0.20	0/-0.010	4	3	8	1.95	50	2	8,45	8,72	8,99	9,26	9,79	MEXLN20200208	●
2	0/-0.015	0.20	0/-0.010	4	3	10	1.95	50	2	10,52	10,85	11,19	11,52	12,20	MEXLN20200210	●
2	0/-0.015	0.20	0/-0.010	4	3	12	1.95	50	2	12,58	12,99	13,39	13,79	14,60	MEXLN20200212	●
2	0/-0.015	0.20	0/-0.010	4	3	14	1.95	50	2	14,65	15,12	15,59	16,06	17,01	MEXLN20200214	●
2	0/-0.015	0.20	0/-0.010	4	3	16	1.95	50	2	16,72	17,26	17,79	18,33	19,41	MEXLN20200216	●
2	0/-0.015	0.20	0/-0.010	4	3	20	1.95	60	2	20,85	21,53	22,20	22,87	-	MEXLN20200220	●
2	0/-0.015	0.20	0/-0.010	4	3	25	1.95	75	2	26,02	26,86	27,70	28,54	-	MEXLN20200225	●
2	0/-0.015	0.20	0/-0.010	4	3	30	1.95	75	2	31,19	32,20	33,21	-	-	MEXLN20200230	●
2	0/-0.015	0.50	0/-0.010	4	3	6	1.95	50	2	6,37	6,56	6,75	6,95	7,33	MEXLN20200506	●
2	0/-0.015	0.50	0/-0.010	4	3	8	1.95	50	2	8,44	8,70	8,96	9,22	9,73	MEXLN20200508	●
2	0/-0.015	0.50	0/-0.010	4	3	12	1.95	50	2	12,57	12,97	13,36	13,75	14,54	MEXLN20200512	●
2	0/-0.015	0.50	0/-0.010	4	3	16	1.95	50	2	16,71	17,24	17,76	18,29	19,35	MEXLN20200516	●
2	0/-0.015	0.50	0/-0.010	4	3	20	1.95	60	2	20,84	21,51	22,17	22,83	-	MEXLN20200520	●
2	0/-0.015	0.50	0/-0.010	4	3	25	1.95	75	2	26,01	26,84	27,67	28,50	-	MEXLN20200525	●
2	0/-0.015	0.50	0/-0.010	4	3	30	1.95	75	2	31,18	32,18	33,18	-	-	MEXLN20200530	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	8	2.40	50	2	8,45	8,71	8,98	9,24	9,77	MEXLN20250308	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	12	2.40	50	2	12,58	12,98	13,38	13,78	14,58	MEXLN20250312	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	16	2.40	50	2	16,72	17,25	17,78	18,32	-	MEXLN20250316	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	20	2.40	60	2	20,85	21,52	22,19	-	-	MEXLN20250320	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	25	2.40	60	2	26,02	26,86	27,69	-	-	MEXLN20250325	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	30	2.40	75	2	31,19	32,19	-	-	-	MEXLN20250330	●
2.5	0/-0.020	0.50	0/-0.015	4	3.7	8	2.40	50	2	8,44	8,70	8,96	9,22	9,73	MEXLN20250508	●
2.5	0/-0.020	0.50	0/-0.015	4	3.7	12	2.40	50	2	12,57	12,97	13,36	13,75	14,54	MEXLN20250512	●
2.5	0/-0.020	0.50	0/-0.015	4	3.7	16	2.40	50	2	16,71	17,24	17,76	18,29	-	MEXLN20250516	●
2.5	0/-0.020	0.50	0/-0.015	4	3.7	20	2.40	60	2	20,84	21,51	22,17	-	-	MEXLN20250520	●
2.5	0/-0.020	0.50	0/-0.015	4	3.7	25	2.40	60	2	26,01	26,84	27,67	-	-	MEXLN20250525	●
2.5	0/-0.020	0.50	0/-0.015	4	3.7	30	2.40	75	2	31,18	32,18	-	-	-	MEXLN20250530	●
3	0/-0.025	0.20	0/-0.015	6	4.5	10	2.85	50	2	10,71	11,05	11,39	11,74	12,42	MEXLN20300210	●
3	0/-0.025	0.20	0/-0.015	6	4.5	12	2.85	50	2	12,78	13,19	13,60	14,00	14,82	MEXLN20300212	●
3	0/-0.025	0.20	0/-0.015	6	4.5	16	2.85	60	2	16,91	17,46	18,00	18,54	19,63	MEXLN20300216	●
3	0/-0.025	0.20	0/-0.015	6	4.5	20	2.85	60	2	21,05	21,72	22,40	23,08	24,44	MEXLN20300220	●
3	0/-0.025	0.20	0/-0.015	6	4.5	25	2.85	75	2	26,21	27,06	27,91	28,75	30,45	MEXLN20300225	●
3	0/-0.025	0.30	0/-0.015	6	4.5	10	2.85	50	2	10,71	11,04	11,38	11,72	12,40	MEXLN20300310	●
3	0/-0.025	0.30	0/-0.015	6	4.5	12	2.85	50	2	12,77	13,18	13,59	13,99	14,80	MEXLN20300312	●
3	0/-0.025	0.30	0/-0.015	6	4.5	16	2.85	60	2	16,91	17,45	17,99	18,53	19,61	MEXLN20300316	●

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

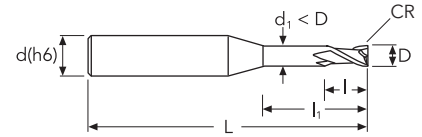
HSS END-MILLS

CARBIDE BURRS

INFO

# MEXLN2R

cylindrical shank, 2 flutes, extended and reduced neck, corner radius

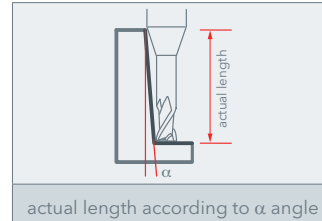


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★		★			★

★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	30°	1°	1°30'	2°	3°	EDP No.	Stock
3	0/-0.025	0.30	0/-0.015	6	4.5	20	2.85	60	2	21,04	21,72	22,39	23,07	24,42	MEXLN20300320	●
3	0/-0.025	0.30	0/-0.015	6	4.5	25	2.85	75	2	26,21	27,05	27,90	28,74	30,43	MEXLN20300325	●
3	0/-0.025	0.50	0/-0.015	6	4.5	10	2.85	50	2	10,70	11,03	11,36	11,70	12,36	MEXLN20300510	●
3	0/-0.025	0.50	0/-0.015	6	4.5	12	2.85	50	2	12,77	13,17	13,57	13,96	14,76	MEXLN20300512	●
3	0/-0.025	0.50	0/-0.015	6	4.5	16	2.85	60	2	16,90	17,44	17,97	18,50	19,57	MEXLN20300516	●
3	0/-0.025	0.50	0/-0.015	6	4.5	20	2.85	60	2	21,04	21,70	22,37	23,04	24,38	MEXLN20300520	●
3	0/-0.025	0.50	0/-0.015	6	4.5	25	2.85	75	2	26,20	27,04	27,88	28,71	30,39	MEXLN20300525	●
4	0/-0.025	0.30	0/-0.015	6	4.5	10	3.85	60	2	10,90	11,24	11,59	11,93	12,62	MEXLN20400310	●
4	0/-0.025	0.30	0/-0.015	6	4.5	15	3.85	60	2	16,07	16,58	17,09	17,61	18,63	MEXLN20400315	●
4	0/-0.025	0.30	0/-0.015	6	4.5	20	3.85	60	2	21,24	21,92	22,60	23,28	-	MEXLN20400320	●
4	0/-0.025	0.30	0/-0.015	6	4.5	25	3.85	75	2	26,40	27,25	28,10	28,95	-	MEXLN20400325	●
4	0/-0.025	0.30	0/-0.015	6	4.5	30	3.85	75	2	31,57	32,59	33,61	-	-	MEXLN20400330	●
4	0/-0.025	0.30	0/-0.015	6	4.5	40	3.85	75	2	41,91	43,26	-	-	-	MEXLN20400340	●
4	0/-0.025	0.50	0/-0.015	6	4.5	10	3.85	60	2	10,89	11,23	11,57	11,91	12,58	MEXLN20400510	●
4	0/-0.025	0.50	0/-0.015	6	4.5	15	3.85	60	2	16,06	16,57	17,07	17,58	18,59	MEXLN20400515	●
4	0/-0.025	0.50	0/-0.015	6	4.5	20	3.85	60	2	21,23	21,90	22,58	23,25	-	MEXLN20400520	●
4	0/-0.025	0.50	0/-0.015	6	4.5	25	3.85	75	2	26,40	27,24	28,08	28,92	-	MEXLN20400525	●
4	0/-0.025	0.50	0/-0.015	6	4.5	30	3.85	75	2	31,57	32,58	33,59	-	-	MEXLN20400530	●
4	0/-0.025	0.50	0/-0.015	6	4.5	40	3.85	75	2	41,90	43,25	-	-	-	MEXLN20400540	●

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH**
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-stock standard ▽ stock exhaustion



CUTTING PARAMETERS

**MEXLN2R**

Material Group ISO 513			P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5	
Hardness/Rm			≤1000 N/mm <sup>2</sup>		≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae			ap x D		ap x D	ap x D	ap x D
Vc (m/min)			70÷110		50÷90	40÷60	20÷40
D (mm)	l1 (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
0.3	≤ 6D	0.02	0.004	0.004	0.003	0.003	
	≤ 8D	0.01	0.004	0.003	0.003	0.003	
	≤ 10D	0.01	0.003	0.003	0.003	0.002	
	≤ 12D	0.01	0.003	0.003	0.002	0.002	
0.4	≤ 6D	0.02	0.006	0.005	0.005	0.004	
	≤ 8D	0.02	0.005	0.005	0.004	0.004	
	≤ 10D	0.01	0.005	0.004	0.004	0.003	
	≤ 12D	0.01	0.004	0.004	0.003	0.003	
0.5	≤ 6D	0.03	0.007	0.006	0.006	0.005	
	≤ 8D	0.02	0.006	0.006	0.005	0.004	
	≤ 10D	0.02	0.006	0.005	0.004	0.004	
	≤ 12D	0.01	0.005	0.004	0.004	0.003	
0.6	≤ 6D	0.03	0.008	0.007	0.006	0.006	
	≤ 8D	0.03	0.007	0.006	0.006	0.005	
	≤ 10D	0.02	0.006	0.006	0.005	0.004	
	≤ 12D	0.02	0.006	0.005	0.004	0.004	
0.8	≤ 6D	0.04	0.010	0.009	0.008	0.007	
	≤ 8D	0.03	0.009	0.008	0.007	0.006	
	≤ 10D	0.03	0.008	0.007	0.006	0.006	
	≤ 12D	0.02	0.007	0.006	0.006	0.005	
1	≤ 6D	0.05	0.012	0.011	0.010	0.008	
	≤ 8D	0.04	0.011	0.010	0.009	0.008	
	≤ 10D	0.04	0.010	0.009	0.008	0.007	
	≤ 12D	0.03	0.008	0.008	0.007	0.006	
1.2	≤ 6D	0.06	0.022	0.020	0.018	0.015	
	≤ 8D	0.05	0.020	0.018	0.016	0.014	
	≤ 10D	0.04	0.018	0.016	0.014	0.012	
	≤ 12D	0.03	0.015	0.014	0.012	0.011	
1.4	≤ 6D	0.07	0.024	0.022	0.019	0.017	
	≤ 8D	0.06	0.022	0.019	0.017	0.015	
	≤ 10D	0.05	0.019	0.017	0.015	0.013	
	≤ 12D	0.04	0.017	0.015	0.013	0.012	
	≤ 15D	0.03	0.014	0.013	0.012	0.010	
1.5	≥ 15D	0.02	0.012	0.011	0.010	0.008	
	≤ 6D	0.08	0.025	0.023	0.020	0.018	
	≤ 8D	0.06	0.023	0.020	0.018	0.016	
	≤ 10D	0.05	0.020	0.018	0.016	0.014	
	≤ 12D	0.04	0.018	0.016	0.014	0.012	
	≤ 15D	0.03	0.015	0.014	0.012	0.011	
1.6	≥ 15D	0.02	0.013	0.011	0.010	0.009	
	≤ 6D	0.08	0.026	0.023	0.021	0.018	
	≤ 8D	0.07	0.023	0.021	0.019	0.016	
	≤ 10D	0.06	0.021	0.019	0.017	0.015	
	≤ 12D	0.04	0.018	0.016	0.015	0.013	
	≤ 15D	0.04	0.016	0.014	0.012	0.011	
≥ 15D	0.02	0.013	0.012	0.010	0.009		



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# MEXLN2R

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

Material Group ISO 513			P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm			≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae			<b>ap x D</b>	<b>ap x D</b>	<b>ap x D</b>	<b>ap x D</b>
Vc (m/min)			<b>70÷110</b>	<b>50÷90</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	l1 (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1.8	≤ 6D	0.09	0.028	0.025	0.022	0.020
	≤ 8D	0.08	0.025	0.023	0.020	0.018
	≤ 10D	0.06	0.022	0.020	0.018	0.016
	≤ 12D	0.05	0.020	0.018	0.016	0.014
	≤ 15D	0.04	0.017	0.015	0.013	0.012
	≥ 15D	0.03	0.014	0.013	0.011	0.010
2	≤ 6D	0.10	0.030	0.027	0.024	0.021
	≤ 8D	0.09	0.027	0.024	0.022	0.019
	≤ 10D	0.07	0.024	0.022	0.019	0.017
	≤ 12D	0.06	0.021	0.019	0.017	0.015
	≤ 15D	0.05	0.018	0.016	0.014	0.013
	≥ 15D	0.03	0.018	0.016	0.014	0.013
2.5	≤ 6D	0.13	0.035	0.032	0.028	0.025
	≤ 8D	0.11	0.032	0.028	0.025	0.022
	≤ 10D	0.09	0.028	0.025	0.022	0.020
	≤ 12D	0.07	0.025	0.022	0.020	0.017
	≤ 15D	0.06	0.021	0.019	0.017	0.015
	≥ 15D	0.04	0.021	0.019	0.017	0.015
3	≤ 6D	0.15	0.040	0.036	0.032	0.028
	≤ 8D	0.13	0.036	0.032	0.029	0.025
	≤ 10D	0.11	0.032	0.029	0.026	0.022
	≤ 12D	0.08	0.028	0.025	0.022	0.020
	≤ 15D	0.07	0.024	0.022	0.019	0.017
	≥ 15D	0.05	0.024	0.022	0.019	0.017
4	≤ 6D	0.20	0.050	0.045	0.040	0.035
	≤ 8D	0.17	0.045	0.041	0.036	0.032
	≤ 10D	0.14	0.040	0.036	0.032	0.028
	≤ 12D	0.11	0.035	0.032	0.028	0.025
	≤ 15D	0.09	0.030	0.027	0.024	0.021
	≥ 15D	0.06	0.030	0.027	0.024	0.021



INFO

# MEXLS2R

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC
ap x ae	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>	<b>0.05D x D</b>
Vc (m/min)	<b>70÷110</b>	<b>50÷90</b>	<b>40÷60</b>	<b>20÷40</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>2</b>	0.005	0.005	0.004	0.004
<b>3</b>	0.006	0.005	0.005	0.004
<b>4</b>	0.009	0.008	0.007	0.006
<b>5</b>	0.012	0.011	0.010	0.008
<b>6</b>	0.018	0.016	0.014	0.013
<b>8</b>	0.024	0.022	0.019	0.017
<b>10</b>	0.029	0.026	0.023	0.020
<b>12</b>	0.035	0.032	0.028	0.025
<b>16</b>	0.041	0.037	0.033	0.029

≤ D3 mm: ap = 0.4 mm

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# MEXCS4R

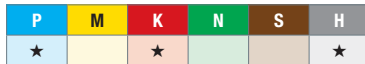
cylindrical shank, 4 flutes, corner radius



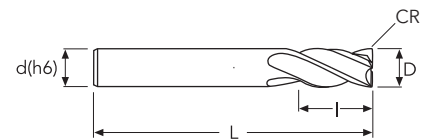
INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



★ 1st choice ☆ suitable



HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

D	D Tol.	CR	CR Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
1	0/-0.015	0.20	0/-0.010	4	3		50	4	MEXCS4R01002	●
1.5	0/-0.015	0.20	0/-0.010	4	4.5		50	4	MEXCS4R01502	●
2	0/-0.015	0.20	0/-0.010	4	6.5		50	4	MEXCS4R02002	●
2	0/-0.015	0.30	0/-0.010	4	6.5		50	4	MEXCS4R02003	●
2.5	0/-0.020	0.20	0/-0.015	4	6.5		50	4	MEXCS4R02502	●
2.5	0/-0.020	0.50	0/-0.015	4	6.5		50	4	MEXCS4R02505	●
3	0/-0.020	0.20	0/-0.015	4	9		50	4	MEXCS4R03002	●
3	0/-0.020	0.30	0/-0.015	4	9		50	4	MEXCS4R03003	●
3	0/-0.020	0.50	0/-0.015	4	9		50	4	MEXCS4R03005	●
4	0/-0.020	0.30	0/-0.015	4	12		50	4	MEXCS4R04003	●
4	0/-0.020	0.50	0/-0.015	4	12		50	4	MEXCS4R04005	●
4	0/-0.020	1.00	0/-0.015	4	12		50	4	MEXCS4R04010	●
5	0/-0.020	0.30	0/-0.015	5	15		50	4	MEXCS4R05003	●
5	0/-0.020	0.50	0/-0.015	5	15		50	4	MEXCS4R05005	●
5	0/-0.020	1.00	0/-0.015	5	15		50	4	MEXCS4R05010	●
6	0/-0.020	0.30	0/-0.015	6	16		50	4	MEXCS4R06003	●
6	0/-0.020	0.50	0/-0.015	6	16		50	4	MEXCS4R06005	●
6	0/-0.020	1.00	0/-0.015	6	16		50	4	MEXCS4R06010	●
8	0/-0.020	0.30	0/-0.015	8	20		64	4	MEXCS4R08003	●
8	0/-0.020	0.50	0/-0.015	8	20		64	4	MEXCS4R08005	●
8	0/-0.020	1.00	0/-0.015	8	20		64	4	MEXCS4R08010	●
8	0/-0.020	1.50	0/-0.015	8	20		64	4	MEXCS4R08015	●
8	0/-0.020	2.00	0/-0.015	8	20		64	4	MEXCS4R08020	●
10	0/-0.020	0.30	0/-0.020	10	22		75	4	MEXCS4R10003	●
10	0/-0.020	0.50	0/-0.020	10	22		75	4	MEXCS4R10005	●
10	0/-0.020	1.00	0/-0.020	10	22		75	4	MEXCS4R10010	●
10	0/-0.020	1.50	0/-0.020	10	22		75	4	MEXCS4R10015	●
10	0/-0.020	2.00	0/-0.020	10	22		75	4	MEXCS4R10020	●
12	0/-0.020	0.30	0/-0.020	12	25		75	4	MEXCS4R12003	●
12	0/-0.020	0.50	0/-0.020	12	25		75	4	MEXCS4R12005	●
12	0/-0.020	1.00	0/-0.020	12	25		75	4	MEXCS4R12010	●
12	0/-0.020	1.50	0/-0.020	12	25		75	4	MEXCS4R12015	●
12	0/-0.020	2.00	0/-0.020	12	25		75	4	MEXCS4R12020	●
12	0/-0.020	3.00	0/-0.020	12	25		75	4	MEXCS4R12030	●
14	0/-0.020	0.50	0/-0.020	14	32		90	4	MEXCS4R14005	○
14	0/-0.020	1.00	0/-0.020	14	32		90	4	MEXCS4R14010	●
14	0/-0.020	2.00	0/-0.020	14	32		90	4	MEXCS4R14020	○
16	0/-0.020	0.50	0/-0.020	16	32		90	4	MEXCS4R16005	●
16	0/-0.020	1.00	0/-0.020	16	32		90	4	MEXCS4R16010	●

● stock standard ○ non-stock standard ▽ stock exhaustion



CUTTING PARAMETERS

### MEXCS4R

	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
	ap x ae	<b>D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>
	Vc (m/min)	<b>80÷120</b>	<b>50÷90</b>	<b>40÷60</b>	<b>20÷40</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>1</b>	0.009	0.008	0.007	0.006
	<b>2</b>	0.017	0.015	0.014	0.012
	<b>3</b>	0.026	0.023	0.020	0.018
	<b>4</b>	0.034	0.031	0.027	0.024
	<b>5</b>	0.038	0.034	0.031	0.027
<b>6</b>	0.043	0.038	0.034	0.030	
<b>8</b>	0.055	0.050	0.044	0.039	
<b>10</b>	0.071	0.064	0.057	0.050	
<b>12</b>	0.085	0.077	0.068	0.060	
<b>14</b>	0.098	0.088	0.078	0.068	
<b>16</b>	0.110	0.099	0.088	0.077	
<b>18</b>	0.125	0.113	0.100	0.088	
<b>20</b>	0.140	0.126	0.112	0.098	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS END-MILLS

CARBIDE BURRS





CUTTING PARAMETERS

**MEX410R**

	<b>Material Group ISO 513</b>	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	<b>Hardness/Rm</b>	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
	<b>ap x ae</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>
	<b>Vc (m/min)</b>	<b>80÷120</b>	<b>50÷90</b>	<b>40÷60</b>	<b>20÷40</b>
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>2</b>	0.015	0.014	0.012	0.011
	<b>3</b>	0.023	0.021	0.018	0.016
	<b>4</b>	0.031	0.028	0.024	0.021
	<b>5</b>	0.034	0.031	0.028	0.024
	<b>6</b>	0.038	0.034	0.031	0.027
	<b>8</b>	0.050	0.045	0.040	0.035
	<b>10</b>	0.065	0.059	0.052	0.046
<b>12</b>	0.077	0.069	0.061	0.054	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

**MEXLS4R**

	<b>Material Group ISO 513</b>	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	<b>Hardness/Rm</b>	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
	<b>ap x ae</b>	<b>D x 0.1D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>
	<b>Vc (m/min)</b>	<b>70÷110</b>	<b>50÷90</b>	<b>40÷60</b>	<b>20÷40</b>
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>2</b>	0.014	0.013	0.012	0.010
	<b>3</b>	0.022	0.020	0.017	0.015
	<b>4</b>	0.029	0.026	0.023	0.020
	<b>5</b>	0.033	0.029	0.026	0.023
	<b>6</b>	0.036	0.033	0.029	0.025
	<b>8</b>	0.047	0.042	0.038	0.033
	<b>10</b>	0.060	0.054	0.048	0.042
	<b>12</b>	0.072	0.065	0.058	0.051
<b>16</b>	0.094	0.084	0.075	0.065	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# MEX610R

cylindrical shank, multi flute, short, corner radius

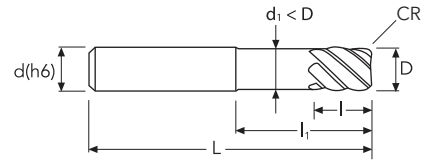


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
★		★			★

★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
6	0/-0.030	0.50	+/-0.020	6	6	14	5.80	50	6	MEX610R05060	●
8	0/-0.030	0.50	+/-0.020	8	8	24	7.80	60	6	MEX610R05080	●
10	0/-0.030	1.00	+/-0.020	10	10	30	9.80	70	6	MEX610R10100	●
12	0/-0.030	1.00	+/-0.020	12	12	30	11.80	75	6	MEX610R10120	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH**
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-stock standard ▽ stock exhaustion

CUTTING PARAMETERS

### MEX610R

	<b>Material Group ISO 513</b>	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	<b>Hardness/Rm</b>	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
	<b>ap x ae</b>	<b>D x 0.1D</b>	<b>D x 0.1D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>
	<b>Vc (m/min)</b>	<b>120÷160</b>	<b>90÷130</b>	<b>60÷100</b>	<b>50÷70</b>
	<b>D (mm)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>	<b>fz (mm/z)</b>
	<b>6</b>	0.018	0.016	0.014	0.013
	<b>8</b>	0.028	0.025	0.022	0.019
	<b>10</b>	0.034	0.030	0.027	0.024
<b>12</b>	0.041	0.037	0.033	0.029	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

**MEX611R**

	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
	ap x ae	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>
	Vc (m/min)	<b>100÷140</b>	<b>80÷120</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.015	0.014	0.012	0.011
	<b>8</b>	0.023	0.021	0.019	0.016
	<b>10</b>	0.029	0.026	0.023	0.020
<b>12</b>	0.035	0.031	0.028	0.024	

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS END-MILLS

CARBIDE BURRS





CUTTING PARAMETERS

# MHMB204

Material Group ISO 513		P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
Hardness/Rm		≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae		<b>0.05D x 0.1D</b>	<b>0.05D x 0.1D</b>	<b>0.05D x 0.1D</b>	<b>0.05D x 0.1D</b>
Vc (m/min)		<b>80÷120</b>	<b>60÷100</b>	<b>40÷80</b>	<b>20÷60</b>
D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>0.1</b>	0.04	0.004	0.004	0.003	0.003
<b>0.2</b>	0.09	0.006	0.005	0.005	0.004
<b>0.3</b>	0.13	0.008	0.007	0.006	0.006
<b>0.4</b>	0.17	0.010	0.009	0.008	0.007
<b>0.5</b>	0.22	0.012	0.011	0.010	0.008
<b>0.6</b>	0.26	0.015	0.014	0.012	0.011
<b>0.7</b>	0.31	0.018	0.016	0.014	0.013
<b>0.8</b>	0.35	0.020	0.018	0.016	0.014
<b>0.9</b>	0.39	0.023	0.021	0.018	0.016
<b>1</b>	0.44	0.026	0.023	0.020	0.017
<b>1.5</b>	0.79	0.040	0.036	0.030	0.026
<b>2</b>	1.20	0.055	0.050	0.041	0.036



	α	n (rpm)	Vf (mm/min)
	15°	x 1.1	x 1.1

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

### MHMB206

	Material Group ISO 513		P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm		≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
	ap x ae		<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>
	Vc (m/min)		<b>80÷120</b>	<b>60÷100</b>	<b>40÷80</b>	<b>20÷60</b>
	D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>0.4</b>	0.17	0.010	0.009	0.008	0.007
	<b>0.5</b>	0.22	0.012	0.011	0.010	0.008
<b>0.6</b>	0.26	0.015	0.014	0.012	0.011	
<b>0.8</b>	0.35	0.020	0.018	0.016	0.014	

	$\alpha$	n (rpm)	Vf (mm/min)
	15°	x 1.1	x 1.1

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

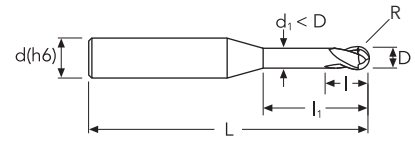
HSS END-MILLS

CARBIDE BURRS

INFO

# MHLNB2

cylindrical shank, 2 flutes ball nose, extended and reduced neck, miniature

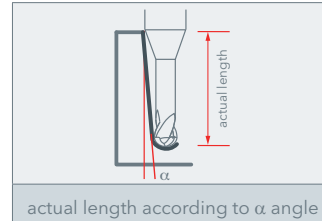


CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
★		★			★

★ 1st choice ★ suitable



HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

D	D Tol.	R	R Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
0.2	0/-0.015	0.10	0/-0.020	4	0.2	0.5	0.17	50	2	0.57	0.58	0.60	0.62	0.66	MHLNB2002005	●
0.2	0/-0.015	0.10	0/-0.020	4	0.2	1	0.17	50	2	1.08	1.12	1.15	1.19	1.27	MHLNB200201	●
0.2	0/-0.015	0.10	0/-0.020	4	0.2	1.5	0.17	50	2	1.60	1.65	1.71	1.76	1.89	MHLNB2002015	●
0.3	0/-0.015	0.15	0/-0.020	4	0.3	1	0.27	50	2	1.08	1.11	1.15	1.18	1.26	MHLNB200301	●
0.3	0/-0.015	0.15	0/-0.020	4	0.3	2	0.27	50	2	2.12	2.18	2.25	2.33	2.49	MHLNB200302	●
0.3	0/-0.015	0.15	0/-0.020	4	0.3	3	0.27	50	2	3.15	3.25	3.36	3.48	3.73	MHLNB200303	●
0.4	0/-0.015	0.20	0/-0.020	4	0.4	1	0.37	50	2	1.08	1.11	1.14	1.18	1.25	MHLNB200401	●
0.4	0/-0.015	0.20	0/-0.020	4	0.4	2	0.37	50	2	2.11	2.18	2.25	2.32	2.48	MHLNB200402	●
0.4	0/-0.015	0.20	0/-0.020	4	0.4	3	0.37	50	2	3.15	3.25	3.36	3.47	3.72	MHLNB200403	●
0.4	0/-0.015	0.20	0/-0.020	4	0.4	4	0.37	50	2	4.18	4.32	4.46	4.62	4.95	MHLNB200404	●
0.4	0/-0.015	0.20	0/-0.020	4	0.4	5	0.37	50	2	5.21	5.39	5.57	5.77	6.18	MHLNB200405	●
0.5	0/-0.015	0.25	0/-0.020	4	0.4	2	0.45	50	2	2.15	2.22	2.29	2.36	2.52	MHLNB200502	●
0.5	0/-0.015	0.25	0/-0.020	4	0.4	3	0.45	50	2	3.18	3.29	3.39	3.51	3.75	MHLNB200503	●
0.5	0/-0.015	0.25	0/-0.020	4	0.4	4	0.45	50	2	4.22	4.35	4.50	4.65	4.98	MHLNB200504	●
0.5	0/-0.015	0.25	0/-0.020	4	0.4	5	0.45	50	2	5.25	5.42	5.61	5.80	6.22	MHLNB200505	●
0.5	0/-0.015	0.25	0/-0.020	4	0.4	6	0.45	50	2	6.28	6.49	6.71	6.95	7.45	MHLNB200506	●
0.5	0/-0.015	0.25	0/-0.020	4	0.4	8	0.45	50	2	8.35	8.63	8.93	9.24	9.92	MHLNB200508	●
0.6	0/-0.015	0.30	0/-0.020	4	0.5	2	0.55	50	2	2.15	2.21	2.28	2.35	2.50	MHLNB200602	●
0.6	0/-0.015	0.30	0/-0.020	4	0.5	3	0.55	50	2	3.18	3.28	3.39	3.50	3.74	MHLNB200603	●
0.6	0/-0.015	0.30	0/-0.020	4	0.5	4	0.55	50	2	4.22	4.35	4.49	4.65	4.97	MHLNB200604	●
0.6	0/-0.015	0.30	0/-0.020	4	0.5	5	0.55	50	2	5.25	5.42	5.60	5.79	6.21	MHLNB200605	●
0.6	0/-0.015	0.30	0/-0.020	4	0.5	6	0.55	50	2	6.28	6.49	6.71	6.94	7.44	MHLNB200606	●
0.6	0/-0.015	0.30	0/-0.020	4	0.5	8	0.55	50	2	8.35	8.63	8.92	9.23	9.91	MHLNB200608	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	2	0.75	50	2	2.15	2.21	2.27	2.34	2.48	MHLNB200802	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	4	0.75	50	2	4.21	4.34	4.48	4.63	4.95	MHLNB200804	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	5	0.75	50	2	5.25	5.41	5.59	5.78	6.18	MHLNB200805	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	6	0.75	50	2	6.28	6.48	6.70	6.93	7.42	MHLNB200806	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	7	0.75	50	2	7.31	7.55	7.81	8.07	8.65	MHLNB200807	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	8	0.75	50	2	8.35	8.62	8.91	9.22	9.88	MHLNB200808	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	10	0.75	50	2	10.41	10.76	11.13	11.51	12.35	MHLNB200810	●
1	0/-0.015	0.50	0/-0.020	4	0.8	3	0.9	50	2	3.27	3.37	3.47	3.57	3.80	MHLNB201003	●
1	0/-0.015	0.50	0/-0.020	4	0.8	4	0.9	50	2	4.31	4.44	4.58	4.72	5.04	MHLNB201004	●
1	0/-0.015	0.50	0/-0.020	4	0.8	5	0.9	50	2	5.34	5.51	5.68	5.87	6.27	MHLNB201005	●
1	0/-0.015	0.50	0/-0.020	4	0.8	6	0.9	50	2	6.37	6.58	6.79	7.02	7.50	MHLNB201006	●
1	0/-0.015	0.50	0/-0.020	4	0.8	7	0.9	50	2	7.41	7.64	7.90	8.16	8.74	MHLNB201007	●
1	0/-0.015	0.50	0/-0.020	4	0.8	8	0.9	50	2	8.44	8.71	9.00	9.31	9.97	MHLNB201008	●
1	0/-0.015	0.50	0/-0.020	4	0.8	9	0.9	50	2	9.47	9.78	10.11	10.46	11.21	MHLNB201009	●
1	0/-0.015	0.50	0/-0.020	4	0.8	10	0.9	50	2	10.51	10.85	11.22	11.61	12.44	MHLNB201010	●
1	0/-0.015	0.50	0/-0.020	4	0.8	12	0.9	50	2	12.57	12.99	13.43	13.90	14.91	MHLNB201012	●

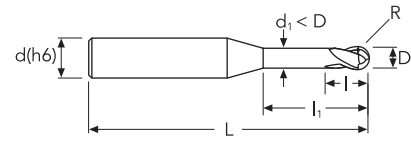
● stock standard ○ non-standard stock ▽ stock exhaustion

# MHLNB2

cylindrical shank, 2 flutes ball nose, extended and reduced neck, miniature

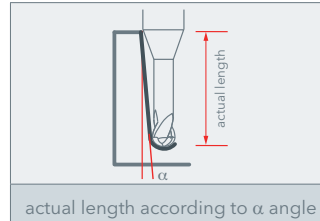


INFO



P	M	K	N	S	H
★		★			★

★ 1st choice ★ suitable



D	D Tol.	R	R Tol.	d(h6)	l	l1	d1	L	z	30°	1°	1°30'	2°	3°	EDP No.	Stock
1	0/-0.015	0.50	0/-0.020	4	0.8	14	0.9	50	2	14.64	15.13	15.65	16.19	17.37	MHLNB201014	●
1	0/-0.015	0.50	0/-0.020	4	0.8	16	0.9	50	2	16.71	17.27	17.86	18.49	19.84	MHLNB201016	●
1	0/-0.015	0.50	0/-0.020	4	0.8	20	0.9	60	2	20.84	21.55	22.29	23.08	24.78	MHLNB201020	●
1.2	0/-0.015	0.60	0/-0.020	4	1.0	6	1.1	50	2	6.37	6.57	6.78	7.00	7.48	MHLNB201206	●
1.2	0/-0.015	0.60	0/-0.020	4	1.0	8	1.1	50	2	8.44	8.71	8.99	9.30	9.95	MHLNB201208	●
1.2	0/-0.015	0.60	0/-0.020	4	1.0	10	1.1	50	2	10.50	10.85	11.21	11.59	12.42	MHLNB201210	●
1.2	0/-0.015	0.60	0/-0.020	4	1.0	12	1.1	50	2	12.57	12.98	13.42	13.89	14.88	MHLNB201212	●
1.4	0/-0.015	0.70	0/-0.020	4	1.1	8	1.3	50	2	8.43	8.70	8.98	9.28	9.93	MHLNB201408	●
1.4	0/-0.015	0.70	0/-0.020	4	1.1	12	1.3	50	2	12.57	12.98	13.41	13.87	14.86	MHLNB201412	●
1.4	0/-0.015	0.70	0/-0.020	4	1.1	16	1.3	50	2	16.70	17.26	17.84	18.46	19.80	MHLNB201416	●
1.5	0/-0.015	0.75	0/-0.020	4	1.2	8	1.4	50	2	8.43	8.70	8.98	9.27	9.91	MHLNB201508	●
1.5	0/-0.015	0.75	0/-0.020	4	1.2	12	1.4	50	2	12.57	12.97	13.41	13.86	14.85	MHLNB201512	●
1.5	0/-0.015	0.75	0/-0.020	4	1.2	16	1.4	50	2	16.70	17.25	17.84	18.45	19.78	MHLNB201516	●
1.5	0/-0.015	0.75	0/-0.020	4	1.2	18	1.4	60	2	18.77	19.39	20.05	20.75	22.25	MHLNB201518	●
1.5	0/-0.015	0.75	0/-0.020	6	2.4	20	1.4	50	2	20.84	21.53	22.26	23.04	24.72	MHLNB201520	●
1.6	0/-0.015	0.80	0/-0.020	4	1.3	8	1.5	50	2	8.43	8.69	8.97	9.27	9.90	MHLNB201608	●
1.6	0/-0.015	0.80	0/-0.020	4	1.3	12	1.5	50	2	12.56	12.97	13.40	13.86	14.84	MHLNB201612	●
1.6	0/-0.015	0.80	0/-0.020	4	1.3	16	1.5	50	2	16.70	17.25	17.83	18.45	19.77	MHLNB201616	●
1.6	0/-0.015	0.80	0/-0.020	4	1.3	20	1.5	60	2	20.83	21.53	22.26	23.03	-	MHLNB201620	●
1.8	0/-0.015	0.90	0/-0.020	4	1.4	8	1.7	50	2	8.43	8.69	8.96	9.25	9.88	MHLNB201808	●
1.8	0/-0.015	0.90	0/-0.020	4	1.4	12	1.7	50	2	12.56	12.96	13.39	13.84	14.81	MHLNB201812	●
1.8	0/-0.015	0.90	0/-0.020	4	1.4	16	1.7	50	2	16.70	17.24	17.82	18.43	19.75	MHLNB201816	●
1.8	0/-0.015	0.90	0/-0.020	4	1.4	20	1.7	60	2	20.83	21.52	22.25	23.02	-	MHLNB201820	●
2	0/-0.015	1.00	0/-0.020	4	1.6	4	1.9	50	2	4.29	4.40	4.52	4.65	4.92	MHLNB202004	●
2	0/-0.015	1.00	0/-0.020	4	1.6	6	1.9	50	2	6.36	6.54	6.74	6.94	7.39	MHLNB202006	●
2	0/-0.015	1.00	0/-0.020	4	1.6	8	1.9	50	2	8.42	8.68	8.95	9.24	9.86	MHLNB202008	●
2	0/-0.015	1.00	0/-0.020	4	1.6	10	1.9	50	2	10.49	10.82	11.17	11.53	12.32	MHLNB202010	●
2	0/-0.015	1.00	0/-0.020	4	1.6	12	1.9	50	2	12.56	12.96	13.38	13.83	14.79	MHLNB202012	●
2	0/-0.015	1.00	0/-0.020	4	1.6	14	1.9	50	2	14.62	15.10	15.59	16.12	17.26	MHLNB202014	●
2	0/-0.015	1.00	0/-0.020	4	1.6	16	1.9	50	2	16.69	17.23	17.81	18.42	19.73	MHLNB202016	●
2	0/-0.015	1.00	0/-0.020	4	1.6	18	1.9	60	2	18.76	19.37	20.02	20.71	-	MHLNB202018	●
2	0/-0.015	1.00	0/-0.020	4	1.6	20	1.9	60	2	20.83	21.51	22.24	23.00	-	MHLNB202020	●
2	0/-0.015	1.00	0/-0.020	4	1.6	22	1.9	60	2	22.89	23.65	24.45	25.30	-	MHLNB202022	●
2	0/-0.015	1.00	0/-0.020	4	1.6	25	1.9	75	2	25.99	26.86	27.77	28.74	-	MHLNB202025	●
2	0/-0.015	1.00	0/-0.020	4	1.6	30	1.9	75	2	31.16	32.21	33.31	-	-	MHLNB202030	●
3	0/-0.020	1.50	0/-0.020	6	2.4	8	2.8	50	2	8.60	8.84	9.10	9.37	9.96	MHLNB203008	●
3	0/-0.020	1.50	0/-0.020	6	2.4	10	2.8	50	2	10.67	10.98	11.32	11.67	12.43	MHLNB203010	●
3	0/-0.020	1.50	0/-0.020	6	2.4	12	2.8	50	2	12.73	13.12	13.53	13.96	14.90	MHLNB203012	●
3	0/-0.020	1.50	0/-0.020	6	2.4	16	2.8	60	2	16.87	17.40	17.96	18.55	19.83	MHLNB203016	●

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

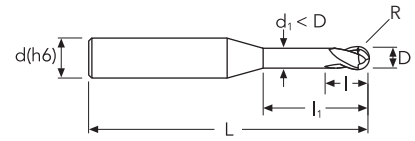
CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# MHLNB2

cylindrical shank, 2 flutes ball nose, extended and reduced neck, miniature

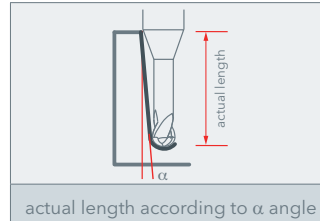


CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
★		★			★

★ 1st choice ★ suitable



D	D Tol.	R	R Tol.	d(h6)	l	l1	d1	L	z	30°	1°	1°30'	2°	3°	EDP No.	Stock
3	0/-0.020	1.50	0/-0.020	6	2.4	20	2.8	60	2	21.00	21.68	22.39	23.14	24.77	MHLNB203020	●
3	0/-0.020	1.50	0/-0.020	6	2.4	25	2.8	75	2	26.17	27.02	27.93	28.88	-	MHLNB203025	●
3	0/-0.020	1.50	0/-0.020	6	2.4	30	2.8	75	2	31.34	32.37	33.46	34.62	-	MHLNB203030	●
3	0/-0.020	1.50	0/-0.020	6	2.4	35	2.8	75	2	36.51	37.72	39.00	40.35	-	MHLNB203035	●
4	0/-0.020	2.00	0/-0.020	6	3.2	10	3.7	50	2	10.84	11.15	11.47	11.81	12.54	MHLNB204010	●
4	0/-0.020	2.00	0/-0.020	6	3.2	16	3.7	60	2	17.04	17.56	18.11	18.69	19.94	MHLNB204016	●
4	0/-0.020	2.00	0/-0.020	6	3.2	20	3.7	60	2	21.18	21.84	22.54	23.28	-	MHLNB204020	●
4	0/-0.020	2.00	0/-0.020	6	3.2	25	3.7	75	2	26.35	27.19	28.08	29.02	-	MHLNB204025	●
4	0/-0.020	2.00	0/-0.020	6	3.2	30	3.7	75	2	31.51	32.53	33.61	-	-	MHLNB204030	●
4	0/-0.020	2.00	0/-0.020	6	3.2	35	3.7	75	2	36.68	37.88	39.15	-	-	MHLNB204035	●
4	0/-0.020	2.00	0/-0.020	6	3.2	40	3.7	100	2	41.85	43.23	-	-	-	MHLNB204040	●
4	0/-0.020	2.00	0/-0.020	6	3.2	45	3.7	100	2	47.02	48.57	-	-	-	MHLNB204045	●
4	0/-0.020	2.00	0/-0.020	6	3.2	50	3.7	100	2	52.19	53.92	-	-	-	MHLNB204050	●

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

MHLNB2

Material Group ISO 513				P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3			
Hardness/Rm				≤45 HRC				45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae				ap x 0.2D				ap x 0.2D	ap x 0.2D	ap x 0.2D
Vc (m/min)				140÷160				110÷130	80÷100	50÷70
D (mm)	I1 (mm)	ap (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)			
0.2	≤ 6D	0.01	0.09	0.008	0.007	0.006	0.006			
	≤ 8D	0.01	0.08	0.007	0.006	0.005	0.005			
	≤ 10D	0.01	0.07	0.006	0.005	0.004	0.004			
0.3	≤ 6D	0.02	0.13	0.010	0.009	0.008	0.007			
	≤ 8D	0.01	0.12	0.009	0.007	0.006	0.006			
	≤ 10D	0.01	0.11	0.008	0.006	0.005	0.004			
0.4	≤ 6D	0.02	0.17	0.013	0.012	0.010	0.009			
	≤ 8D	0.02	0.16	0.012	0.009	0.008	0.007			
	≤ 10D	0.01	0.15	0.010	0.007	0.007	0.006			
0.5	≤ 6D	0.03	0.22	0.017	0.015	0.014	0.012			
	≤ 8D	0.02	0.20	0.015	0.012	0.011	0.010			
	≤ 10D	0.02	0.18	0.014	0.010	0.009	0.008			
0.6	≤ 6D	0.03	0.26	0.021	0.019	0.017	0.015			
	≤ 8D	0.03	0.24	0.019	0.015	0.014	0.012			
	≤ 10D	0.02	0.22	0.017	0.012	0.011	0.009			
0.8	≤ 6D	0.04	0.35	0.025	0.023	0.020	0.018			
	≤ 8D	0.03	0.32	0.023	0.018	0.016	0.014			
	≤ 10D	0.03	0.29	0.020	0.014	0.013	0.011			
1	≤ 6D	0.05	0.44	0.030	0.027	0.024	0.021			
	≤ 8D	0.04	0.40	0.027	0.022	0.019	0.017			
	≤ 10D	0.04	0.37	0.024	0.017	0.015	0.013			
	≤ 12D	0.03	0.33	0.021	0.013	0.012	0.010			
	>12D	0.02	0.30	0.018	0.010	0.009	0.008			
1.2	≤ 6D	0.06	0.52	0.035	0.032	0.028	0.025			
	≤ 8D	0.05	0.48	0.032	0.026	0.023	0.020			
	≤ 10D	0.04	0.44	0.028	0.020	0.018	0.016			
	≤ 12D	0.03	0.39	0.025	0.015	0.014	0.012			
	>12D	0.03	0.36	0.021	0.011	0.010	0.009			
1.5	≤ 6D	0.08	0.65	0.045	0.041	0.036	0.032			
	≤ 8D	0.06	0.61	0.041	0.033	0.029	0.026			
	≤ 10D	0.05	0.55	0.036	0.026	0.023	0.020			
	≤ 12D	0.04	0.49	0.032	0.020	0.018	0.015			
	>12D	0.03	0.44	0.027	0.015	0.013	0.011			
2	≤ 6D	0.10	0.87	0.060	0.054	0.048	0.042			
	≤ 8D	0.09	0.81	0.054	0.044	0.039	0.034			
	≤ 10D	0.07	0.74	0.048	0.035	0.031	0.027			
	≤ 12D	0.06	0.65	0.042	0.026	0.024	0.021			
	>12D	0.05	0.59	0.036	0.019	0.017	0.015			
2.5	≤ 6D	0.13	1.09	0.060	0.054	0.048	0.042			
	≤ 8D	0.11	1.01	0.054	0.044	0.039	0.034			
	≤ 10D	0.09	0.92	0.048	0.035	0.031	0.027			
	≤ 12D	0.07	0.82	0.042	0.026	0.024	0.021			
	>12D	0.06	0.74	0.036	0.019	0.017	0.015			
3	≤ 6D	0.15	1.31	0.075	0.068	0.060	0.053			
	≤ 8D	0.13	1.21	0.068	0.055	0.049	0.043			
	≤ 10D	0.11	1.10	0.060	0.043	0.038	0.034			
	≤ 12D	0.08	0.98	0.053	0.033	0.029	0.026			
>12D	0.07	0.89	0.045	0.024	0.022	0.019				



	α	n (rpm)	Vf (mm/min)
	45°	x 1.65	x 1.65
	30°	x 1.30	x 1.30
	15°	x 1.15	x 1.15

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

## MHLNB2

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

	Material Group ISO 513				P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm				≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
	ap x ae				ap x 0.2D		ap x 0.2D	
	Vc (m/min)				140÷160		110÷130	
	D (mm)	I1 (mm)	ap (mm)	D(eff.) (mm)	fz (mm/z)		fz (mm/z)	
4	≤ 6D	0.20	1.74	0.095		0.086		
	≤ 8D	0.17	1.61	0.086		0.069		
	≤ 10D	0.14	1.47	0.076		0.055		
	≤ 12D	0.11	1.31	0.067		0.042		
	>12D	0.09	1.19	0.057		0.031		

	α	n (rpm)	Vf (mm/min)
	45°	x 1.65	x 1.65
	30°	x 1.30	x 1.30
	15°	x 1.15	x 1.15

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

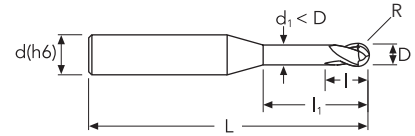
HSS  
END-MILLS

CARBIDE  
BURRS



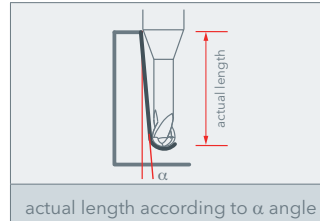
# MHCRB2

cylindrical shank, 2 flutes ball nose, extended and reduced neck, miniature, 6 mm. shank



P	M	K	N	S	H
★		★			★

★ 1st choice ★ suitable



D	D Tol.	R	R Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
0.5	0/-0.012	0.25	+/-0.005	6	0.5	2	0.45	50	2	2.15	2.22	2.29	2.36	2.52	MHCRB20050206	●
0.5	0/-0.012	0.25	+/-0.005	6	0.5	4	0.45	50	2	4.22	4.35	4.50	4.65	4.98	MHCRB20050406	●
0.6	0/-0.012	0.30	+/-0.005	6	0.5	2	0.55	50	2	2.15	2.21	2.28	2.35	2.50	MHCRB20060206	●
0.6	0/-0.012	0.30	+/-0.005	6	0.5	4	0.55	50	2	4.22	4.35	4.49	4.65	4.97	MHCRB20060406	●
0.6	0/-0.012	0.30	+/-0.005	6	0.5	6	0.55	50	2	6.28	6.49	6.71	6.94	7.44	MHCRB20060606	●
0.8	0/-0.012	0.40	+/-0.005	6	0.8	2	0.75	50	2	2.15	2.21	2.27	2.34	2.48	MHCRB20080206	●
0.8	0/-0.012	0.40	+/-0.005	6	0.8	4	0.75	50	2	4.21	4.34	4.48	4.63	4.95	MHCRB20080406	●
0.8	0/-0.012	0.40	+/-0.005	6	0.8	6	0.75	50	2	6.28	6.48	6.70	6.93	7.42	MHCRB20080606	●
1	0/-0.012	0.50	+/-0.005	6	1	3	0.90	50	2	3.27	3.37	3.47	3.57	3.80	MHCRB20100306	●
1	0/-0.012	0.50	+/-0.005	6	1	6	0.90	50	2	6.37	6.58	6.79	7.02	7.50	MHCRB20100606	●
1	0/-0.012	0.50	+/-0.005	6	1	8	0.90	50	2	8.44	8.71	9.00	9.31	9.97	MHCRB20100806	●
1	0/-0.012	0.50	+/-0.005	6	1	10	0.90	50	2	10.51	10.85	11.22	11.61	12.44	MHCRB20101006	●
1.2	0/-0.012	0.60	+/-0.005	6	1.2	6	1.10	50	2	6.37	6.57	6.78	7.00	7.48	MHCRB20120606	●
1.2	0/-0.012	0.60	+/-0.005	6	1.2	8	1.10	50	2	8.44	8.71	8.99	9.30	9.95	MHCRB20120806	●
1.2	0/-0.012	0.60	+/-0.005	6	1.2	10	1.10	50	2	10.50	10.85	11.21	11.59	12.42	MHCRB20121006	●
1.5	0/-0.012	0.75	+/-0.005	6	1.5	4	1.40	50	2	4.30	4.42	4.55	4.68	4.98	MHCRB20150406	●
1.5	0/-0.012	0.75	+/-0.005	6	1.5	8	1.40	50	2	8.43	8.70	8.98	9.27	9.91	MHCRB20150806	●
1.5	0/-0.012	0.75	+/-0.005	6	1.5	10	1.40	50	2	10.50	10.84	11.19	11.57	12.38	MHCRB20151006	●
1.5	0/-0.012	0.75	+/-0.005	6	1.5	12	1.40	50	2	12.57	12.97	13.41	13.86	14.85	MHCRB20151206	●
1.5	0/-0.012	0.75	+/-0.005	6	1.5	16	1.40	50	2	16.70	17.25	17.84	18.45	19.78	MHCRB20151606	●
2	0/-0.012	1.00	+/-0.005	6	3	6	1.90	50	2	6.36	6.54	6.74	6.94	7.39	MHCRB20200606	●
2	0/-0.012	1.00	+/-0.005	6	3	8	1.90	50	2	8.42	8.68	8.95	9.24	9.86	MHCRB20200806	●
2	0/-0.012	1.00	+/-0.005	6	3	10	1.90	50	2	10.49	10.82	11.17	11.53	12.32	MHCRB20201006	●
2	0/-0.012	1.00	+/-0.005	6	3	12	1.90	50	2	12.56	12.96	13.38	13.83	14.79	MHCRB20201206	●
2	0/-0.012	1.00	+/-0.005	6	3	16	1.90	50	2	16.69	17.23	17.81	18.42	19.73	MHCRB20201606	●
2	0/-0.012	1.00	+/-0.005	6	3	20	1.90	50	2	20.83	21.51	22.24	23.00	24.66	MHCRB20202006	●

INFO

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

### MHCRB2

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

Material Group ISO 513				P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3			
Hardness/Rm				≤45 HRC				45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae				ap x 0.2D				ap x 0.2D	ap x 0.2D	ap x 0.2D
Vc (m/min)				140÷160				110÷130	80÷100	50÷70
D (mm)	l1 (mm)	ap (mm)	D(eff.) (mm)	fz (mm/z)		fz (mm/z)		fz (mm/z)		
0.5	≤ 6D	0.03	0.22	0.020		0.018		0.016		
	≤ 8D	0.02	0.20	0.018		0.015		0.013		
	≤ 10D	0.02	0.18	0.016		0.012		0.010		
0.6	≤ 6D	0.03	0.26	0.022		0.020		0.018		
	≤ 8D	0.03	0.24	0.020		0.016		0.014		
	≤ 10D	0.02	0.22	0.018		0.013		0.011		
0.8	≤ 6D	0.04	0.35	0.025		0.023		0.020		
	≤ 8D	0.03	0.32	0.023		0.018		0.016		
	≤ 10D	0.03	0.29	0.020		0.014		0.013		
1	≤ 6D	0.05	0.44	0.030		0.027		0.024		
	≤ 8D	0.04	0.40	0.027		0.022		0.019		
	≤ 10D	0.04	0.37	0.024		0.017		0.015		
	≤ 12D	0.03	0.33	0.021		0.013		0.012		
	>12D	0.02	0.30	0.018		0.010		0.009		
1.2	≤ 6D	0.06	0.52	0.035		0.032		0.028		
	≤ 8D	0.05	0.48	0.032		0.026		0.023		
	≤ 10D	0.04	0.44	0.028		0.020		0.018		
	≤ 12D	0.03	0.39	0.025		0.015		0.014		
1.5	>12D	0.03	0.36	0.021		0.011		0.010		
	≤ 6D	0.08	0.65	0.045		0.041		0.036		
	≤ 8D	0.06	0.61	0.041		0.033		0.029		
	≤ 10D	0.05	0.55	0.036		0.026		0.023		
2	≤ 12D	0.04	0.49	0.032		0.020		0.018		
	>12D	0.03	0.44	0.027		0.015		0.013		
	≤ 6D	0.10	0.87	0.060		0.054		0.048		
	≤ 8D	0.09	0.81	0.054		0.044		0.039		
	≤ 10D	0.07	0.74	0.048		0.035		0.031		
2	≤ 12D	0.06	0.65	0.042		0.026		0.024		
	>12D	0.05	0.59	0.036		0.019		0.017		
	≥ 15D	0.06	0.06	0.030		0.027		0.024		

	α	n (rpm)	Vf (mm/min)
	45°	x 1.65	x 1.65
	30°	x 1.30	x 1.30
	15°	x 1.15	x 1.15



INFO

## MEXCSB2

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm		≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae		<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>
Vc (m/min)		<b>120÷160</b>	<b>80÷120</b>	<b>60÷100</b>	<b>50÷70</b>
D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.44	0.009	0.008	0.007	0.006
<b>1.5</b>	0.79	0.012	0.011	0.010	0.008
<b>2</b>	1.20	0.012	0.011	0.010	0.008
<b>2.5</b>	1.65	0.015	0.014	0.012	0.011
<b>3</b>	2.14	0.018	0.016	0.014	0.013
<b>4</b>	3.20	0.025	0.023	0.020	0.018
<b>5</b>	4.33	0.032	0.029	0.026	0.022
<b>6</b>	5.50	0.038	0.034	0.030	0.027
<b>8</b>	7.84	0.048	0.043	0.038	0.034
<b>10</b>	10.00	0.057	0.051	0.046	0.040
<b>12</b>	11.76	0.067	0.060	0.054	0.047
<b>14</b>	12.83	0.080	0.072	0.064	0.056
<b>16</b>	12.80	0.095	0.086	0.076	0.067
<b>18</b>	10.80	0.108	0.097	0.086	0.076
<b>20</b>	12.00	0.108	0.097	0.086	0.076

HSS  
DRILLS



$\alpha$	n (rpm)	Vf (mm/min)
15°	x 1.1	x 1.1

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

## MEXCLSB2

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm		≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae		<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>
Vc (m/min)		<b>100÷140</b>	<b>80÷120</b>	<b>60÷80</b>	<b>40÷60</b>
D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.44	0.015	0.014	0.012	0.011
<b>2</b>	0.87	0.021	0.019	0.017	0.015
<b>3</b>	1.31	0.027	0.024	0.022	0.019
<b>4</b>	1.74	0.037	0.033	0.029	0.026
<b>5</b>	2.18	0.045	0.041	0.036	0.032
<b>6</b>	2.62	0.051	0.046	0.041	0.036
<b>8</b>	3.49	0.060	0.054	0.048	0.042
<b>10</b>	4.36	0.068	0.061	0.054	0.048
<b>12</b>	5.23	0.077	0.069	0.061	0.054
<b>14</b>	6.10	0.089	0.080	0.071	0.062
<b>16</b>	6.97	0.102	0.092	0.082	0.071
<b>18</b>	7.85	0.115	0.103	0.092	0.080
<b>20</b>	8.72	0.132	0.119	0.106	0.092

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



α	n (rpm)	Vf (mm/min)
30°	x 0.8	x 0.8
15°	x 0.7	x 0.7
0°	x 0.6	x 0.6

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# MEX253

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm		≤1000 N/mm <sup>2</sup>	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae		<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>
Vc (m/min)		<b>90÷130</b>	<b>60÷100</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.44	0.015	0.014	0.012	0.011
<b>2</b>	0.87	0.021	0.019	0.017	0.015
<b>3</b>	1.31	0.027	0.024	0.022	0.019
<b>4</b>	1.74	0.037	0.033	0.029	0.026
<b>5</b>	2.18	0.045	0.041	0.036	0.032
<b>6</b>	2.62	0.051	0.046	0.041	0.036
<b>8</b>	3.49	0.060	0.054	0.048	0.042
<b>10</b>	4.36	0.068	0.061	0.054	0.048
<b>12</b>	5.23	0.077	0.069	0.061	0.054
<b>14</b>	6.10	0.089	0.080	0.071	0.062
<b>16</b>	6.97	0.102	0.092	0.082	0.071
<b>18</b>	7.85	0.115	0.103	0.092	0.080
<b>20</b>	8.72	0.132	0.119	0.106	0.092

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



α	n (rpm)	Vf (mm/min)
30°	x 0.8	x 0.8
15°	x 0.7	x 0.7
0°	x 0.6	x 0.6

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
**MEX/MH**  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS





INFO

CARBIDE  
DRILLSPU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

## UH AND MH

STEEL AND HARDENED STEEL  
< 70 HRC (UH) AND 30÷ 70 HRC (MH)

🇩🇪 Nano micrograin and UH RED and MH, TiSi base coating for high performance milling on hardened steel up to 70 HRC. High reliability and long life in dry milling operation adopting high speed or high feed strategy. The cutting geometry has been specifically designed to obtain high precision and high quality surface finishing.

🇮🇹 Nano micrograna e rivestimento UH RED e MH, a base TiSi per la fresatura di materiali temprati sino a 70 HRC. Grande affidabilità e durata nell'utilizzo di strategie di lavorazione ad alta velocità o alto avanzamento e con la possibilità di evitare l'utilizzo del refrigerante. Le geometrie di taglio specifiche garantiscono elevata precisione ed eccellente finitura della superficie lavorata.

🇩🇪 Nano-Mikrokörnung und Beschichtung UH RED und MH auf TiSi-Basis für das Fräsen von gehärteten Materialien bis zu 70 HRC. Hohe Zuverlässigkeit und lange Standzeit auch bei Bearbeitungsverfahren mit hoher Geschwindigkeit und großem Vorschub und mit der Möglichkeit, ohne Kühlmittel zu arbeiten. Die spezifischen Schnittgeometrien gewährleisten eine hohe Präzision und eine hervorragende Endbearbeitung der bearbeiteten Fläche.

🇫🇷 Nano micrograin et revêtement UH RED et MH à base TiSi pour le fraisage de matériaux trempés jusqu'à 70 HRC. Grande fiabilité et durée dans l'utilisation stratégique d'usinage à haute vitesse ou avancement élevé et avec la possibilité d'éviter l'utilisation de lubrifiant. Les géométries de coupe spécifiques garantissent une précision élevée et une excellente finition de la surface usinée.

🇪🇸 Nano micrograno y revestimiento UH RED e MH a base de TiSi para el fresado de materiales templados hasta 70 HRC. Gran fiabilidad y duración en la utilización de estrategias de elaboración a alta velocidad o alto avance con la posibilidad de evitar la utilización del refrigerante. Las geometrías de corte específicas garantizan una elevada precisión y excelente acabado de la superficie trabajada.

🇷🇺 Нано-микрoзернистoсть и покрытие UH RED и MH на основе TiSi для фрезерования материалов с твердостью до 70 HRC. Высокая надежность и долговечность при использовании стратегий обработки с высокой скоростью или высокой подачей и с возможностью без использования СОЖ. Особая геометрия резания гарантирует высокую точность и отличное качество обработанной поверхности.


HSS  
DRILLSLFTA  
SUTA  
HSS-HSS/COCARBIDE  
END-MILLSG2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MHHSS  
END-MILLSCARBIDE  
BURRS



## CUTTING PARAMETERS

INFO

## UHM204

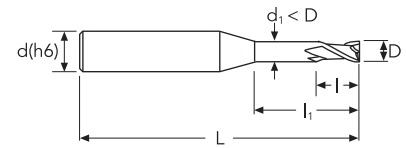
 SLOTTING	Material Group ISO 513		P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3				
	Hardness/Rm		≤45 HRC		45÷55 HRC		55÷60 HRC		60÷65 HRC	
	ap x ae		ap x D		ap x D		ap x D		ap x D	
	Vc (m/min)		80÷120		60÷100		50÷70		30÷50	
D (mm)	ap (mm)	fz (mm/z)		fz (mm/z)		fz (mm/z)		fz (mm/z)		
<b>0.1</b>	0.01	0.002		0.002		0.002		0.001		
<b>0.2</b>	0.01	0.003		0.003		0.002		0.002		
<b>0.3</b>	0.02	0.004		0.004		0.003		0.003		
<b>0.4</b>	0.02	0.006		0.005		0.005		0.004		
<b>0.5</b>	0.03	0.007		0.006		0.006		0.005		
<b>0.6</b>	0.03	0.008		0.007		0.006		0.006		
<b>0.8</b>	0.04	0.010		0.009		0.008		0.007		
<b>0.9</b>	0.05	0.012		0.011		0.010		0.008		

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
**UH/MH**
HSS  
END-MILLSCARBIDE  
BURRS

INFO

# UHLN2

cylindrical shank, 2F, extended and reduced neck

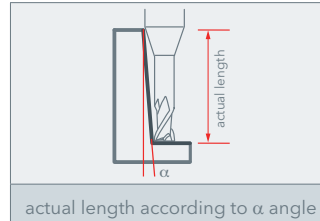


CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
☆		☆			★

★ 1st choice ☆ suitable



HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

D	D Tol.	C	C Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
0.2	0/-0.010			4	0.3	0.5	0.16	50	2	0.57	0.59	0.61	0.63	0.68	UHLN2002005	●
0.2	0/-0.010			4	0.3	1	0.16	50	2	1.09	1.12	1.16	1.21	1.30	UHLN200201	●
0.2	0/-0.010			4	0.3	1.5	0.16	50	2	1.60	1.66	1.72	1.78	1.91	UHLN2002015	●
0.3	0/-0.010			4	0.4	1	0.26	50	2	1.09	1.12	1.16	1.21	1.30	UHLN200301	●
0.3	0/-0.010			4	0.4	2	0.26	50	2	2.12	2.19	2.27	2.35	2.53	UHLN200302	●
0.3	0/-0.010			4	0.4	3	0.26	50	2	3.15	3.26	3.38	3.50	3.76	UHLN200303	●
0.4	0/-0.010			4	0.6	2	0.37	50	2	2.12	2.19	2.27	2.35	2.53	UHLN200402	●
0.4	0/-0.010			4	0.6	3	0.37	50	2	3.15	3.26	3.38	3.50	3.76	UHLN200403	●
0.4	0/-0.010			4	0.6	4	0.37	50	2	4.19	4.33	4.49	4.65	5.00	UHLN200404	●
0.4	0/-0.010			4	0.6	5	0.37	50	2	5.22	5.40	5.59	5.79	6.23	UHLN200405	●
0.5	0/-0.010			4	0.7	2	0.45	50	2	2.16	2.23	2.31	2.40	2.57	UHLN200502	●
0.5	0/-0.010			4	0.7	4	0.45	50	2	4.23	4.37	4.53	4.69	5.04	UHLN200504	●
0.5	0/-0.010			4	0.7	6	0.45	50	2	6.29	6.51	6.74	6.98	7.51	UHLN200506	●
0.5	0/-0.010			4	0.7	8	0.45	50	2	8.36	8.65	8.96	9.28	9.98	UHLN200508	●
0.6	0/-0.010			4	0.9	2	0.55	50	2	2.16	2.23	2.31	2.40	2.57	UHLN200602	●
0.6	0/-0.010			4	0.9	4	0.55	50	2	4.23	4.37	4.53	4.69	5.04	UHLN200604	●
0.6	0/-0.010			4	0.9	6	0.55	50	2	6.29	6.51	6.74	6.98	7.51	UHLN200606	●
0.6	0/-0.010			4	0.9	8	0.55	50	2	8.36	8.65	8.96	9.28	9.98	UHLN200608	●
0.6	0/-0.010			4	0.9	10	0.55	50	2	10.43	10.79	11.17	11.57	12.44	UHLN200610	●
0.7	0/-0.010			4	1.0	2	0.65	50	2	2.16	2.23	2.31	2.40	2.57	UHLN200702	●
0.7	0/-0.010			4	1.0	4	0.65	50	2	4.23	4.37	4.53	4.69	5.04	UHLN200704	●
0.7	0/-0.010			4	1.0	6	0.65	50	2	6.29	6.51	6.74	6.98	7.51	UHLN200706	●
0.7	0/-0.010			4	1.0	8	0.65	50	2	8.36	8.65	8.96	9.28	9.98	UHLN200708	●
0.7	0/-0.010			4	1.0	10	0.65	50	2	10.43	10.79	11.17	11.57	12.44	UHLN200710	●
0.8	0/-0.010			4	1.2	4	0.75	50	2	4.23	4.37	4.53	4.69	5.04	UHLN200804	●
0.8	0/-0.010			4	1.2	6	0.75	50	2	6.29	6.51	6.74	6.98	7.51	UHLN200806	●
0.8	0/-0.010			4	1.2	8	0.75	50	2	8.36	8.65	8.96	9.28	9.98	UHLN200808	●
0.8	0/-0.010			4	1.2	10	0.75	50	2	10.43	10.79	11.17	11.57	12.44	UHLN200810	●
0.8	0/-0.010			4	1.2	12	0.75	50	2	12.49	12.93	13.38	13.87	14.91	UHLN200812	●
0.9	0/-0.010			4	1.4	6	0.85	50	2	6.29	6.51	6.74	6.98	7.51	UHLN200906	●
0.9	0/-0.010			4	1.4	8	0.85	50	2	8.36	8.65	8.96	9.28	9.98	UHLN200908	●
0.9	0/-0.010			4	1.4	10	0.85	50	2	10.43	10.79	11.17	11.57	12.44	UHLN200910	●
0.9	0/-0.010			4	1.4	15	0.85	50	2	15.6	16.14	16.71	17.31	18.61	UHLN200915	●
1	0/-0.015			4	1.5	6	0.95	50	2	6.39	6.61	6.84	7.09	7.62	UHLN201006	●
1	0/-0.015			4	1.5	8	0.95	50	2	8.46	8.75	9.06	9.38	10.09	UHLN201008	●
1	0/-0.015			4	1.5	10	0.95	50	2	10.52	10.89	11.27	11.68	12.56	UHLN201010	●
1	0/-0.015			4	1.5	12	0.95	50	2	12.59	13.03	13.49	13.97	15.02	UHLN201012	●
1	0/-0.015			4	1.5	14	0.95	50	2	14.66	15.17	15.70	16.27	17.49	UHLN201014	●
1	0/-0.015			4	1.5	16	0.95	50	2	16.73	17.30	17.92	18.56	19.96	UHLN201016	●

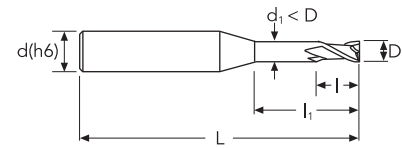
● stock standard ○ non-standard stock ▽ stock exhaustion

# UHLN2

cylindrical shank, 2F, extended and reduced neck

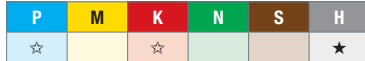


INFO

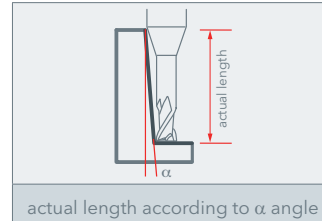


CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



★ 1st choice ☆ suitable



D	D Tol.	C	C Tol.	d(h6)	l	l1	d1	L	z	30°	1°	1°30'	2°	3°	EDP No.	Stock
1.2	0/-0.015			4	1.8	6	1.15	50	2	6.39	6.61	6.84	7.09	7.62	UHLN201206	●
1.2	0/-0.015			4	1.8	8	1.15	50	2	8.46	8.75	9.06	9.38	10.09	UHLN201208	●
1.2	0/-0.015			4	1.8	10	1.15	50	2	10.52	10.89	11.27	11.68	12.56	UHLN201210	●
1.2	0/-0.015			4	1.8	12	1.15	50	2	12.59	13.03	13.49	13.97	15.02	UHLN201212	●
1.4	0/-0.015			4	2.1	6	1.35	50	2	6.39	6.61	6.84	7.09	7.62	UHLN201406	●
1.4	0/-0.015			4	2.1	8	1.35	50	2	8.46	8.75	9.06	9.38	10.09	UHLN201408	●
1.4	0/-0.015			4	2.1	10	1.35	50	2	10.52	10.89	11.27	11.68	12.56	UHLN201410	●
1.4	0/-0.015			4	2.1	12	1.35	50	2	12.59	13.03	13.49	13.97	15.02	UHLN201412	●
1.4	0/-0.015			4	2.1	14	1.35	50	2	14.66	15.17	15.70	16.27	17.49	UHLN201414	●
1.4	0/-0.015			4	2.1	16	1.35	50	2	16.73	17.30	17.92	18.56	19.96	UHLN201416	●
1.5	0/-0.015			4	2.3	6	1.45	50	2	6.39	6.61	6.84	7.09	7.62	UHLN201506	●
1.5	0/-0.015			4	2.3	8	1.45	50	2	8.46	8.75	9.06	9.38	10.09	UHLN201508	●
1.5	0/-0.015			4	2.3	10	1.45	50	2	10.52	10.89	11.27	11.68	12.56	UHLN201510	●
1.5	0/-0.015			4	2.3	12	1.45	50	2	12.59	13.03	13.49	13.97	15.02	UHLN201512	●
1.5	0/-0.015			4	2.3	14	1.45	50	2	14.66	15.17	15.7	16.27	17.49	UHLN201514	●
1.5	0/-0.015			4	2.3	16	1.45	50	2	16.73	17.30	17.92	18.56	19.96	UHLN201516	●
1.5	0/-0.015			4	2.3	18	1.45	60	2	18.79	19.44	20.13	20.86	22.43	UHLN201518	●
1.5	0/-0.015			4	2.3	20	1.45	60	2	20.86	21.58	22.35	23.15	-	UHLN201520	●
1.6	0/-0.015			4	2.4	6	1.55	50	2	6.39	6.61	6.84	7.09	7.62	UHLN201606	●
1.6	0/-0.015			4	2.4	8	1.55	50	2	8.46	8.75	9.06	9.38	10.09	UHLN201608	●
1.6	0/-0.015			4	2.4	10	1.55	50	2	10.52	10.89	11.27	11.68	12.56	UHLN201610	●
1.6	0/-0.015			4	2.4	12	1.55	50	2	12.59	13.03	13.49	13.97	15.02	UHLN201612	●
1.6	0/-0.015			4	2.4	14	1.55	50	2	14.66	15.17	15.70	16.27	17.49	UHLN201614	●
1.6	0/-0.015			4	2.4	16	1.55	50	2	16.73	17.30	17.92	18.56	19.96	UHLN201616	●
1.6	0/-0.015			4	2.4	18	1.55	60	2	18.79	19.44	20.13	20.86	22.43	UHLN201618	●
1.6	0/-0.015			4	2.4	20	1.55	60	2	20.86	21.58	22.35	23.15	-	UHLN201620	●
1.8	0/-0.015			4	2.7	6	1.75	50	2	6.39	6.61	6.84	7.09	7.62	UHLN201806	●
1.8	0/-0.015			4	2.7	8	1.75	50	2	8.46	8.75	9.06	9.38	10.09	UHLN201808	●
1.8	0/-0.015			4	2.7	10	1.75	50	2	10.52	10.89	11.27	11.68	12.56	UHLN201810	●
1.8	0/-0.015			4	2.7	12	1.75	50	2	12.59	13.03	13.49	13.97	15.02	UHLN201812	●
1.8	0/-0.015			4	2.7	14	1.75	50	2	14.66	15.17	15.70	16.27	17.49	UHLN201814	●
1.8	0/-0.015			4	2.7	16	1.75	50	2	16.73	17.30	17.92	18.56	19.96	UHLN201816	●
1.8	0/-0.015			4	2.7	18	1.75	60	2	18.79	19.44	20.13	20.86	-	UHLN201818	●
1.8	0/-0.015			4	2.7	20	1.75	60	2	20.86	21.58	22.35	23.15	-	UHLN201820	●
2	0/-0.015			4	3	6	1.95	50	2	6.39	6.61	6.84	7.09	7.62	UHLN202006	●
2	0/-0.015			4	3	8	1.95	50	2	8.46	8.75	9.06	9.38	10.09	UHLN202008	●
2	0/-0.015			4	3	10	1.95	50	2	10.52	10.89	11.27	11.68	12.56	UHLN202010	●
2	0/-0.015			4	3	12	1.95	50	2	12.59	13.03	13.49	13.97	15.02	UHLN202012	●
2	0/-0.015			4	3	14	1.95	50	2	14.66	15.17	15.70	16.27	17.49	UHLN202014	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

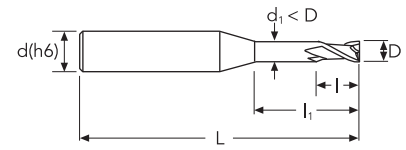
CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# UHLN2

cylindrical shank, 2F, extended and reduced neck

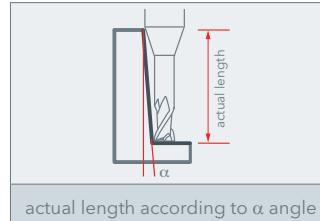


CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
☆		☆			★

★ 1st choice ☆ suitable



HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

D	D Tol.	C	C Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
2	0/-0.015			4	3	16	1.95	50	2	16.73	17.30	17.92	18.56	-	UHLN202016	●
2	0/-0.015			4	3	18	1.95	60	2	18.79	19.44	20.13	20.86	-	UHLN202018	●
2	0/-0.015			4	3	20	1.95	60	2	20.86	21.58	22.35	23.15	-	UHLN202020	●
2	0/-0.015			4	3	25	1.95	75	2	26.03	26.93	27.88	-	-	UHLN202025	●
2	0/-0.015			4	3	30	1.95	75	2	31.2	32.28	33.42	-	-	UHLN202030	●
2.5	0/-0.020			4	3.7	8	2.4	50	2	8.46	8.75	9.06	9.38	10.09	UHLN202508	●
2.5	0/-0.020			4	3.7	10	2.4	50	2	10.52	10.89	11.27	11.68	12.56	UHLN202510	●
2.5	0/-0.020			4	3.7	12	2.4	50	2	12.59	13.03	13.49	13.97	-	UHLN202512	●
2.5	0/-0.020			4	3.7	14	2.4	50	2	14.66	15.17	15.70	16.27	-	UHLN202514	●
2.5	0/-0.020			4	3.7	16	2.4	50	2	16.73	17.30	17.92	18.56	-	UHLN202516	●
2.5	0/-0.020			4	3.7	18	2.4	60	2	18.79	19.44	20.13	20.86	-	UHLN202518	●
2.5	0/-0.020			4	3.7	20	2.4	60	2	20.86	21.58	22.35	-	-	UHLN202520	●
2.5	0/-0.020			4	3.7	25	2.4	75	2	24.1	24.94	25.83	-	-	UHLN202525	●
2.5	0/-0.020			4	3.7	30	2.4	75	2	31.2	32.28	-	-	-	UHLN202530	●
3	0/-0.020			6	4.5	8	2.85	50	2	8.65	8.95	9.26	9.60	10.31	UHLN203008	●
3	0/-0.020			6	4.5	10	2.85	50	2	10.72	11.09	11.48	11.89	12.78	UHLN203010	●
3	0/-0.020			6	4.5	12	2.85	50	2	12.78	13.23	13.69	14.18	15.25	UHLN203012	●
3	0/-0.020			6	4.5	14	2.85	50	2	14.85	15.36	15.91	16.48	17.72	UHLN203014	●
3	0/-0.020			6	4.5	16	2.85	60	2	16.92	17.50	18.12	18.77	20.18	UHLN203016	●
3	0/-0.020			6	4.5	18	2.85	60	2	18.99	19.64	20.34	21.07	22.65	UHLN203018	●
3	0/-0.020			6	4.5	20	2.85	60	2	21.05	21.78	22.55	23.36	25.12	UHLN203020	●
3	0/-0.020			6	4.5	25	2.85	75	2	26.22	27.13	28.09	29.10	-	UHLN203025	●
4	0/-0.020			6	4.5	10	3.85	60	2	10.91	11.29	11.68	12.10	13.00	UHLN204010	●
4	0/-0.020			6	4.5	15	3.85	60	2	16.08	16.63	17.22	17.84	19.17	UHLN204015	●
4	0/-0.020			6	4.5	20	3.85	60	2	21.25	21.98	22.76	23.57	-	UHLN204020	●
4	0/-0.020			6	4.5	25	3.85	75	2	26.41	27.33	28.29	-	-	UHLN204025	●
4	0/-0.020			6	4.5	30	3.85	75	2	31.58	32.67	33.83	-	-	UHLN204030	●
4	0/-0.020			6	4.5	40	3.85	75	2	41.92	43.37	-	-	-	UHLN204040	●

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

**UHLN2**

Material Group ISO 513			P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3				
Hardness/Rm			≤45 HRC		45÷55 HRC		55÷60 HRC		60÷65 HRC	
ap x ae			ap x D		ap x D		ap x D		ap x D	
Vc (m/min)			80÷120		60÷100		50÷70		30÷50	
D (mm)	l1 (mm)	ap (mm)	fz (mm/z)		fz (mm/z)		fz (mm/z)		fz (mm/z)	
0.2	≤ 6D	0.01	0.003		0.003		0.002		0.002	
	≤ 8D	0.01	0.003		0.002		0.002		0.002	
	≤ 10D	0.01	0.002		0.002		0.002		0.001	
	≤ 12D	0.01	0.002		0.001		0.001		0.001	
0.3	≤ 6D	0.02	0.004		0.004		0.003		0.003	
	≤ 8D	0.01	0.003		0.003		0.003		0.002	
	≤ 10D	0.01	0.003		0.003		0.002		0.002	
	≤ 12D	0.01	0.002		0.002		0.002		0.002	
0.4	≤ 6D	0.02	0.006		0.005		0.005		0.004	
	≤ 8D	0.02	0.005		0.005		0.004		0.004	
	≤ 10D	0.01	0.004		0.004		0.003		0.003	
	≤ 12D	0.01	0.003		0.003		0.003		0.002	
0.5	≤ 6D	0.03	0.007		0.006		0.006		0.005	
	≤ 8D	0.02	0.006		0.005		0.005		0.004	
	≤ 10D	0.02	0.005		0.004		0.004		0.003	
	≤ 12D	0.01	0.004		0.003		0.003		0.003	
0.6	≤ 6D	0.03	0.008		0.007		0.006		0.006	
	≤ 8D	0.03	0.007		0.006		0.005		0.005	
	≤ 10D	0.02	0.006		0.005		0.004		0.004	
	≤ 12D	0.02	0.004		0.004		0.004		0.003	
0.8	≤ 6D	0.04	0.010		0.009		0.008		0.007	
	≤ 8D	0.03	0.009		0.008		0.007		0.006	
	≤ 10D	0.03	0.007		0.006		0.006		0.005	
	≤ 12D	0.02	0.006		0.005		0.004		0.004	
1	≤ 6D	0.05	0.012		0.011		0.010		0.008	
	≤ 8D	0.04	0.010		0.009		0.008		0.007	
	≤ 10D	0.04	0.008		0.008		0.007		0.006	
	≤ 12D	0.03	0.007		0.006		0.005		0.005	
1.2	≤ 6D	0.06	0.022		0.020		0.018		0.015	
	≤ 8D	0.05	0.019		0.017		0.015		0.013	
	≤ 10D	0.04	0.015		0.014		0.012		0.011	
	≤ 12D	0.03	0.012		0.011		0.010		0.008	
1.4	≤ 6D	0.07	0.024		0.022		0.019		0.017	
	≤ 8D	0.06	0.020		0.018		0.016		0.014	
	≤ 10D	0.05	0.017		0.015		0.013		0.012	
	≤ 12D	0.04	0.013		0.012		0.011		0.009	
	≤ 15D	0.03	0.011		0.010		0.009		0.008	
> 15D	0.02	0.007		0.006		0.006		0.005		
1.5	≤ 6D	0.08	0.025		0.023		0.020		0.018	
	≤ 8D	0.06	0.021		0.019		0.017		0.015	
	≤ 10D	0.05	0.018		0.016		0.014		0.012	
	≤ 12D	0.04	0.014		0.012		0.011		0.010	
	≤ 15D	0.03	0.011		0.010		0.009		0.008	
> 15D	0.02	0.008		0.007		0.006		0.005		
1.6	≤ 6D	0.08	0.026		0.023		0.021		0.018	
	≤ 8D	0.07	0.022		0.020		0.018		0.015	
	≤ 10D	0.06	0.018		0.016		0.015		0.013	
	≤ 12D	0.04	0.014		0.013		0.011		0.010	
	≤ 15D	0.04	0.012		0.011		0.009		0.008	
> 15D	0.02	0.008		0.007		0.006		0.005		



INFO

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS



INFO

# UHLN2

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS  
END-MILLS

CARBIDE  
BURRS

Material Group ISO 513			P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
Hardness/Rm			≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae			<b>ap x D</b>	<b>ap x D</b>	<b>ap x D</b>	<b>ap x D</b>
Vc (m/min)			<b>80÷120</b>	<b>60÷100</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	l1 (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1.8	≤ 6D	0.09	0.028	0.025	0.022	0.020
	≤ 8D	0.08	0.024	0.021	0.019	0.017
	≤ 10D	0.06	0.020	0.018	0.016	0.014
	≤ 12D	0.05	0.015	0.014	0.012	0.011
	≤ 15D	0.04	0.013	0.011	0.010	0.009
	> 15D	0.03	0.008	0.008	0.007	0.006
2	≤ 6D	0.10	0.030	0.027	0.024	0.021
	≤ 8D	0.09	0.026	0.023	0.020	0.018
	≤ 10D	0.07	0.021	0.019	0.017	0.015
	≤ 12D	0.06	0.017	0.015	0.013	0.012
	≤ 15D	0.05	0.014	0.012	0.011	0.009
	> 15D	0.03	0.009	0.008	0.007	0.006
2.5	≤ 6D	0.13	0.035	0.032	0.028	0.025
	≤ 8D	0.11	0.030	0.027	0.024	0.021
	≤ 10D	0.09	0.025	0.022	0.020	0.017
	≤ 12D	0.07	0.019	0.017	0.015	0.013
	≤ 15D	0.06	0.016	0.014	0.013	0.011
	> 15D	0.04	0.011	0.009	0.008	0.007
3	≤ 6D	0.15	0.040	0.036	0.032	0.028
	≤ 8D	0.13	0.034	0.031	0.027	0.024
	≤ 10D	0.11	0.028	0.025	0.022	0.020
	≤ 12D	0.08	0.022	0.020	0.018	0.015
	≤ 15D	0.07	0.018	0.016	0.014	0.013
	> 15D	0.05	0.012	0.011	0.010	0.008
4	≤ 6D	0.20	0.050	0.045	0.040	0.035
	≤ 8D	0.17	0.043	0.038	0.034	0.030
	≤ 10D	0.14	0.035	0.032	0.028	0.025
	≤ 12D	0.11	0.028	0.025	0.022	0.019
	≤ 15D	0.09	0.023	0.020	0.018	0.016
	> 15D	0.06	0.015	0.014	0.012	0.011





INFO

# UH600

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



	Material Group ISO 513	P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm	≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae	<b>1.5D x 0.1D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>
Vc (m/min)	<b>140÷180</b>	<b>100÷140</b>	<b>80÷100</b>	<b>60÷80</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.008	0.008	0.007	0.006	
<b>4</b>	0.012	0.011	0.010	0.008	
<b>5</b>	0.014	0.013	0.012	0.010	
<b>6</b>	0.018	0.016	0.014	0.013	
<b>8</b>	0.028	0.025	0.022	0.019	
<b>10</b>	0.034	0.030	0.027	0.024	
<b>12</b>	0.041	0.037	0.033	0.029	
<b>14</b>	0.048	0.043	0.038	0.034	
<b>16</b>	0.056	0.051	0.045	0.039	
<b>18</b>	0.066	0.059	0.053	0.046	
<b>20</b>	0.078	0.070	0.062	0.055	

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# UH612

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm	≤45 HRC	45÷55 HRC	55÷60 HRC
ap x ae	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>
Vc (m/min)	<b>90÷130</b>	<b>70÷110</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.007	0.006	0.006	0.005
<b>4</b>	0.010	0.009	0.008	0.007
<b>5</b>	0.012	0.011	0.010	0.009
<b>6</b>	0.015	0.014	0.012	0.011
<b>8</b>	0.023	0.021	0.019	0.016
<b>10</b>	0.029	0.026	0.023	0.020
<b>12</b>	0.035	0.031	0.028	0.024
<b>14</b>	0.041	0.037	0.033	0.029
<b>16</b>	0.048	0.043	0.038	0.034
<b>20</b>	0.066	0.060	0.053	0.046

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

## UHM206

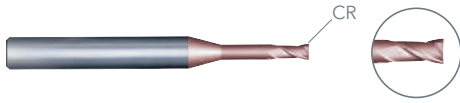
CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA


Material Group ISO 513		P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
Hardness/Rm		≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae		ap x D	ap x D	ap x D	ap x D
Vc (m/min)		80÷120	60÷100	50÷70	30÷50
D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>0.3</b>	0.02	0.004	0.004	0.003	0.003
<b>0.4</b>	0.02	0.006	0.005	0.005	0.004
<b>0.5</b>	0.03	0.007	0.006	0.006	0.005
<b>0.6</b>	0.03	0.008	0.007	0.006	0.006
<b>0.8</b>	0.04	0.010	0.009	0.008	0.007
<b>1</b>	0.05	0.012	0.011	0.010	0.008
<b>1.5</b>	0.08	0.025	0.023	0.020	0.018
<b>2</b>	0.10	0.030	0.027	0.024	0.021

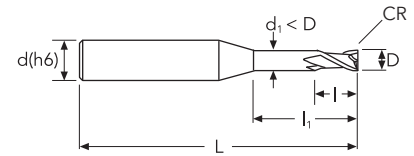
HSS  
DRILLSLFTA  
SUTA  
HSS-HSS/COCARBIDE  
END-MILLSG2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**HSS  
END-MILLSCARBIDE  
BURRS

# UH211

cylindrical shank, 2F, extended and reduced neck, corner radius



INFO

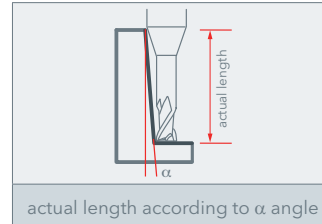


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
☆		☆			★

★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
1	0/-0.012	0.10	0/-0.010	4	2	4	0.95	50	2	4.36	4.60	4.86	5.16	5.89	UH2110100104	●
1	0/-0.012	0.10	0/-0.010	4	2	6	0.95	50	2	6.46	6.82	7.21	7.66	8.74	UH2110100106	●
1	0/-0.012	0.10	0/-0.010	4	2	8	0.90	50	2	8.45	8.73	9.00	9.27	9.81	UH2110100108	●
1	0/-0.012	0.20	0/-0.010	4	2	4	0.95	50	2	4.36	4.60	4.86	5.16	5.89	UH2110100204	●
1	0/-0.012	0.20	0/-0.010	4	2	8	0.95	50	2	8.57	9.04	9.56	10.15	11.18	UH2110100208	●
1	0/-0.012	0.30	0/-0.010	4	2	4	0.90	50	2	4.31	4.44	4.57	4.70	4.97	UH2110100304	●
1	0/-0.012	0.30	0/-0.010	4	2	8	0.95	50	2	8.57	9.04	9.56	10.15	11.18	UH2110100308	●
1.5	0/-0.012	0.10	0/-0.010	4	2.5	6	1.45	50	2	6.30	6.52	6.75	7.01	7.57	UH2110150106	●
1.5	0/-0.012	0.10	0/-0.010	4	2.5	10	1.45	50	2	10.43	10.8	11.19	11.61	12.55	UH2110150110	●
1.5	0/-0.012	0.20	0/-0.010	4	2.5	8	1.45	50	2	8.37	8.66	8.97	9.31	10.06	UH2110150208	●
1.5	0/-0.012	0.20	0/-0.010	4	2.5	12	1.45	50	2	12.50	12.94	13.40	13.91	15.03	UH2110150212	●
2	0/-0.012	0.10	0/-0.010	4	3	6	1.95	50	2	6.30	6.52	6.75	7.01	7.57	UH2110200106	●
2	0/-0.012	0.10	0/-0.010	4	3	12	1.95	50	2	12.50	12.94	13.40	13.91	15.03	UH2110200112	●
2	0/-0.012	0.20	0/-0.010	4	3	6	1.95	50	2	6.30	6.52	6.75	7.01	7.57	UH2110200206	●
2	0/-0.012	0.20	0/-0.010	4	3	12	1.95	50	2	12.50	12.94	13.40	13.91	15.03	UH2110200212	●
2	0/-0.012	0.30	0/-0.010	4	3	8	1.95	50	2	8.37	8.66	8.97	9.31	10.06	UH2110200308	●
2	0/-0.012	0.30	0/-0.010	4	3	12	1.95	50	2	12.50	12.94	13.40	13.91	15.03	UH2110200312	●
2	0/-0.012	0.30	0/-0.010	4	3	16	1.95	50	2	16.64	17.21	17.84	18.50	-	UH2110200316	●
2	0/-0.012	0.50	0/-0.010	4	3	6	1.95	50	2	6.30	6.52	6.75	7.01	7.57	UH2110200506	●
2	0/-0.012	0.50	0/-0.010	4	3	12	1.95	50	2	12.50	12.94	13.40	13.91	15.03	UH2110200512	●
3	0/-0.012	0.30	0/-0.010	6	4.5	10	2.80	55	2	10.71	11.04	11.38	11.72	12.40	UH2110300310	●
3	0/-0.012	0.30	0/-0.010	6	4.5	16	2.85	55	2	16.83	17.41	18.04	18.72	20.24	UH2110300316	●
3	0/-0.012	0.50	0/-0.010	6	4.5	10	2.85	55	2	10.63	11.00	11.39	11.82	12.78	UH2110300510	●
3	0/-0.012	0.50	0/-0.010	6	4.5	16	2.85	55	2	16.83	17.41	18.04	18.72	20.24	UH2110300516	●
4	0/-0.012	0.20	0/-0.010	6	6	20	3.85	60	2	20.96	21.69	22.48	23.32	-	UH2110400220	●
4	0/-0.012	0.30	0/-0.010	6	6	12	3.85	55	2	12.69	13.14	13.61	14.12	15.27	UH2110400312	●
4	0/-0.012	0.30	0/-0.010	6	6	20	3.85	60	2	20.96	21.69	22.48	23.32	-	UH2110400320	●
4	0/-0.012	0.50	0/-0.010	6	6	12	3.85	55	2	12.69	13.14	13.61	14.12	15.27	UH2110400512	●
4	0/-0.012	0.50	0/-0.010	6	6	20	3.85	60	2	20.96	21.69	22.48	23.32	-	UH2110400520	●
4	0/-0.012	1.00	0/-0.010	6	6	16	3.85	55	2	16.83	17.41	18.04	18.72	-	UH2110401016	●
6	0/-0.015	0.50	0/-0.010	6	9	15	5.85	60	2	-	-	-	-	-	UH2110600520	●
6	0/-0.015	1.00	0/-0.010	6	9	15	5.85	60	2	-	-	-	-	-	UH2110601020	●
6	0/-0.015	2.00	0/-0.010	6	9	15	5.85	60	2	-	-	-	-	-	UH2110602020	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# UH211

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

Material Group ISO 513			P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
Hardness/Rm			≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae			ap x D	ap x D	ap x D	ap x D
Vc (m/min)			80÷120	60÷100	50÷70	30÷50
D (mm)	l1 (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	≤ 6D	0.05	0.012	0.011	0.010	0.008
	≤ 8D	0.04	0.010	0.009	0.008	0.007
	≤ 10D	0.04	0.008	0.008	0.007	0.006
	≤ 12D	0.03	0.007	0.006	0.005	0.005
1.5	≤ 6D	0.08	0.025	0.023	0.020	0.018
	≤ 8D	0.06	0.021	0.019	0.017	0.015
	≤ 10D	0.05	0.018	0.016	0.014	0.012
	≤ 12D	0.04	0.014	0.012	0.011	0.010
	≤ 15D	0.03	0.011	0.010	0.009	0.008
> 15D	0.02	0.008	0.007	0.006	0.005	
2	≤ 6D	0.10	0.030	0.027	0.024	0.021
	≤ 8D	0.09	0.026	0.023	0.020	0.018
	≤ 10D	0.07	0.021	0.019	0.017	0.015
	≤ 12D	0.06	0.017	0.015	0.013	0.012
	≤ 15D	0.05	0.014	0.012	0.011	0.009
> 15D	0.03	0.009	0.008	0.007	0.006	
2.5	≤ 6D	0.13	0.035	0.032	0.028	0.025
	≤ 8D	0.11	0.030	0.027	0.024	0.021
	≤ 10D	0.09	0.025	0.022	0.020	0.017
	≤ 12D	0.07	0.019	0.017	0.015	0.013
	≤ 15D	0.06	0.016	0.014	0.013	0.011
> 15D	0.04	0.011	0.009	0.008	0.007	
3	≤ 6D	0.15	0.040	0.036	0.032	0.028
	≤ 8D	0.13	0.034	0.031	0.027	0.024
	≤ 10D	0.11	0.028	0.025	0.022	0.020
	≤ 12D	0.08	0.022	0.020	0.018	0.015
	≤ 15D	0.07	0.018	0.016	0.014	0.013
> 15D	0.05	0.012	0.011	0.010	0.008	
4	≤ 6D	0.20	0.050	0.045	0.040	0.035
	≤ 8D	0.17	0.043	0.038	0.034	0.030
	≤ 10D	0.14	0.035	0.032	0.028	0.025
	≤ 12D	0.11	0.028	0.025	0.022	0.019
	≤ 15D	0.09	0.023	0.020	0.018	0.016
> 15D	0.06	0.015	0.014	0.012	0.011	
6	≤ 6D	0.30	0.070	0.063	0.056	0.049
	≤ 8D	0.26	0.060	0.054	0.048	0.042
	≤ 10D	0.21	0.049	0.044	0.039	0.034
	≤ 12D	0.17	0.039	0.035	0.031	0.027
> 15D	0.14	0.032	0.028	0.025	0.022	

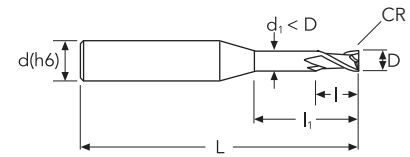


# UH212

cylindrical shank, 2F, extended and reduced neck, corner radius

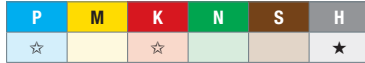


INFO

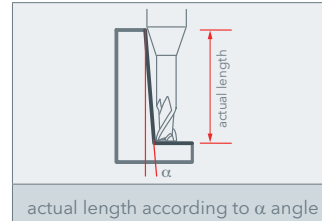


CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	I	I1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
0.2	0/-0.010	0.02	0/-0.010	4	0.3	0.5	0.16	50	2	0.57	0.59	0.6	0.62	0.66	UH21200202005	●
0.2	0/-0.010	0.02	0/-0.010	4	0.3	1	0.16	50	2	1.09	1.12	1.16	1.19	1.26	UH2120020201	●
0.2	0/-0.010	0.02	0/-0.010	4	0.3	1.5	0.16	50	2	1.60	1.65	1.71	1.76	1.86	UH21200202015	●
0.3	0/-0.010	0.03	0/-0.010	4	0.4	1	0.26	50	2	1.09	1.12	1.15	1.19	1.26	UH21200300301	●
0.3	0/-0.010	0.03	0/-0.010	4	0.4	2	0.26	50	2	2.12	2.19	2.26	2.32	2.46	UH21200300302	●
0.3	0/-0.010	0.03	0/-0.010	4	0.4	3	0.26	50	2	3.15	3.25	3.36	3.46	3.66	UH21200300303	●
0.4	0/-0.010	0.03	0/-0.010	4	0.6	2	0.37	50	2	2.12	2.19	2.26	2.32	2.46	UH21200400302	●
0.4	0/-0.010	0.03	0/-0.010	4	0.6	3	0.37	50	2	3.15	3.25	3.36	3.46	3.66	UH21200400303	●
0.4	0/-0.010	0.03	0/-0.010	4	0.6	4	0.37	50	2	4.19	4.32	4.46	4.59	4.86	UH21200400304	●
0.4	0/-0.010	0.03	0/-0.010	4	0.6	5	0.37	50	2	5.22	5.39	5.56	5.73	6.07	UH21200400305	●
0.5	0/-0.010	0.05	0/-0.010	4	0.7	2	0.45	50	2	2.16	2.23	2.29	2.36	2.50	UH21200500502	●
0.5	0/-0.010	0.05	0/-0.010	4	0.7	4	0.45	50	2	4.22	4.36	4.50	4.63	4.90	UH21200500504	●
0.5	0/-0.010	0.05	0/-0.010	4	0.7	6	0.45	50	2	6.29	6.49	6.70	6.90	7.31	UH21200500506	●
0.5	0/-0.010	0.05	0/-0.010	4	0.7	8	0.45	50	2	8.36	8.63	8.90	9.17	9.71	UH21200500508	●
0.6	0/-0.010	0.05	0/-0.010	4	0.9	2	0.55	50	2	2.16	2.23	2.29	2.36	2.50	UH21200600502	●
0.6	0/-0.010	0.05	0/-0.010	4	0.9	4	0.55	50	2	4.22	4.36	4.50	4.63	4.90	UH21200600504	●
0.6	0/-0.010	0.05	0/-0.010	4	0.9	6	0.55	50	2	6.29	6.49	6.70	6.90	7.31	UH21200600506	●
0.6	0/-0.010	0.05	0/-0.010	4	0.9	8	0.55	50	2	8.36	8.63	8.90	9.17	9.71	UH21200600508	●
0.6	0/-0.010	0.05	0/-0.010	4	0.9	10	0.55	50	2	10.43	10.76	11.10	11.44	12.12	UH21200600510	●
0.7	0/-0.010	0.08	0/-0.010	4	1.0	2	0.65	50	2	2.16	2.22	2.29	2.36	2.49	UH21200700802	●
0.7	0/-0.010	0.08	0/-0.010	4	1.0	4	0.65	50	2	4.22	4.36	4.49	4.63	4.90	UH21200700804	●
0.7	0/-0.010	0.08	0/-0.010	4	1.0	6	0.65	50	2	6.29	6.49	6.69	6.90	7.30	UH21200700806	●
0.7	0/-0.010	0.08	0/-0.010	4	1.0	8	0.65	50	2	8.36	8.63	8.90	9.17	9.71	UH21200700808	●
0.7	0/-0.010	0.08	0/-0.010	4	1.0	10	0.65	50	2	10.42	10.76	11.10	11.44	12.11	UH21200700810	●
0.8	0/-0.010	0.08	0/-0.010	4	1.2	4	0.75	50	2	4.22	4.36	4.49	4.63	4.90	UH21200800804	●
0.8	0/-0.010	0.08	0/-0.010	4	1.2	6	0.75	50	2	6.29	6.49	6.69	6.90	7.30	UH21200800806	●
0.8	0/-0.010	0.08	0/-0.010	4	1.2	8	0.75	50	2	8.36	8.63	8.90	9.17	9.71	UH21200800808	●
0.8	0/-0.010	0.08	0/-0.010	4	1.2	10	0.75	50	2	10.42	10.76	11.10	11.44	12.11	UH21200800810	●
0.8	0/-0.010	0.08	0/-0.010	4	1.2	12	0.75	50	2	12.49	12.90	13.30	13.7	14.51	UH21200800812	●
0.9	0/-0.010	0.08	0/-0.010	4	1.4	6	0.85	50	2	6.29	6.49	6.69	6.90	7.30	UH21200900806	●
0.9	0/-0.010	0.08	0/-0.010	4	1.4	8	0.85	50	2	8.36	8.63	8.90	9.17	9.71	UH21200900808	●
0.9	0/-0.010	0.08	0/-0.010	4	1.4	10	0.85	50	2	10.42	10.76	11.10	11.44	12.11	UH21200900810	●
0.9	0/-0.010	0.08	0/-0.010	4	1.4	15	0.85	50	2	15.59	16.1	16.60	17.11	18.12	UH21200900815	●
1.0	0/-0.015	0.10	0/-0.010	4	1.5	6	0.95	50	2	6.39	6.59	6.80	7.00	7.41	UH2120100106	●
1.0	0/-0.015	0.10	0/-0.010	4	1.5	8	0.95	50	2	8.45	8.73	9.00	9.27	9.81	UH2120100108	●
1.0	0/-0.015	0.10	0/-0.010	4	1.5	10	0.95	50	2	10.52	10.86	11.20	11.54	12.22	UH2120100110	●
1.0	0/-0.015	0.10	0/-0.010	4	1.5	12	0.95	50	2	12.59	12.99	13.40	13.81	14.62	UH2120100112	●
1.0	0/-0.015	0.10	0/-0.010	4	1.5	14	0.95	50	2	14.66	15.13	15.60	16.08	17.03	UH2120100114	●
1.0	0/-0.015	0.10	0/-0.010	4	1.5	16	0.95	50	2	16.72	17.26	17.80	18.35	19.43	UH2120100116	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

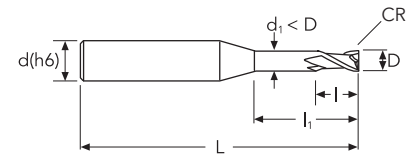
HSS END-MILLS

CARBIDE BURRS

INFO

# UH212

cylindrical shank, 2F, extended and reduced neck, corner radius

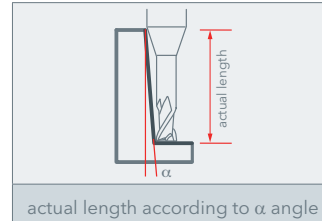


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
☆		☆			★

★ 1st choice ☆ suitable



HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
1.2	0/-0.015	0.10	0/-0.010	4	1.8	6	1.15	50	2	6.39	6.59	6.80	7.00	7.41	UH2120120106	●
1.2	0/-0.015	0.10	0/-0.010	4	1.8	8	1.15	50	2	8.45	8.73	9.00	9.27	9.81	UH2120120108	●
1.2	0/-0.015	0.10	0/-0.010	4	1.8	10	1.15	50	2	10.52	10.86	11.20	11.54	12.22	UH2120120110	●
1.2	0/-0.015	0.10	0/-0.010	4	1.8	12	1.15	50	2	12.59	12.99	13.40	13.81	14.62	UH2120120112	●
1.4	0/-0.015	0.15	0/-0.010	4	2.1	6	1.35	50	2	6.38	6.59	6.79	6.99	7.40	UH21201401506	●
1.4	0/-0.015	0.15	0/-0.010	4	2.1	8	1.35	50	2	8.45	8.72	8.99	9.26	9.80	UH21201401508	●
1.4	0/-0.015	0.15	0/-0.010	4	2.1	10	1.35	50	2	10.52	10.86	11.19	11.53	12.21	UH21201401510	●
1.4	0/-0.015	0.15	0/-0.010	4	2.1	12	1.35	50	2	12.59	12.99	13.40	13.80	14.61	UH21201401512	●
1.4	0/-0.015	0.15	0/-0.010	4	2.1	14	1.35	50	2	14.65	15.13	15.60	16.07	17.02	UH21201401514	●
1.4	0/-0.015	0.15	0/-0.010	4	2.1	16	1.35	50	2	16.72	17.26	17.80	18.34	19.42	UH21201401516	●
1.5	0/-0.015	0.15	0/-0.010	4	2.3	6	1.45	50	2	6.38	6.59	6.79	6.99	7.40	UH21201501506	●
1.5	0/-0.015	0.15	0/-0.010	4	2.3	8	1.45	50	2	8.45	8.72	8.99	9.26	9.80	UH21201501508	●
1.5	0/-0.015	0.15	0/-0.010	4	2.3	10	1.45	50	2	10.52	10.86	11.19	11.53	12.21	UH21201501510	●
1.5	0/-0.015	0.15	0/-0.010	4	2.3	12	1.45	50	2	12.59	12.99	13.40	13.80	14.61	UH21201501512	●
1.5	0/-0.015	0.15	0/-0.010	4	2.3	14	1.45	50	2	14.65	15.13	15.60	16.07	17.02	UH21201501514	●
1.5	0/-0.015	0.15	0/-0.010	4	2.3	16	1.45	50	2	16.72	17.26	17.80	18.34	19.42	UH21201501516	●
1.5	0/-0.015	0.15	0/-0.010	4	2.3	18	1.45	60	2	18.79	19.39	20.00	20.61	21.82	UH21201501518	●
1.5	0/-0.015	0.15	0/-0.010	4	2.3	20	1.45	60	2	20.86	21.53	22.20	22.88	24.23	UH21201501520	●
1.6	0/-0.015	0.15	0/-0.010	4	2.4	6	1.55	50	2	6.38	6.59	6.79	6.99	7.40	UH21201601506	●
1.6	0/-0.015	0.15	0/-0.010	4	2.4	8	1.55	50	2	8.45	8.72	8.99	9.26	9.80	UH21201601508	●
1.6	0/-0.015	0.15	0/-0.010	4	2.4	10	1.55	50	2	10.52	10.86	11.19	11.53	12.21	UH21201601510	●
1.6	0/-0.015	0.15	0/-0.010	4	2.4	12	1.55	50	2	12.59	12.99	13.40	13.80	14.61	UH21201601512	●
1.6	0/-0.015	0.15	0/-0.010	4	2.4	14	1.55	50	2	14.65	15.13	15.60	16.07	17.02	UH21201601514	●
1.6	0/-0.015	0.15	0/-0.010	4	2.4	16	1.55	50	2	16.72	17.26	17.80	18.34	19.42	UH21201601516	●
1.6	0/-0.015	0.15	0/-0.010	4	2.4	18	1.55	60	2	18.79	19.39	20.00	20.61	21.82	UH21201601518	●
1.6	0/-0.015	0.15	0/-0.010	4	2.4	20	1.55	60	2	20.86	21.53	22.20	22.88	24.23	UH21201601520	●
1.8	0/-0.015	0.20	0/-0.010	4	2.7	6	1.75	50	2	6.38	6.58	6.79	6.99	7.39	UH2120180206	●
1.8	0/-0.015	0.20	0/-0.010	4	2.7	8	1.75	50	2	8.45	8.72	8.99	9.26	9.79	UH2120180208	●
1.8	0/-0.015	0.20	0/-0.010	4	2.7	10	1.75	50	2	10.52	10.85	11.19	11.52	12.20	UH2120180210	●
1.8	0/-0.015	0.20	0/-0.010	4	2.7	12	1.75	50	2	12.58	12.99	13.39	13.79	14.60	UH2120180212	●
1.8	0/-0.015	0.20	0/-0.010	4	2.7	14	1.75	50	2	14.65	15.12	15.59	16.06	17.01	UH2120180214	●
1.8	0/-0.015	0.20	0/-0.010	4	2.7	16	1.75	50	2	16.72	17.26	17.79	18.33	19.41	UH2120180216	●
1.8	0/-0.015	0.20	0/-0.010	4	2.7	18	1.75	60	2	18.79	19.39	20.00	20.6	21.81	UH2120180218	●
1.8	0/-0.015	0.20	0/-0.010	4	2.7	20	1.75	60	2	20.85	21.53	22.20	22.87	24.22	UH2120180220	●
2	0/-0.015	0.20	0/-0.010	4	3	6	1.95	50	2	6.38	6.58	6.79	6.99	7.39	UH2120200206	●
2	0/-0.015	0.20	0/-0.010	4	3	8	1.95	50	2	8.45	8.72	8.99	9.26	9.79	UH2120200208	●
2	0/-0.015	0.20	0/-0.010	4	3	10	1.95	50	2	10.52	10.85	11.19	11.52	12.20	UH2120200210	●
2	0/-0.015	0.20	0/-0.010	4	3	12	1.95	50	2	12.58	12.99	13.39	13.79	14.60	UH2120200212	●
2	0/-0.015	0.20	0/-0.010	4	3	14	1.95	50	2	14.65	15.12	15.59	16.06	17.01	UH2120200214	●

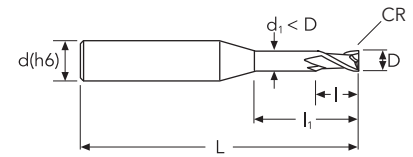
● stock standard ○ non-standard stock ▽ stock exhaustion

# UH212

cylindrical shank, 2F, extended and reduced neck, corner radius



INFO

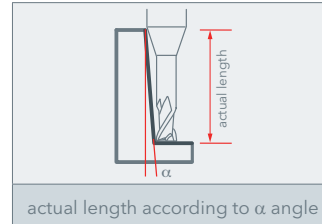


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
☆		☆			★

★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
2	0/-0.015	0.20	0/-0.010	4	3	16	1.95	50	2	16.72	17.26	17.79	18.33	19.41	UH2120200216	●
2	0/-0.015	0.20	0/-0.010	4	3	18	1.95	60	2	18.79	19.39	20.00	20.60	21.81	UH2120200218	●
2	0/-0.015	0.20	0/-0.010	4	3	20	1.95	60	2	20.85	21.53	22.20	22.87	-	UH2120200220	●
2	0/-0.015	0.20	0/-0.010	4	3	25	1.95	75	2	26.02	26.86	27.70	28.54	-	UH2120200225	●
2	0/-0.015	0.20	0/-0.010	4	3	30	1.95	75	2	31.19	32.20	33.21	-	-	UH2120200230	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	8	2.40	50	2	8.45	8.71	8.98	9.24	9.77	UH2120250308	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	10	2.40	50	2	10.51	10.85	11.18	11.51	12.18	UH2120250310	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	12	2.40	50	2	12.58	12.98	13.38	13.78	14.58	UH2120250312	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	14	2.40	50	2	14.65	15.12	15.58	16.05	-	UH2120250314	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	16	2.40	50	2	16.72	17.25	17.78	18.32	-	UH2120250316	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	18	2.40	60	2	18.78	19.38	19.99	20.59	-	UH2120250318	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	20	2.40	60	2	20.85	21.52	22.19	22.86	-	UH2120250320	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	25	2.40	60	2	26.02	26.86	27.69	-	-	UH2120250325	●
2.5	0/-0.020	0.30	0/-0.015	4	3.7	30	2.40	75	2	31.19	32.19	-	-	-	UH2120250330	●
3	0/-0.025	0.30	0/-0.015	6	4.5	8	2.85	50	2	8.64	8.91	9.18	9.45	10.00	UH2120300308	●
3	0/-0.025	0.30	0/-0.015	6	4.5	10	2.85	50	2	10.71	11.04	11.38	11.72	12.40	UH2120300310	●
3	0/-0.025	0.30	0/-0.015	6	4.5	12	2.85	50	2	12.77	13.18	13.59	13.99	14.80	UH2120300312	●
3	0/-0.025	0.30	0/-0.015	6	4.5	14	2.85	50	2	14.84	15.31	15.79	16.26	17.21	UH2120300314	●
3	0/-0.025	0.30	0/-0.015	6	4.5	16	2.85	60	2	16.91	17.45	17.99	18.53	19.61	UH2120300316	●
3	0/-0.025	0.30	0/-0.015	6	4.5	18	2.85	60	2	18.98	19.58	20.19	20.80	22.02	UH2120300318	●
3	0/-0.025	0.30	0/-0.015	6	4.5	20	2.85	60	2	21.04	21.72	22.39	23.07	24.42	UH2120300320	●
3	0/-0.025	0.30	0/-0.015	6	4.5	25	2.85	75	2	26.21	27.05	27.90	28.74	30.43	UH2120300325	●
4	0/-0.025	0.40	0/-0.015	6	4.5	10	3.85	60	2	10.90	11.24	11.58	11.92	12.60	UH2120400410	●
4	0/-0.025	0.40	0/-0.015	6	4.5	15	3.85	60	2	16.06	16.57	17.08	17.59	18.61	UH2120400415	●
4	0/-0.025	0.40	0/-0.015	6	4.5	20	3.85	60	2	21.23	21.91	22.59	23.27	-	UH2120400420	●
4	0/-0.025	0.40	0/-0.015	6	4.5	25	3.85	75	2	26.40	27.25	28.09	28.94	-	UH2120400425	●
4	0/-0.025	0.40	0/-0.015	6	4.5	30	3.85	75	2	31.57	32.58	33.60	-	-	UH2120400430	●
4	0/-0.025	0.40	0/-0.015	6	4.5	40	3.85	75	2	41.90	43.25	-	-	-	UH2120400440	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# UH212

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

Material Group ISO 513			P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
Hardness/Rm			≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae			ap x D	ap x D	ap x D	ap x D
Vc (m/min)			80÷120	60÷100	50÷70	30÷50
D (mm)	I1 (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
0.2	≤ 6D	0.01	0.003	0.003	0.002	0.002
	≤ 8D	0.01	0.003	0.002	0.002	0.002
	≤ 10D	0.01	0.002	0.002	0.002	0.001
	≤ 12D	0.01	0.002	0.001	0.001	0.001
0.3	≤ 6D	0.02	0.004	0.004	0.003	0.003
	≤ 8D	0.01	0.003	0.003	0.003	0.002
	≤ 10D	0.01	0.003	0.003	0.002	0.002
	≤ 12D	0.01	0.002	0.002	0.002	0.002
0.4	≤ 6D	0.02	0.006	0.005	0.005	0.004
	≤ 8D	0.02	0.005	0.005	0.004	0.004
	≤ 10D	0.01	0.004	0.004	0.003	0.003
	≤ 12D	0.01	0.003	0.003	0.003	0.002
0.5	≤ 6D	0.03	0.007	0.006	0.006	0.005
	≤ 8D	0.02	0.006	0.005	0.005	0.004
	≤ 10D	0.02	0.005	0.004	0.004	0.003
	≤ 12D	0.01	0.004	0.003	0.003	0.003
0.6	≤ 6D	0.03	0.008	0.007	0.006	0.006
	≤ 8D	0.03	0.007	0.006	0.005	0.005
	≤ 10D	0.02	0.006	0.005	0.004	0.004
	≤ 12D	0.02	0.004	0.004	0.004	0.003
0.8	≤ 6D	0.04	0.010	0.009	0.008	0.007
	≤ 8D	0.03	0.009	0.008	0.007	0.006
	≤ 10D	0.03	0.007	0.006	0.006	0.005
	≤ 12D	0.02	0.006	0.005	0.004	0.004
1	≤ 6D	0.05	0.012	0.011	0.010	0.008
	≤ 8D	0.04	0.010	0.009	0.008	0.007
	≤ 10D	0.04	0.008	0.008	0.007	0.006
	≤ 12D	0.03	0.007	0.006	0.005	0.005
1.2	≤ 6D	0.06	0.022	0.020	0.018	0.015
	≤ 8D	0.05	0.019	0.017	0.015	0.013
	≤ 10D	0.04	0.015	0.014	0.012	0.011
	≤ 12D	0.03	0.012	0.011	0.010	0.008
1.4	≤ 6D	0.07	0.024	0.022	0.019	0.017
	≤ 8D	0.06	0.020	0.018	0.016	0.014
	≤ 10D	0.05	0.017	0.015	0.013	0.012
	≤ 12D	0.04	0.013	0.012	0.011	0.009
	≤ 15D	0.03	0.011	0.010	0.009	0.008
	> 15D	0.02	0.007	0.006	0.006	0.005
1.5	≤ 6D	0.08	0.025	0.023	0.020	0.018
	≤ 8D	0.06	0.021	0.019	0.017	0.015
	≤ 10D	0.05	0.018	0.016	0.014	0.012
	≤ 12D	0.04	0.014	0.012	0.011	0.010
	≤ 15D	0.03	0.011	0.010	0.009	0.008
	≥ 15D	0.02	0.008	0.007	0.006	0.005
1.6	≤ 6D	0.08	0.026	0.023	0.021	0.018
	≤ 8D	0.07	0.022	0.020	0.018	0.015
	≤ 10D	0.06	0.018	0.016	0.015	0.013
	≤ 12D	0.04	0.014	0.013	0.011	0.010
	≤ 15D	0.04	0.012	0.011	0.009	0.008
	> 15D	0.02	0.008	0.007	0.006	0.005

CUTTING PARAMETERS

UH212

Material Group ISO 513			P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3				
Hardness/Rm			≤45 HRC		45÷55 HRC		55÷60 HRC		60÷65 HRC	
ap x ae			ap x D		ap x D		ap x D		ap x D	
Vc (m/min)			80÷120		60÷100		50÷70		30÷50	
D (mm)	l1 (mm)	ap (mm)	fz (mm/z)		fz (mm/z)		fz (mm/z)		fz (mm/z)	
1.8	≤ 6D	0.09	0.028		0.025		0.022		0.020	
	≤ 8D	0.08	0.024		0.021		0.019		0.017	
	≤ 10D	0.06	0.020		0.018		0.016		0.014	
	≤ 12D	0.05	0.015		0.014		0.012		0.011	
	≤ 15D	0.04	0.013		0.011		0.010		0.009	
2	> 15D	0.03	0.008		0.008		0.007		0.006	
	≤ 6D	0.10	0.030		0.027		0.024		0.021	
	≤ 8D	0.09	0.026		0.023		0.020		0.018	
	≤ 10D	0.07	0.021		0.019		0.017		0.015	
	≤ 12D	0.06	0.017		0.015		0.013		0.012	
2.5	≤ 15D	0.05	0.014		0.012		0.011		0.009	
	> 15D	0.03	0.009		0.008		0.007		0.006	
	≤ 6D	0.13	0.035		0.032		0.028		0.025	
	≤ 8D	0.11	0.030		0.027		0.024		0.021	
	≤ 10D	0.09	0.025		0.022		0.020		0.017	
3	≤ 12D	0.07	0.019		0.017		0.015		0.013	
	≤ 15D	0.06	0.016		0.014		0.013		0.011	
	> 15D	0.04	0.011		0.009		0.008		0.007	
	≤ 6D	0.15	0.040		0.036		0.032		0.028	
	≤ 8D	0.13	0.034		0.031		0.027		0.024	
4	≤ 10D	0.11	0.028		0.025		0.022		0.020	
	≤ 12D	0.08	0.022		0.020		0.018		0.015	
	≤ 15D	0.07	0.018		0.016		0.014		0.013	
	> 15D	0.05	0.012		0.011		0.010		0.008	
	≤ 6D	0.20	0.050		0.045		0.040		0.035	
4	≤ 8D	0.17	0.043		0.038		0.034		0.030	
	≤ 10D	0.14	0.035		0.032		0.028		0.025	
	≤ 12D	0.11	0.028		0.025		0.022		0.019	
	≤ 15D	0.09	0.023		0.020		0.018		0.016	
	> 15D	0.06	0.015		0.014		0.012		0.011	



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS END-MILLS

CARBIDE BURRS

INFO

# UHCS2

cylindrical shank, 2F, reduced neck, corner radius

OSAWA  
NORM

UH

NMG  
UH RED

<70  
HRC

40°

RADIUS

Z

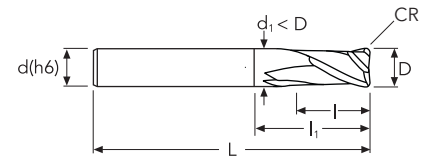


CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
☆		☆			★

★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
1	0/-0.012	0.10	+/-0.010	4	2	3	0.95	50	2	UHCS2010	●
1.5	0/-0.012	0.10	+/-0.010	4	2.5	4	1.45	50	2	UHCS2015	●
2	0/-0.012	0.10	+/-0.010	4	3	6	1.95	50	2	UHCS2020	●
3	0/-0.012	0.10	+/-0.010	6	4.5	8	2.85	55	2	UHCS2030	●
4	0/-0.012	0.10	+/-0.010	6	6	10	3.85	55	2	UHCS2040	●
5	0/-0.012	0.20	+/-0.010	6	6	11	4.85	50	2	UHCS2050	●
6	0/-0.015	0.20	+/-0.010	6	9	15	5.85	60	2	UHCS2060	●
8	0/-0.015	0.20	+/-0.015	8	12	20	7.70	70	2	UHCS2080	●
10	0/-0.015	0.20	+/-0.015	10	15	25	9.70	70	2	UHCS2100	●
12	0/-0.015	0.30	+/-0.015	12	18	30	11.70	80	2	UHCS2120	●

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH**


HSS  
END-MILLS

CARBIDE  
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

## CUTTING PARAMETERS

## UHCS2

	Material Group ISO 513	P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm	≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
	ap x ae	<b>0.3D x D</b>	<b>0.2D x D</b>	<b>0.2D x D</b>	<b>0.1D x D</b>
	Vc (m/min)	<b>80÷120</b>	<b>60÷100</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>1</b>	0.007	0.006	0.006	0.005
	<b>2</b>	0.012	0.011	0.010	0.008
	<b>3</b>	0.017	0.015	0.014	0.012
	<b>4</b>	0.023	0.021	0.018	0.016
	<b>5</b>	0.030	0.027	0.024	0.021
<b>6</b>	0.038	0.034	0.030	0.027	
<b>8</b>	0.050	0.045	0.040	0.035	
<b>10</b>	0.065	0.059	0.052	0.046	
<b>12</b>	0.080	0.072	0.064	0.056	

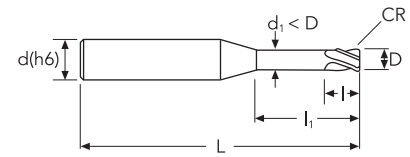
INFO

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
**UH/MH**
HSS  
END-MILLSCARBIDE  
BURRS

INFO

# UHF4LN

cylindrical shank, 4F Unequal Pitch, extended and reduced neck, corner radius

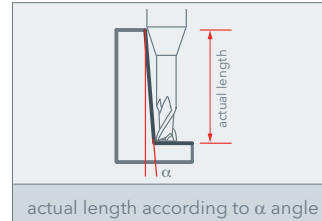


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
☆		☆			★

★ 1st choice ☆ suitable



HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HFVH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
1	0/-0.010	0.10	+/-0.005	4	1	4	0.90	50	4	4.32	4.46	4.62	4.78	5.13	UHF4LN0100104	●
1	0/-0.010	0.10	+/-0.005	4	1	6	0.90	50	4	6.39	6.60	6.83	7.08	7.60	UHF4LN0100106	●
1	0/-0.010	0.10	+/-0.005	4	1	8	0.90	50	4	8.45	8.74	9.05	9.37	10.07	UHF4LN0100108	●
1	0/-0.010	0.10	+/-0.005	4	1	10	0.90	50	4	10.52	10.88	11.26	11.66	12.53	UHF4LN0100110	●
1	0/-0.010	0.10	+/-0.005	4	1	12	0.90	50	4	12.59	13.02	13.48	13.96	15.00	UHF4LN0100112	●
1	0/-0.010	0.10	+/-0.005	4	1	14	0.90	50	4	14.66	15.16	15.69	16.25	17.47	UHF4LN0100114	●
1	0/-0.010	0.10	+/-0.005	4	1	16	0.90	50	4	16.72	17.30	17.91	18.55	19.94	UHF4LN0100116	●
1	0/-0.010	0.10	+/-0.005	4	1	20	0.90	75	4	20.86	21.57	22.33	23.14	24.87	UHF4LN0100120	●
1	0/-0.010	0.20	+/-0.005	4	1	4	0.90	50	4	4.32	4.46	4.61	4.77	5.11	UHF4LN0100204	●
1	0/-0.010	0.20	+/-0.005	4	1	6	0.90	50	4	6.38	6.60	6.82	7.06	7.57	UHF4LN0100206	●
1	0/-0.010	0.20	+/-0.005	4	1	8	0.90	50	4	8.45	8.73	9.04	9.35	10.04	UHF4LN0100208	●
1	0/-0.010	0.20	+/-0.005	4	1	10	0.90	50	4	10.52	10.87	11.25	11.65	12.51	UHF4LN0100210	●
1	0/-0.010	0.20	+/-0.005	4	1	12	0.90	50	4	12.58	13.01	13.47	13.94	14.98	UHF4LN0100212	●
1	0/-0.010	0.20	+/-0.005	4	1	14	0.90	50	4	14.65	15.15	15.68	16.24	17.45	UHF4LN0100214	●
1	0/-0.010	0.20	+/-0.005	4	1	16	0.90	50	4	16.72	17.29	17.89	18.53	19.91	UHF4LN0100216	●
1	0/-0.010	0.20	+/-0.005	4	1	20	0.90	60	4	20.85	21.57	22.32	23.12	24.85	UHF4LN0100220	●
1	0/-0.010	0.30	+/-0.005	4	1	6	0.90	50	4	6.38	6.59	6.81	7.05	7.55	UHF4LN0100306	●
1	0/-0.010	0.30	+/-0.005	4	1	10	0.90	50	4	10.51	10.87	11.24	11.63	12.49	UHF4LN0100310	●
1	0/-0.010	0.30	+/-0.005	4	1	16	0.90	50	4	16.72	17.28	17.88	18.52	19.89	UHF4LN0100316	●
1	0/-0.010	0.30	+/-0.005	4	1	20	0.90	60	4	20.85	21.56	22.31	23.11	24.82	UHF4LN0100320	●
1.5	0/-0.010	0.10	+/-0.005	4	1.5	6	1.40	50	4	6.39	6.60	6.83	7.08	7.60	UHF4LN0150106	●
1.5	0/-0.010	0.10	+/-0.005	4	1.5	8	1.40	50	4	8.45	8.74	9.05	9.37	10.07	UHF4LN0150108	●
1.5	0/-0.010	0.10	+/-0.005	4	1.5	12	1.40	50	4	12.59	13.02	13.48	13.96	15.00	UHF4LN0150112	●
1.5	0/-0.010	0.10	+/-0.005	4	1.5	16	1.40	50	4	16.72	17.3	17.91	18.55	19.94	UHF4LN0150116	●
1.5	0/-0.010	0.10	+/-0.005	4	1.5	20	1.40	60	4	20.86	21.57	22.33	23.14	-	UHF4LN0150120	●
1.5	0/-0.010	0.20	+/-0.005	4	1.5	6	1.40	50	4	6.38	6.60	6.82	7.06	7.57	UHF4LN0150206	●
1.5	0/-0.010	0.20	+/-0.005	4	1.5	8	1.40	50	4	8.45	8.73	9.04	9.35	10.04	UHF4LN0150208	●
1.5	0/-0.010	0.20	+/-0.005	4	1.5	10	1.40	50	4	10.52	10.87	11.25	11.65	12.51	UHF4LN0150210	●
1.5	0/-0.010	0.20	+/-0.005	4	1.5	12	1.40	50	4	12.58	13.01	13.47	13.94	14.98	UHF4LN0150212	●
1.5	0/-0.010	0.20	+/-0.005	4	1.5	14	1.40	50	4	14.65	15.15	15.68	16.24	17.45	UHF4LN0150214	●
1.5	0/-0.010	0.20	+/-0.005	4	1.5	16	1.40	50	4	16.72	17.29	17.89	18.53	19.91	UHF4LN0150216	●
1.5	0/-0.010	0.20	+/-0.005	4	1.5	18	1.40	60	4	18.79	19.43	20.11	20.83	22.38	UHF4LN0150218	●
1.5	0/-0.010	0.20	+/-0.005	4	1.5	20	1.40	60	4	20.85	21.57	22.32	23.12	-	UHF4LN0150220	●
1.5	0/-0.010	0.30	+/-0.005	4	1.5	8	1.40	50	4	8.45	8.73	9.03	9.34	10.02	UHF4LN0150308	●
1.5	0/-0.010	0.30	+/-0.005	4	1.5	16	1.40	50	4	16.72	17.28	17.88	18.52	19.89	UHF4LN0150316	●
1.5	0/-0.010	0.30	+/-0.005	4	1.5	20	1.40	60	4	20.85	21.56	22.31	23.11	-	UHF4LN0150320	●
2	0/-0.010	0.20	+/-0.005	4	2	6	1.90	50	4	6.38	6.60	6.82	7.06	7.57	UHF4LN0200206	●
2	0/-0.010	0.20	+/-0.005	4	2	8	1.90	50	4	8.45	8.73	9.04	9.35	10.04	UHF4LN0200208	●
2	0/-0.010	0.20	+/-0.005	4	2	10	1.90	50	4	10.52	10.87	11.25	11.65	12.51	UHF4LN0200210	●

● stock standard ○ non-standard stock ▽ stock exhaustion

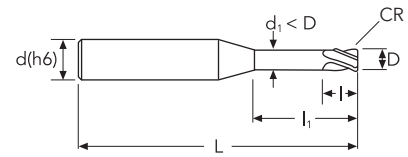


# UHF4LN

cylindrical shank, 4F Unequal Pitch, extended and reduced neck, corner radius

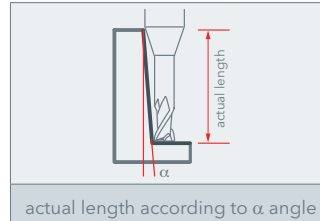


INFO



P	M	K	N	S	H
☆		☆			★

★ 1st choice ☆ suitable



CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

D	D Tol.	CR	CR Tol.	d(h6)	I	I1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
2	0/-0.010	0.20	+/-0.005	4	2	12	1.90	50	4	12.58	13.01	13.47	13.94	14.98	UHF4LN0200212	●
2	0/-0.010	0.20	+/-0.005	4	2	14	1.90	50	4	14.65	15.15	15.68	16.24	17.45	UHF4LN0200214	●
2	0/-0.010	0.20	+/-0.005	4	2	16	1.90	50	4	16.72	17.29	17.89	18.53	-	UHF4LN0200216	●
2	0/-0.010	0.20	+/-0.005	4	2	18	1.90	60	4	18.79	19.43	20.11	20.83	-	UHF4LN0200218	●
2	0/-0.010	0.20	+/-0.005	4	2	20	1.90	60	4	20.85	21.57	22.32	23.12	-	UHF4LN0200220	●
2	0/-0.010	0.20	+/-0.005	4	2	25	1.90	75	4	26.02	26.91	27.86	-	-	UHF4LN0200225	●
2	0/-0.010	0.20	+/-0.005	4	2	30	1.90	75	4	31.19	32.26	33.40	-	-	UHF4LN0200230	●
2	0/-0.010	0.30	+/-0.005	4	2	8	1.90	50	4	8.45	8.73	9.03	9.34	10.02	UHF4LN0200308	●
2	0/-0.010	0.30	+/-0.005	4	2	16	1.90	50	4	16.72	17.28	17.88	18.52	-	UHF4LN0200316	●
2	0/-0.010	0.30	+/-0.005	4	2	20	1.90	60	4	20.85	21.56	22.31	23.11	-	UHF4LN0200320	●
2	0/-0.010	0.50	+/-0.005	4	2	6	1.90	50	4	6.37	6.58	6.79	7.02	7.50	UHF4LN0200506	●
2	0/-0.010	0.50	+/-0.005	4	2	8	1.90	50	4	8.44	8.71	9.00	9.31	9.97	UHF4LN0200508	●
2	0/-0.010	0.50	+/-0.005	4	2	12	1.90	50	4	12.57	12.99	13.43	13.9	14.91	UHF4LN0200512	●
2	0/-0.010	0.50	+/-0.005	4	2	16	1.90	50	4	16.71	17.27	17.86	18.49	-	UHF4LN0200516	●
2	0/-0.010	0.50	+/-0.005	4	2	20	1.90	60	4	20.84	21.55	22.29	23.08	-	UHF4LN0200520	●
2	0/-0.010	0.50	+/-0.005	4	2	25	1.90	75	4	26.01	26.89	27.83	28.82	-	UHF4LN0200525	●
2	0/-0.010	0.50	+/-0.005	4	2	30	1.90	75	4	31.18	32.24	33.36	-	-	UHF4LN0200530	●
2.5	0/-0.015	0.30	+/-0.005	4	2.5	8	2.40	50	4	8.45	8.73	9.03	9.34	10.02	UHF4LN0250308	●
2.5	0/-0.015	0.30	+/-0.005	4	2.5	10	2.40	50	4	10.51	10.87	11.24	11.63	12.49	UHF4LN0250310	●
2.5	0/-0.015	0.30	+/-0.005	4	2.5	12	2.40	50	4	12.58	13.01	13.45	13.93	-	UHF4LN0250312	●
2.5	0/-0.015	0.30	+/-0.005	4	2.5	14	2.40	50	4	14.65	15.14	15.67	16.22	-	UHF4LN0250314	●
2.5	0/-0.015	0.30	+/-0.005	4	2.5	16	2.40	50	4	16.72	17.28	17.88	18.52	-	UHF4LN0250316	●
2.5	0/-0.015	0.30	+/-0.005	4	2.5	18	2.40	60	4	18.78	19.42	20.10	20.81	-	UHF4LN0250318	●
2.5	0/-0.015	0.30	+/-0.005	4	2.5	20	2.40	60	4	20.85	21.56	22.31	-	-	UHF4LN0250320	●
2.5	0/-0.015	0.30	+/-0.005	4	2.5	25	2.40	60	4	26.02	26.91	27.85	-	-	UHF4LN0250325	●
2.5	0/-0.015	0.30	+/-0.005	4	2.5	30	2.40	75	4	31.19	32.25	-	-	-	UHF4LN0250330	●
2.5	0/-0.015	0.50	+/-0.005	4	2.5	8	2.40	50	4	8.44	8.71	9.00	9.31	9.97	UHF4LN0250508	●
2.5	0/-0.015	0.50	+/-0.005	4	2.5	12	2.40	50	4	12.57	12.99	13.43	13.90	-	UHF4LN0250512	●
2.5	0/-0.015	0.50	+/-0.005	4	2.5	16	2.40	50	4	16.71	17.27	17.86	18.49	-	UHF4LN0250516	●
2.5	0/-0.015	0.50	+/-0.005	4	2.5	20	2.40	60	4	20.84	21.55	22.29	-	-	UHF4LN0250520	●
2.5	0/-0.015	0.50	+/-0.005	4	2.5	25	2.40	60	4	26.01	26.89	27.83	-	-	UHF4LN0250525	●
2.5	0/-0.015	0.50	+/-0.005	4	2.5	30	2.40	75	4	31.18	32.24	-	-	-	UHF4LN0250530	●
3	0/-0.015	0.20	+/-0.010	6	3	8	2.80	50	4	8.64	8.93	9.24	9.57	10.27	UHF4LN0300208	●
3	0/-0.015	0.20	+/-0.010	6	3	10	2.80	50	4	10.71	11.07	11.46	11.86	12.73	UHF4LN0300210	●
3	0/-0.015	0.20	+/-0.010	6	3	12	2.80	50	4	12.78	13.21	13.67	14.16	15.20	UHF4LN0300212	●
3	0/-0.015	0.20	+/-0.010	6	3	14	2.80	50	4	14.84	15.35	15.89	16.45	17.67	UHF4LN0300214	●
3	0/-0.015	0.20	+/-0.010	6	3	16	2.80	60	4	16.91	17.49	18.10	18.74	20.14	UHF4LN0300216	●
3	0/-0.015	0.20	+/-0.010	6	3	18	2.80	60	4	18.98	19.63	20.31	21.04	22.60	UHF4LN0300218	●
3	0/-0.015	0.20	+/-0.010	6	3	20	2.80	60	4	21.05	21.77	22.53	23.33	25.07	UHF4LN0300220	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

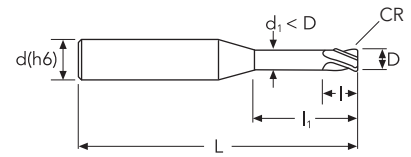
HSS END-MILLS

CARBIDE BURRS

INFO

# UHF4LN

cylindrical shank, 4F Unequal Pitch, extended and reduced neck, corner radius

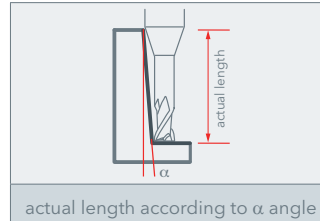


CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
☆		☆			★

★ 1st choice ☆ suitable



actual length according to α angle

D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
3	0/-0.015	0.20	+/-0.010	6	3	25	2.80	75	4	26.21	27.11	28.07	29.07	-	UHF4LN0300225	●
3	0/-0.015	0.30	+/-0.010	6	3	8	2.80	50	4	8.64	8.93	9.23	9.55	10.24	UHF4LN0300308	●
3	0/-0.015	0.30	+/-0.010	6	3	10	2.80	50	4	10.71	11.07	11.45	11.85	12.71	UHF4LN0300310	●
3	0/-0.015	0.30	+/-0.010	6	3	12	2.80	50	4	12.77	13.20	13.66	14.14	15.18	UHF4LN0300312	●
3	0/-0.015	0.30	+/-0.010	6	3	14	2.80	50	4	14.84	15.34	15.87	16.44	17.64	UHF4LN0300314	●
3	0/-0.015	0.30	+/-0.010	6	3	16	2.80	60	4	16.91	17.48	18.09	18.73	20.11	UHF4LN0300316	●
3	0/-0.015	0.30	+/-0.010	6	3	18	2.80	60	4	18.98	19.62	20.30	21.02	22.58	UHF4LN0300318	●
3	0/-0.015	0.30	+/-0.010	6	3	20	2.80	60	4	21.04	21.76	22.52	23.32	25.05	UHF4LN0300320	●
3	0/-0.015	0.30	+/-0.010	6	3	30	2.80	75	4	31.38	32.45	33.59	34.79	-	UHF4LN0300330	●
3	0/-0.015	0.50	+/-0.010	6	3	8	2.80	50	4	8.63	8.91	9.21	9.52	10.20	UHF4LN0300508	●
3	0/-0.015	0.50	+/-0.010	6	3	10	2.80	50	4	10.7	11.05	11.42	11.82	12.66	UHF4LN0300510	●
3	0/-0.015	0.50	+/-0.010	6	3	12	2.80	50	4	12.77	13.19	13.64	14.11	15.13	UHF4LN0300512	●
3	0/-0.015	0.50	+/-0.010	6	3	14	2.80	50	4	14.83	15.33	15.85	16.41	17.60	UHF4LN0300514	●
3	0/-0.015	0.50	+/-0.010	6	3	16	2.80	60	4	16.9	17.47	18.07	18.70	20.07	UHF4LN0300516	●
3	0/-0.015	0.50	+/-0.010	6	3	18	2.80	60	4	18.97	19.61	20.28	20.99	22.53	UHF4LN0300518	●
3	0/-0.015	0.50	+/-0.010	6	3	20	2.80	60	4	21.04	21.75	22.50	23.29	25.00	UHF4LN0300520	●
3	0/-0.015	0.50	+/-0.010	6	3	30	2.80	75	4	31.37	32.44	33.57	34.76	-	UHF4LN0300530	●
4	0/-0.015	0.30	+/-0.010	6	4	10	3.70	60	4	10.90	11.26	11.65	12.06	12.93	UHF4LN0400310	●
4	0/-0.015	0.30	+/-0.010	6	4	15	3.70	60	4	16.07	16.61	17.19	17.79	19.10	UHF4LN0400315	●
4	0/-0.015	0.30	+/-0.010	6	4	20	3.70	60	4	21.24	21.96	22.72	23.53	-	UHF4LN0400320	●
4	0/-0.015	0.30	+/-0.010	6	4	25	3.70	75	4	26.4	27.31	28.26	-	-	UHF4LN0400325	●
4	0/-0.015	0.30	+/-0.010	6	4	32	3.70	75	4	33.64	34.79	36.01	-	-	UHF4LN0400332	●
4	0/-0.015	0.30	+/-0.010	6	4	40	3.70	75	4	41.91	43.35	-	-	-	UHF4LN0400340	●
4	0/-0.015	0.50	+/-0.010	6	4	10	3.70	60	4	10.89	11.25	11.63	12.03	12.89	UHF4LN0400510	●
4	0/-0.015	0.50	+/-0.010	6	4	15	3.70	60	4	16.06	16.60	17.17	17.76	19.06	UHF4LN0400515	●
4	0/-0.015	0.50	+/-0.010	6	4	20	3.70	60	4	21.23	21.94	22.7	23.50	-	UHF4LN0400520	●
4	0/-0.015	0.50	+/-0.010	6	4	25	3.70	75	4	26.4	27.29	28.24	-	-	UHF4LN0400525	●
4	0/-0.015	0.50	+/-0.010	6	4	32	3.70	75	4	33.63	34.78	35.99	-	-	UHF4LN0400532	●
4	0/-0.015	0.50	+/-0.010	6	4	40	3.70	75	4	41.9	43.33	-	-	-	UHF4LN0400540	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

**UHF4LN**

Material Group ISO 513			P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3				
Hardness/Rm			≤45 HRC		45÷55 HRC		55÷60 HRC		60÷65 HRC	
ap x ae			ap x D		ap x D		ap x D		ap x D	
Vc (m/min)			80÷120		60÷100		50÷70		30÷50	
D (mm)	l1 (mm)	ap (mm)	fz (mm/z)		fz (mm/z)		fz (mm/z)		fz (mm/z)	
<b>1</b>	≤ 6D	0.05	0.010		0.009		0.008		0.007	
	≤ 8D	0.04	0.009		0.008		0.007		0.006	
	≤ 10D	0.04	0.007		0.006		0.006		0.005	
	≤ 12D	0.03	0.006		0.005		0.004		0.004	
<b>1.5</b>	≤ 6D	0.08	0.021		0.019		0.017		0.015	
	≤ 8D	0.06	0.018		0.016		0.014		0.013	
	≤ 10D	0.05	0.015		0.013		0.012		0.010	
	≤ 12D	0.04	0.012		0.011		0.009		0.008	
	≤ 15D	0.03	0.010		0.009		0.008		0.007	
	> 15D	0.02	0.006		0.006		0.005		0.004	
<b>2</b>	≤ 6D	0.10	0.026		0.023		0.020		0.018	
	≤ 8D	0.09	0.022		0.020		0.017		0.015	
	≤ 10D	0.07	0.018		0.016		0.014		0.012	
	≤ 12D	0.06	0.014		0.013		0.011		0.010	
	≤ 15D	0.05	0.011		0.010		0.009		0.008	
	> 15D	0.03	0.008		0.007		0.006		0.005	
<b>2.5</b>	≤ 6D	0.13	0.030		0.027		0.024		0.021	
	≤ 8D	0.11	0.025		0.023		0.020		0.018	
	≤ 10D	0.09	0.021		0.019		0.017		0.015	
	≤ 12D	0.07	0.016		0.015		0.013		0.011	
	≤ 15D	0.06	0.013		0.012		0.011		0.009	
> 15D	0.04	0.009		0.008		0.007		0.006		
<b>3</b>	≤ 6D	0.15	0.034		0.031		0.027		0.024	
	≤ 8D	0.13	0.029		0.026		0.023		0.020	
	≤ 10D	0.11	0.024		0.021		0.019		0.017	
	≤ 12D	0.08	0.019		0.017		0.015		0.013	
	≤ 15D	0.07	0.015		0.014		0.012		0.011	
> 15D	0.05	0.010		0.009		0.008		0.007		
<b>4</b>	≤ 6D	0.20	0.043		0.038		0.034		0.030	
	≤ 8D	0.17	0.036		0.033		0.029		0.025	
	≤ 10D	0.14	0.030		0.027		0.024		0.021	
	≤ 12D	0.11	0.023		0.021		0.019		0.016	
	≤ 15D	0.09	0.019		0.017		0.015		0.013	
> 15D	0.06	0.013		0.011		0.010		0.009		



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS END-MILLS

CARBIDE BURRS

INFO

# UHF-RT

cylindrical shank, multiflutes radius type for high feed machining

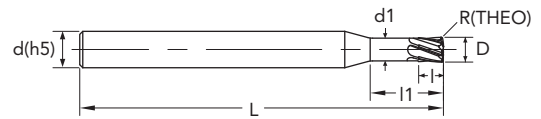


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
☆					★

★ 1st choice ☆ suitable



D	D Tol.	R(Theo)	d(h5)	l	l1	d1	L	Z	EDP No.	Stock
2	-0.014/-0.038	0.13	6	2	6	1.9	50	4	UHF470RT020	●
3	-0.014/-0.038	0.19	6	3	9	2.9	60	4	UHF470RT030	●
4	-0.014/-0.038	0.25	6	4	12	3.9	60	6	UHF670RT040	●
5	-0.014/-0.038	0.31	6	5	15	4.7	60	6	UHF670RT050	●
6	-0.014/-0.038	0.38	6	5	18	5.5	60	6	UHF670RT060	●
8	-0.014/-0.038	0.50	8	7	24	7.5	75	6	UHF670RT080	●
10	-0.014/-0.038	0.63	10	8	30	9.5	90	6	UHF670RT100	●
12	-0.014/-0.038	0.75	12	10	36	11.5	100	6	UHF670RT120	●

● stock standard ○ non-standard stock

HSS DRILLS

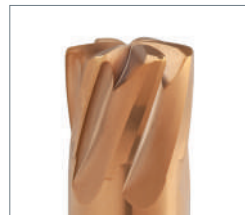
- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

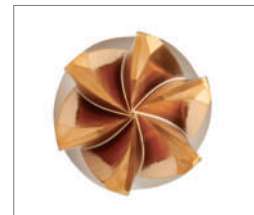
- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



The geometry with combined radius (corner radius + head radius) create thinner chips in comparison with conventional full radius, allowing a great reduction of cutting forces.



Special "no-contact" area in the end mill center, together with low helix geometry, reduce drastically the vibration, even when machining at corners.



Curved cutting edges reduce chattering and improve the chips flow.

HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

UHF-RT

	Material Group ISO 513	P6 H1 H4 H5	H2	H3	
	Hardness/Rm	45÷55 HRC	55÷60 HRC	60÷65 HRC	
	ap x ae	<b>0.03D x 0.55D</b>	<b>0.03D x 0.55D</b>	<b>0.03D x 0.55D</b>	
	Vc (m/min)	<b>100÷120</b>	<b>80÷100</b>	<b>50÷70</b>	
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>2</b>	0.070	0.050	0.040	
	<b>3</b>	0.100	0.080	0.060	
	<b>4</b>	0.150	0.100	0.080	
	<b>5</b>	0.200	0.120	0.100	
	<b>6</b>	0.250	0.200	0.150	
	<b>8</b>	0.350	0.250	0.200	
	<b>10</b>	0.400	0.300	0.250	
<b>12</b>	0.450	0.350	0.300		

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

D	ap max	CAM input			Circular interpolation			Cutting length for linear ramping Lmax (αmax=5°)		
		Rtheo	max unmachined part K		Ø min	Ø max		α=0.5°	α=5°	
2	0.07	0.189	0.051		2.9	3.8	8.02	0.80		
3	0.10	0.283	0.076		4.3	5.8	11.46	1.14		
4	0.13	0.378	0.102		5.7	7.8	14.90	1.49		
5	0.17	0.472	0.127		7.1	9.8	19.48	1.94		
6	0.20	0.567	0.152		8.6	11.8	22.92	2.29		
8	0.27	0.756	0.203		11.4	15.8	30.94	3.09		
10	0.33	0.945	0.254		14.2	19.8	37.81	3.77		
12	0.40	1.134	0.305		17.1	23.8	45.84	4.57		

(mm)

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS



CUTTING PARAMETERS

**UHF4**

	Material Group ISO 513	P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm	≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
	ap x ae	<b>0.03D x 0.3D</b>	<b>0.03D x 0.3D</b>	<b>0.02D x 0.3D</b>	<b>0.02D x 0.3D</b>
	Vc (m/min)	<b>110÷150</b>	<b>90÷130</b>	<b>60÷100</b>	<b>50÷70</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	2	0.033	0.029	0.026	0.023
	3	0.050	0.045	0.040	0.035
	4	0.068	0.061	0.054	0.047
	5	0.086	0.077	0.068	0.060
	6	0.104	0.093	0.083	0.072
8	0.122	0.109	0.097	0.085	
10	0.140	0.126	0.112	0.098	
12	0.158	0.142	0.126	0.110	
ap x ae	<b>D2 - D3</b>	0.02D x 0.3D	0.02D x 0.25D	0.01D x 0.02D	0.01D x 0.02D

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS END-MILLS

CARBIDE BURRS

INFO

# UHCS4

cylindrical shank, 4F, reduced neck, corner radius

OSAWA NORM

UH

NMG  
UH RED

<70  
HRC

40°

RADIUS

Z4

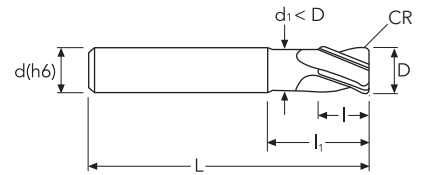


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
☆		☆			★

★ 1st choice ☆ suitable



D	D Tol.	CR	CR Tol.	d(h6)	l	l1	d1	L	z	EDP No.	Stock
<b>1</b>	0/-0.012	0.10	+/-0.010	4	2	3	0.95	50	4	UHCS4010	●
<b>1.5</b>	0/-0.012	0.10	+/-0.010	4	2.5	4	1.45	50	4	UHCS4015	●
<b>2</b>	0/-0.012	0.10	+/-0.010	4	3	6	1.95	50	4	UHCS4020	●
<b>3</b>	0/-0.012	0.10	+/-0.010	6	4	8	2.85	55	4	UHCS4030	●
<b>4</b>	0/-0.012	0.10	+/-0.010	6	6	10	3.85	55	4	UHCS4040	●
<b>5</b>	0/-0.012	0.20	+/-0.010	6	6	11	4.85	50	4	UHCS4050	●
<b>6</b>	0/-0.015	0.20	+/-0.010	6	9	15	5.85	60	4	UHCS4060	●
<b>8</b>	0/-0.015	0.20	+/-0.015	8	12	20	7.70	70	4	UHCS4080	●
<b>10</b>	0/-0.015	0.20	+/-0.015	10	15	25	9.70	70	4	UHCS4100	●
<b>12</b>	0/-0.015	0.30	+/-0.015	12	18	30	11.70	80	4	UHCS4120	●

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH**

HSS END-MILLS


CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



## CUTTING PARAMETERS

## UHCS4

	Material Group ISO 513	P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm	≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
	ap x ae	<b>D x 0.1D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>
	Vc (m/min)	<b>90÷130</b>	<b>60÷100</b>	<b>50÷70</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>1</b>	0.010	0.009	0.008	0.007
	<b>2</b>	0.020	0.018	0.016	0.014
	<b>3</b>	0.030	0.027	0.024	0.021
	<b>4</b>	0.040	0.036	0.032	0.028
	<b>5</b>	0.045	0.041	0.036	0.032
<b>6</b>	0.050	0.045	0.040	0.035	
<b>8</b>	0.065	0.059	0.052	0.046	
<b>10</b>	0.085	0.077	0.068	0.060	
<b>12</b>	0.100	0.090	0.080	0.070	

INFO

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
**UH/MH**
HSS  
END-MILLSCARBIDE  
BURRS

INFO

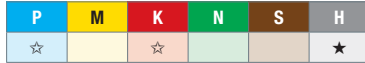
# UH410

cylindrical shank, 4F, corner radius

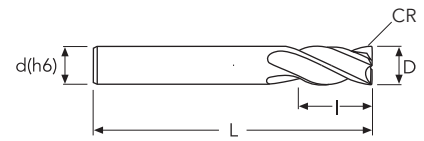


CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



★ 1st choice ☆ suitable



HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

D	D Tol.	CR	CR Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
1	0/-0.015	0.20	0/-0.010	6	3		50	4	UH41001002	●
1.5	0/-0.015	0.20	0/-0.010	6	4.5		50	4	UH41001502	●
2	0/-0.015	0.30	0/-0.010	6	6.5		50	4	UH41002003	●
2.5	0/-0.020	0.30	0/-0.015	6	6.5		50	4	UH41002503	●
2.5	0/-0.020	0.50	0/-0.015	6	6.5		50	4	UH41002505	●
3	0/-0.020	0.20	0/-0.015	6	9		50	4	UH41003002	●
3	0/-0.020	0.30	0/-0.015	6	9		50	4	UH41003003	●
3	0/-0.020	0.50	0/-0.015	6	9		50	4	UH41003005	●
4	0/-0.020	0.30	0/-0.015	6	12		50	4	UH41004003	●
4	0/-0.020	0.50	0/-0.015	6	12		50	4	UH41004005	●
4	0/-0.020	1.00	0/-0.015	6	12		50	4	UH41004010	●
5	0/-0.020	0.30	0/-0.015	6	15		50	4	UH41005003	●
5	0/-0.020	0.50	0/-0.015	6	15		50	4	UH41005005	●
5	0/-0.020	1.00	0/-0.015	6	15		50	4	UH41005010	●
6	0/-0.020	0.30	0/-0.015	6	16		50	4	UH41006003	●
6	0/-0.020	0.50	0/-0.015	6	16		50	4	UH41006005	●
6	0/-0.020	1.00	0/-0.015	6	16		50	4	UH41006010	●
8	0/-0.020	0.30	0/-0.015	8	20		64	4	UH41008003	●
8	0/-0.020	0.50	0/-0.015	8	20		64	4	UH41008005	●
8	0/-0.020	1.00	0/-0.015	8	20		64	4	UH41008010	●
8	0/-0.020	1.50	0/-0.015	8	20		64	4	UH41008015	●
8	0/-0.020	2.00	0/-0.015	8	20		64	4	UH41008020	●
10	0/-0.020	0.30	0/-0.020	10	22		70	4	UH41010003	●
10	0/-0.020	0.50	0/-0.020	10	22		70	4	UH41010005	●
10	0/-0.020	1.00	0/-0.020	10	22		70	4	UH41010010	●
10	0/-0.020	1.50	0/-0.020	10	22		70	4	UH41010015	●
10	0/-0.020	2.00	0/-0.020	10	22		70	4	UH41010020	●
12	0/-0.020	0.30	0/-0.020	12	25		75	4	UH41012003	●
12	0/-0.020	0.50	0/-0.020	12	25		75	4	UH41012005	●
12	0/-0.020	1.00	0/-0.020	12	25		75	4	UH41012010	●
12	0/-0.020	1.50	0/-0.020	12	25		75	4	UH41012015	●
12	0/-0.020	2.00	0/-0.020	12	25		75	4	UH41012020	●
12	0/-0.020	3.00	0/-0.020	12	25		75	4	UH41012030	●
14	0/-0.020	0.50	0/-0.020	14	32		90	4	UH41014005	●
14	0/-0.020	1.00	0/-0.020	14	32		90	4	UH41014010	●
14	0/-0.020	2.00	0/-0.020	14	32		90	4	UH41014020	○
16	0/-0.020	0.30	0/-0.020	16	32		90	4	UH41016003	○
16	0/-0.020	0.50	0/-0.020	16	32		90	4	UH41016005	●
16	0/-0.020	1.00	0/-0.020	16	32		90	4	UH41016010	●

● stock standard ○ non-standard stock ▽ stock exhaustion



INFO

## UH410

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA


	Material Group ISO 513	P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm	≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae	<b>D x 0.1D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>
Vc (m/min)	<b>90÷130</b>	<b>60÷100</b>	<b>50÷70</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.010	0.009	0.008	0.007	
<b>2</b>	0.018	0.016	0.014	0.013	
<b>3</b>	0.027	0.024	0.022	0.019	
<b>4</b>	0.036	0.032	0.029	0.025	
<b>5</b>	0.041	0.036	0.032	0.028	
<b>6</b>	0.045	0.041	0.036	0.032	
<b>8</b>	0.059	0.053	0.047	0.041	
<b>10</b>	0.077	0.069	0.061	0.054	
<b>12</b>	0.090	0.081	0.072	0.063	
<b>14</b>	0.102	0.092	0.082	0.071	
<b>16</b>	0.114	0.103	0.091	0.080	
<b>18</b>	0.126	0.113	0.101	0.088	
<b>20</b>	0.138	0.124	0.110	0.097	

HSS  
DRILLSLFTA  
SUTA  
HSS-HSS/COCARBIDE  
END-MILLSG2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**HSS  
END-MILLSCARBIDE  
BURRS



INFO

## UH411

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA


	Material Group ISO 513	P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
		≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
Hardness/Rm					
ap x ae	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>
Vc (m/min)	<b>90÷130</b>	<b>60÷100</b>	<b>50÷70</b>	<b>30÷50</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.027	0.024	0.022	0.019	
<b>4</b>	0.036	0.032	0.029	0.025	
<b>5</b>	0.041	0.036	0.032	0.028	
<b>6</b>	0.045	0.041	0.036	0.032	
<b>8</b>	0.059	0.053	0.047	0.041	
<b>10</b>	0.077	0.069	0.061	0.054	
<b>12</b>	0.090	0.081	0.072	0.063	

HSS  
DRILLSLFTA  
SUTA  
HSS-HSS/COCARBIDE  
END-MILLSG2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**HSS  
END-MILLSCARBIDE  
BURRS



INFO

# UH412

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm	≤45 HRC	45÷55 HRC	55÷60 HRC
ap x ae	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>
Vc (m/min)	<b>80÷120</b>	<b>60÷100</b>	<b>50÷70</b>	<b>30÷50</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>2</b>	0.016	0.015	0.013	0.011
<b>3</b>	0.024	0.022	0.019	0.017
<b>4</b>	0.032	0.029	0.026	0.023
<b>5</b>	0.036	0.033	0.029	0.026
<b>6</b>	0.041	0.036	0.032	0.028
<b>8</b>	0.053	0.047	0.042	0.037
<b>10</b>	0.069	0.062	0.055	0.048
<b>12</b>	0.081	0.073	0.065	0.057

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS  
END-MILLS


CARBIDE  
BURRS





INFO

## UH413


	Material Group ISO 513	P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm	≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
	ap x ae	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>
	Vc (m/min)	<b>70÷110</b>	<b>60÷80</b>	<b>40÷60</b>	<b>30÷50</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	<b>6</b>	0.041	0.036	0.032	0.028
	<b>8</b>	0.053	0.047	0.042	0.037
<b>10</b>	0.069	0.062	0.055	0.048	
<b>12</b>	0.081	0.073	0.065	0.057	
<b>16</b>	0.095	0.086	0.076	0.067	

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
**UH/MH**
HSS  
END-MILLSCARBIDE  
BURRS



INFO

## UH610R

	Material Group ISO 513	P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm	≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae	<b>D x 0.1D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>	<b>D x 0.05D</b>
Vc (m/min)	<b>140÷180</b>	<b>100÷140</b>	<b>70÷110</b>	<b>60÷80</b>	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.018	0.016	0.014	0.013	
<b>8</b>	0.028	0.025	0.022	0.019	
<b>10</b>	0.034	0.030	0.027	0.024	
<b>12</b>	0.041	0.037	0.033	0.029	

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
**UH/MH**
HSS  
END-MILLSCARBIDE  
BURRS



INFO

## UH611R

Material Group ISO 513	P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm	≤45 HRC	45÷55 HRC	55÷60 HRC
ap x ae	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>	<b>1.5D x 0.05D</b>
Vc (m/min)	<b>110÷150</b>	<b>90÷130</b>	<b>60÷80</b>	<b>40÷60</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.015	0.014	0.012	0.011
<b>8</b>	0.023	0.021	0.019	0.016
<b>10</b>	0.029	0.026	0.023	0.020
<b>12</b>	0.035	0.031	0.028	0.024
<b>16</b>	0.048	0.043	0.038	0.034
<b>20</b>	0.066	0.060	0.053	0.046

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
**UH/MH**
HSS  
END-MILLSCARBIDE  
BURRS



INFO

# MHMB204

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
Hardness/Rm		≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae		<b>0.05D x 0.1D</b>	<b>0.05D x 0.1D</b>	<b>0.05D x 0.1D</b>	<b>0.05D x 0.1D</b>
Vc (m/min)		<b>80÷120</b>	<b>60÷100</b>	<b>40÷80</b>	<b>20÷60</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>0.1</b>	0.04	0.004	0.004	0.003	0.003
<b>0.2</b>	0.09	0.006	0.005	0.005	0.004
<b>0.3</b>	0.13	0.008	0.007	0.006	0.006
<b>0.4</b>	0.17	0.010	0.009	0.008	0.007
<b>0.5</b>	0.22	0.012	0.011	0.010	0.008
<b>0.6</b>	0.26	0.015	0.014	0.012	0.011
<b>0.7</b>	0.31	0.018	0.016	0.014	0.013
<b>0.8</b>	0.35	0.020	0.018	0.016	0.014
<b>0.9</b>	0.39	0.023	0.021	0.018	0.016
<b>1</b>	0.44	0.026	0.023	0.020	0.017
<b>1.5</b>	0.79	0.040	0.036	0.030	0.026
<b>2</b>	1.20	0.055	0.050	0.041	0.036



$\alpha$	n (rpm)	Vf (mm/min)
15°	x 1.1	x 1.1

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS  
END-MILLS


CARBIDE  
BURRS





INFO

## MHMB206

	Material Group ISO 513		P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm		≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
	ap x ae		<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>
	Vc (m/min)		<b>80÷120</b>	<b>60÷100</b>	<b>40÷80</b>	<b>20÷60</b>
	D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>0.4</b>	0.17	0.010	0.009	0.008	0.007	
<b>0.5</b>	0.22	0.012	0.011	0.010	0.008	
<b>0.6</b>	0.26	0.015	0.014	0.012	0.011	
<b>0.8</b>	0.35	0.020	0.018	0.016	0.014	

CARBIDE  
DRILLS

PU-HPU

TA-4HTA

SUH

ALH


HRC

SUH MINI

HL

HSD

C-SD-TA

	$\alpha$	n (rpm)	Vf (mm/min)
	15°	x 1.1	x 1.1

HSS  
DRILLS

LFTA

SUTA

HSS-HSS/CO

CARBIDE  
END-MILLS

G2

MDTA

HF VH/UP

MEF

ALU

MEX/MH

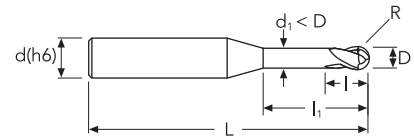
**UH/MH**HSS  
END-MILLSCARBIDE  
BURRS

# MHLNB2

cylindrical shank, 2 flutes ball nose, extended and reduced neck, miniature

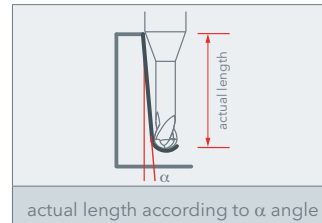


INFO



P	M	K	N	S	H
★		★			★

★ 1st choice ★ suitable



CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

D	D Tol.	R	R Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
0.2	0/-0.015	0.10	0/-0.020	4	0.2	0.5	0.17	50	2	0.57	0.58	0.60	0.62	0.66	MHLNB2002005	●
0.2	0/-0.015	0.10	0/-0.020	4	0.2	1	0.17	50	2	1.08	1.12	1.15	1.19	1.27	MHLNB200201	●
0.2	0/-0.015	0.10	0/-0.020	4	0.2	1.5	0.17	50	2	1.60	1.65	1.71	1.76	1.89	MHLNB2002015	●
0.3	0/-0.015	0.15	0/-0.020	4	0.3	1	0.27	50	2	1.08	1.11	1.15	1.18	1.26	MHLNB200301	●
0.3	0/-0.015	0.15	0/-0.020	4	0.3	2	0.27	50	2	2.12	2.18	2.25	2.33	2.49	MHLNB200302	●
0.3	0/-0.015	0.15	0/-0.020	4	0.3	3	0.27	50	2	3.15	3.25	3.36	3.48	3.73	MHLNB200303	●
0.4	0/-0.015	0.20	0/-0.020	4	0.4	1	0.37	50	2	1.08	1.11	1.14	1.18	1.25	MHLNB200401	●
0.4	0/-0.015	0.20	0/-0.020	4	0.4	2	0.37	50	2	2.11	2.18	2.25	2.32	2.48	MHLNB200402	●
0.4	0/-0.015	0.20	0/-0.020	4	0.4	3	0.37	50	2	3.15	3.25	3.36	3.47	3.72	MHLNB200403	●
0.4	0/-0.015	0.20	0/-0.020	4	0.4	4	0.37	50	2	4.18	4.32	4.46	4.62	4.95	MHLNB200404	●
0.4	0/-0.015	0.20	0/-0.020	4	0.4	5	0.37	50	2	5.21	5.39	5.57	5.77	6.18	MHLNB200405	●
0.5	0/-0.015	0.25	0/-0.020	4	0.4	2	0.45	50	2	2.15	2.22	2.29	2.36	2.52	MHLNB200502	●
0.5	0/-0.015	0.25	0/-0.020	4	0.4	3	0.45	50	2	3.18	3.29	3.39	3.51	3.75	MHLNB200503	●
0.5	0/-0.015	0.25	0/-0.020	4	0.4	4	0.45	50	2	4.22	4.35	4.50	4.65	4.98	MHLNB200504	●
0.5	0/-0.015	0.25	0/-0.020	4	0.4	5	0.45	50	2	5.25	5.42	5.61	5.80	6.22	MHLNB200505	●
0.5	0/-0.015	0.25	0/-0.020	4	0.4	6	0.45	50	2	6.28	6.49	6.71	6.95	7.45	MHLNB200506	●
0.5	0/-0.015	0.25	0/-0.020	4	0.4	8	0.45	50	2	8.35	8.63	8.93	9.24	9.92	MHLNB200508	●
0.6	0/-0.015	0.30	0/-0.020	4	0.5	2	0.55	50	2	2.15	2.21	2.28	2.35	2.50	MHLNB200602	●
0.6	0/-0.015	0.30	0/-0.020	4	0.5	3	0.55	50	2	3.18	3.28	3.39	3.50	3.74	MHLNB200603	●
0.6	0/-0.015	0.30	0/-0.020	4	0.5	4	0.55	50	2	4.22	4.35	4.49	4.65	4.97	MHLNB200604	●
0.6	0/-0.015	0.30	0/-0.020	4	0.5	5	0.55	50	2	5.25	5.42	5.60	5.79	6.21	MHLNB200605	●
0.6	0/-0.015	0.30	0/-0.020	4	0.5	6	0.55	50	2	6.28	6.49	6.71	6.94	7.44	MHLNB200606	●
0.6	0/-0.015	0.30	0/-0.020	4	0.5	8	0.55	50	2	8.35	8.63	8.92	9.23	9.91	MHLNB200608	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	2	0.75	50	2	2.15	2.21	2.27	2.34	2.48	MHLNB200802	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	4	0.75	50	2	4.21	4.34	4.48	4.63	4.95	MHLNB200804	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	5	0.75	50	2	5.25	5.41	5.59	5.78	6.18	MHLNB200805	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	6	0.75	50	2	6.28	6.48	6.70	6.93	7.42	MHLNB200806	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	7	0.75	50	2	7.31	7.55	7.81	8.07	8.65	MHLNB200807	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	8	0.75	50	2	8.35	8.62	8.91	9.22	9.88	MHLNB200808	●
0.8	0/-0.015	0.40	0/-0.020	4	0.6	10	0.75	50	2	10.41	10.76	11.13	11.51	12.35	MHLNB200810	●
1	0/-0.015	0.50	0/-0.020	4	0.8	3	0.9	50	2	3.27	3.37	3.47	3.57	3.80	MHLNB201003	●
1	0/-0.015	0.50	0/-0.020	4	0.8	4	0.9	50	2	4.31	4.44	4.58	4.72	5.04	MHLNB201004	●
1	0/-0.015	0.50	0/-0.020	4	0.8	5	0.9	50	2	5.34	5.51	5.68	5.87	6.27	MHLNB201005	●
1	0/-0.015	0.50	0/-0.020	4	0.8	6	0.9	50	2	6.37	6.58	6.79	7.02	7.50	MHLNB201006	●
1	0/-0.015	0.50	0/-0.020	4	0.8	7	0.9	50	2	7.41	7.64	7.90	8.16	8.74	MHLNB201007	●
1	0/-0.015	0.50	0/-0.020	4	0.8	8	0.9	50	2	8.44	8.71	9.00	9.31	9.97	MHLNB201008	●
1	0/-0.015	0.50	0/-0.020	4	0.8	9	0.9	50	2	9.47	9.78	10.11	10.46	11.21	MHLNB201009	●
1	0/-0.015	0.50	0/-0.020	4	0.8	10	0.9	50	2	10.51	10.85	11.22	11.61	12.44	MHLNB201010	●
1	0/-0.015	0.50	0/-0.020	4	0.8	12	0.9	50	2	12.57	12.99	13.43	13.90	14.91	MHLNB201012	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

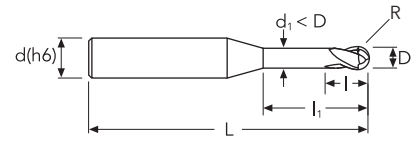
CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# MHLNB2

cylindrical shank, 2 flutes ball nose, extended and reduced neck, miniature

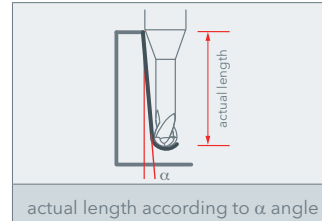


CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
★		★			★

★ 1st choice ★ suitable



D	D Tol.	R	R Tol.	d(h6)	l	l1	d1	L	z	30°	1°	1°30'	2°	3°	EDP No.	Stock
1	0/-0.015	0.50	0/-0.020	4	0.8	14	0.9	50	2	14.64	15.13	15.65	16.19	17.37	MHLNB201014	●
1	0/-0.015	0.50	0/-0.020	4	0.8	16	0.9	50	2	16.71	17.27	17.86	18.49	19.84	MHLNB201016	●
1	0/-0.015	0.50	0/-0.020	4	0.8	20	0.9	60	2	20.84	21.55	22.29	23.08	24.78	MHLNB201020	●
1.2	0/-0.015	0.60	0/-0.020	4	1.0	6	1.1	50	2	6.37	6.57	6.78	7.00	7.48	MHLNB201206	●
1.2	0/-0.015	0.60	0/-0.020	4	1.0	8	1.1	50	2	8.44	8.71	8.99	9.30	9.95	MHLNB201208	●
1.2	0/-0.015	0.60	0/-0.020	4	1.0	10	1.1	50	2	10.50	10.85	11.21	11.59	12.42	MHLNB201210	●
1.2	0/-0.015	0.60	0/-0.020	4	1.0	12	1.1	50	2	12.57	12.98	13.42	13.89	14.88	MHLNB201212	●
1.4	0/-0.015	0.70	0/-0.020	4	1.1	8	1.3	50	2	8.43	8.70	8.98	9.28	9.93	MHLNB201408	●
1.4	0/-0.015	0.70	0/-0.020	4	1.1	12	1.3	50	2	12.57	12.98	13.41	13.87	14.86	MHLNB201412	●
1.4	0/-0.015	0.70	0/-0.020	4	1.1	16	1.3	50	2	16.70	17.26	17.84	18.46	19.80	MHLNB201416	●
1.5	0/-0.015	0.75	0/-0.020	4	1.2	8	1.4	50	2	8.43	8.70	8.98	9.27	9.91	MHLNB201508	●
1.5	0/-0.015	0.75	0/-0.020	4	1.2	12	1.4	50	2	12.57	12.97	13.41	13.86	14.85	MHLNB201512	●
1.5	0/-0.015	0.75	0/-0.020	4	1.2	16	1.4	50	2	16.70	17.25	17.84	18.45	19.78	MHLNB201516	●
1.5	0/-0.015	0.75	0/-0.020	4	1.2	18	1.4	60	2	18.77	19.39	20.05	20.75	22.25	MHLNB201518	●
1.5	0/-0.015	0.75	0/-0.020	6	2.4	20	1.4	50	2	20.84	21.53	22.26	23.04	24.72	MHLNB201520	●
1.6	0/-0.015	0.80	0/-0.020	4	1.3	8	1.5	50	2	8.43	8.69	8.97	9.27	9.90	MHLNB201608	●
1.6	0/-0.015	0.80	0/-0.020	4	1.3	12	1.5	50	2	12.56	12.97	13.40	13.86	14.84	MHLNB201612	●
1.6	0/-0.015	0.80	0/-0.020	4	1.3	16	1.5	50	2	16.70	17.25	17.83	18.45	19.77	MHLNB201616	●
1.6	0/-0.015	0.80	0/-0.020	4	1.3	20	1.5	60	2	20.83	21.53	22.26	23.03	-	MHLNB201620	●
1.8	0/-0.015	0.90	0/-0.020	4	1.4	8	1.7	50	2	8.43	8.69	8.96	9.25	9.88	MHLNB201808	●
1.8	0/-0.015	0.90	0/-0.020	4	1.4	12	1.7	50	2	12.56	12.96	13.39	13.84	14.81	MHLNB201812	●
1.8	0/-0.015	0.90	0/-0.020	4	1.4	16	1.7	50	2	16.70	17.24	17.82	18.43	19.75	MHLNB201816	●
1.8	0/-0.015	0.90	0/-0.020	4	1.4	20	1.7	60	2	20.83	21.52	22.25	23.02	-	MHLNB201820	●
2	0/-0.015	1.00	0/-0.020	4	1.6	4	1.9	50	2	4.29	4.40	4.52	4.65	4.92	MHLNB202004	●
2	0/-0.015	1.00	0/-0.020	4	1.6	6	1.9	50	2	6.36	6.54	6.74	6.94	7.39	MHLNB202006	●
2	0/-0.015	1.00	0/-0.020	4	1.6	8	1.9	50	2	8.42	8.68	8.95	9.24	9.86	MHLNB202008	●
2	0/-0.015	1.00	0/-0.020	4	1.6	10	1.9	50	2	10.49	10.82	11.17	11.53	12.32	MHLNB202010	●
2	0/-0.015	1.00	0/-0.020	4	1.6	12	1.9	50	2	12.56	12.96	13.38	13.83	14.79	MHLNB202012	●
2	0/-0.015	1.00	0/-0.020	4	1.6	14	1.9	50	2	14.62	15.10	15.59	16.12	17.26	MHLNB202014	●
2	0/-0.015	1.00	0/-0.020	4	1.6	16	1.9	50	2	16.69	17.23	17.81	18.42	19.73	MHLNB202016	●
2	0/-0.015	1.00	0/-0.020	4	1.6	18	1.9	60	2	18.76	19.37	20.02	20.71	-	MHLNB202018	●
2	0/-0.015	1.00	0/-0.020	4	1.6	20	1.9	60	2	20.83	21.51	22.24	23.00	-	MHLNB202020	●
2	0/-0.015	1.00	0/-0.020	4	1.6	22	1.9	60	2	22.89	23.65	24.45	25.30	-	MHLNB202022	●
2	0/-0.015	1.00	0/-0.020	4	1.6	25	1.9	75	2	25.99	26.86	27.77	28.74	-	MHLNB202025	●
2	0/-0.015	1.00	0/-0.020	4	1.6	30	1.9	75	2	31.16	32.21	33.31	-	-	MHLNB202030	●
3	0/-0.020	1.50	0/-0.020	6	2.4	8	2.8	50	2	8.60	8.84	9.10	9.37	9.96	MHLNB203008	●
3	0/-0.020	1.50	0/-0.020	6	2.4	10	2.8	50	2	10.67	10.98	11.32	11.67	12.43	MHLNB203010	●
3	0/-0.020	1.50	0/-0.020	6	2.4	12	2.8	50	2	12.73	13.12	13.53	13.96	14.90	MHLNB203012	●
3	0/-0.020	1.50	0/-0.020	6	2.4	16	2.8	60	2	16.87	17.40	17.96	18.55	19.83	MHLNB203016	●

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion



INFO

### MHLNB2

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS END-MILLS

CARBIDE BURRS

Material Group ISO 513				P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3			
Hardness/Rm				≤45 HRC				45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae				ap x 0.2D				ap x 0.2D	ap x 0.2D	ap x 0.2D
Vc (m/min)				140÷160				110÷130	80÷100	50÷70
D (mm)	I1 (mm)	ap (mm)	D(eff.) (mm)	fz (mm/z)		fz (mm/z)		fz (mm/z)		
0.2	≤ 6D	0.01	0.09	0.008		0.007		0.006		
	≤ 8D	0.01	0.08	0.007		0.006		0.005		
	≤ 10D	0.01	0.07	0.006		0.005		0.004		
0.3	≤ 6D	0.02	0.13	0.010		0.009		0.008		
	≤ 8D	0.01	0.12	0.009		0.007		0.006		
	≤ 10D	0.01	0.11	0.008		0.006		0.005		
0.4	≤ 6D	0.02	0.17	0.013		0.012		0.010		
	≤ 8D	0.02	0.16	0.012		0.009		0.008		
	≤ 10D	0.01	0.15	0.010		0.007		0.007		
0.5	≤ 6D	0.03	0.22	0.017		0.015		0.014		
	≤ 8D	0.02	0.20	0.015		0.012		0.011		
	≤ 10D	0.02	0.18	0.014		0.010		0.009		
0.6	≤ 6D	0.03	0.26	0.021		0.019		0.017		
	≤ 8D	0.03	0.24	0.019		0.015		0.014		
	≤ 10D	0.02	0.22	0.017		0.012		0.011		
0.8	≤ 6D	0.04	0.35	0.025		0.023		0.020		
	≤ 8D	0.03	0.32	0.023		0.018		0.016		
	≤ 10D	0.03	0.29	0.020		0.014		0.013		
1	≤ 6D	0.05	0.44	0.030		0.027		0.024		
	≤ 8D	0.04	0.40	0.027		0.022		0.019		
	≤ 10D	0.04	0.37	0.024		0.017		0.015		
	≤ 12D	0.03	0.33	0.021		0.013		0.012		
	>12D	0.02	0.30	0.018		0.010		0.009		
1.2	≤ 6D	0.06	0.52	0.035		0.032		0.028		
	≤ 8D	0.05	0.48	0.032		0.026		0.023		
	≤ 10D	0.04	0.44	0.028		0.020		0.018		
	≤ 12D	0.03	0.39	0.025		0.015		0.014		
	>12D	0.03	0.36	0.021		0.011		0.010		
1.5	≤ 6D	0.08	0.65	0.045		0.041		0.036		
	≤ 8D	0.06	0.61	0.041		0.033		0.029		
	≤ 10D	0.05	0.55	0.036		0.026		0.023		
	≤ 12D	0.04	0.49	0.032		0.020		0.018		
	>12D	0.03	0.44	0.027		0.015		0.013		
2	≤ 6D	0.10	0.87	0.060		0.054		0.048		
	≤ 8D	0.09	0.81	0.054		0.044		0.039		
	≤ 10D	0.07	0.74	0.048		0.035		0.031		
	≤ 12D	0.06	0.65	0.042		0.026		0.024		
	>12D	0.05	0.59	0.036		0.019		0.017		
2.5	≤ 6D	0.13	1.09	0.060		0.054		0.048		
	≤ 8D	0.11	1.01	0.054		0.044		0.039		
	≤ 10D	0.09	0.92	0.048		0.035		0.031		
	≤ 12D	0.07	0.82	0.042		0.026		0.024		
	>12D	0.06	0.74	0.036		0.019		0.017		
3	≤ 6D	0.15	1.31	0.075		0.068		0.060		
	≤ 8D	0.13	1.21	0.068		0.055		0.049		
	≤ 10D	0.11	1.10	0.060		0.043		0.038		
	≤ 12D	0.08	0.98	0.053		0.033		0.029		
	>12D	0.07	0.89	0.045		0.024		0.022		

$\alpha$	n (rpm)	Vf (mm/min)
45°	x 1.65	x 1.65
30°	x 1.30	x 1.30
15°	x 1.15	x 1.15

CUTTING PARAMETERS

### MHLNB2

	Material Group ISO 513				P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm				≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
	ap x ae				ap x 0.2D			
	Vc (m/min)				140÷160			
	D (mm)				fz (mm/z)			
	4				fz (mm/z)			
	l1 (mm)	ap (mm)	D(eff.) (mm)					
	≤ 6D	0.20	1.74	0.095	0.086	0.076	0.067	
	≤ 8D	0.17	1.61	0.086	0.069	0.062	0.054	
	≤ 10D	0.14	1.47	0.076	0.055	0.049	0.043	
	≤ 12D	0.11	1.31	0.067	0.042	0.037	0.033	
	>12D	0.09	1.19	0.057	0.031	0.027	0.024	

	α	n (rpm)	Vf (mm/min)
	45°	x 1.65	x 1.65
	30°	x 1.30	x 1.30
	15°	x 1.15	x 1.15

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

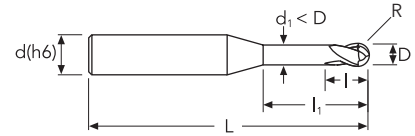
HSS END-MILLS

CARBIDE BURRS

INFO

# MHCRB2

cylindrical shank, 2 flutes ball nose, extended and reduced neck, miniature, 6 mm. shank

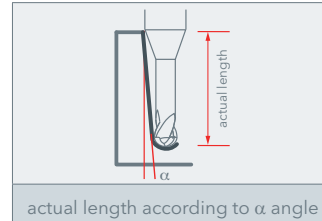


CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
★		★			★

★ 1st choice ★ suitable



HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HFVH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

D	D Tol.	R	R Tol.	d(h6)	l	l1	d1	L	z	30'	1°	1°30'	2°	3°	EDP No.	Stock
0.5	0/-0.012	0.25	+/-0.005	6	0.5	2	0.45	50	2	2.15	2.22	2.29	2.36	2.52	MHCRB20050206	●
0.5	0/-0.012	0.25	+/-0.005	6	0.5	4	0.45	50	2	4.22	4.35	4.50	4.65	4.98	MHCRB20050406	●
0.6	0/-0.012	0.30	+/-0.005	6	0.5	2	0.55	50	2	2.15	2.21	2.28	2.35	2.50	MHCRB20060206	●
0.6	0/-0.012	0.30	+/-0.005	6	0.5	4	0.55	50	2	4.22	4.35	4.49	4.65	4.97	MHCRB20060406	●
0.6	0/-0.012	0.30	+/-0.005	6	0.5	6	0.55	50	2	6.28	6.49	6.71	6.94	7.44	MHCRB20060606	●
0.8	0/-0.012	0.40	+/-0.005	6	0.8	2	0.75	50	2	2.15	2.21	2.27	2.34	2.48	MHCRB20080206	●
0.8	0/-0.012	0.40	+/-0.005	6	0.8	4	0.75	50	2	4.21	4.34	4.48	4.63	4.95	MHCRB20080406	●
0.8	0/-0.012	0.40	+/-0.005	6	0.8	6	0.75	50	2	6.28	6.48	6.70	6.93	7.42	MHCRB20080606	●
1	0/-0.012	0.50	+/-0.005	6	1	3	0.90	50	2	3.27	3.37	3.47	3.57	3.80	MHCRB20100306	●
1	0/-0.012	0.50	+/-0.005	6	1	6	0.90	50	2	6.37	6.58	6.79	7.02	7.50	MHCRB20100606	●
1	0/-0.012	0.50	+/-0.005	6	1	8	0.90	50	2	8.44	8.71	9.00	9.31	9.97	MHCRB20100806	●
1	0/-0.012	0.50	+/-0.005	6	1	10	0.90	50	2	10.51	10.85	11.22	11.61	12.44	MHCRB20101006	●
1.2	0/-0.012	0.60	+/-0.005	6	1.2	6	1.10	50	2	6.37	6.57	6.78	7.00	7.48	MHCRB20120606	●
1.2	0/-0.012	0.60	+/-0.005	6	1.2	8	1.10	50	2	8.44	8.71	8.99	9.30	9.95	MHCRB20120806	●
1.2	0/-0.012	0.60	+/-0.005	6	1.2	10	1.10	50	2	10.50	10.85	11.21	11.59	12.42	MHCRB20121006	●
1.5	0/-0.012	0.75	+/-0.005	6	1.5	4	1.40	50	2	4.30	4.42	4.55	4.68	4.98	MHCRB20150406	●
1.5	0/-0.012	0.75	+/-0.005	6	1.5	8	1.40	50	2	8.43	8.70	8.98	9.27	9.91	MHCRB20150806	●
1.5	0/-0.012	0.75	+/-0.005	6	1.5	10	1.40	50	2	10.50	10.84	11.19	11.57	12.38	MHCRB20151006	●
1.5	0/-0.012	0.75	+/-0.005	6	1.5	12	1.40	50	2	12.57	12.97	13.41	13.86	14.85	MHCRB20151206	●
1.5	0/-0.012	0.75	+/-0.005	6	1.5	16	1.40	50	2	16.70	17.25	17.84	18.45	19.78	MHCRB20151606	●
2	0/-0.012	1.00	+/-0.005	6	3	6	1.90	50	2	6.36	6.54	6.74	6.94	7.39	MHCRB20200606	●
2	0/-0.012	1.00	+/-0.005	6	3	8	1.90	50	2	8.42	8.68	8.95	9.24	9.86	MHCRB20200806	●
2	0/-0.012	1.00	+/-0.005	6	3	10	1.90	50	2	10.49	10.82	11.17	11.53	12.32	MHCRB20201006	●
2	0/-0.012	1.00	+/-0.005	6	3	12	1.90	50	2	12.56	12.96	13.38	13.83	14.79	MHCRB20201206	●
2	0/-0.012	1.00	+/-0.005	6	3	16	1.90	50	2	16.69	17.23	17.81	18.42	19.73	MHCRB20201606	●
2	0/-0.012	1.00	+/-0.005	6	3	20	1.90	50	2	20.83	21.51	22.24	23.00	24.66	MHCRB20202006	●

● stock standard ○ non-standard stock ▽ stock exhaustion



CUTTING PARAMETERS

MHCRB2

Material Group ISO 513				P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3			
Hardness/Rm				≤45 HRC				45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae				ap x 0.2D				ap x 0.2D	ap x 0.2D	ap x 0.2D
Vc (m/min)				140÷160				110÷130	80÷100	50÷70
D (mm)	l1 (mm)	ap (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)			
0.5	≤ 6D	0.03	0.22	0.020	0.018	0.016	0.014			
	≤ 8D	0.02	0.20	0.018	0.015	0.013	0.011			
	≤ 10D	0.02	0.18	0.016	0.012	0.010	0.009			
0.6	≤ 6D	0.03	0.26	0.022	0.020	0.018	0.015			
	≤ 8D	0.03	0.24	0.020	0.016	0.014	0.012			
	≤ 10D	0.02	0.22	0.018	0.013	0.011	0.010			
0.8	≤ 6D	0.04	0.35	0.025	0.023	0.020	0.018			
	≤ 8D	0.03	0.32	0.023	0.018	0.016	0.014			
	≤ 10D	0.03	0.29	0.020	0.014	0.013	0.011			
1	≤ 6D	0.05	0.44	0.030	0.027	0.024	0.021			
	≤ 8D	0.04	0.40	0.027	0.022	0.019	0.017			
	≤ 10D	0.04	0.37	0.024	0.017	0.015	0.013			
	≤ 12D	0.03	0.33	0.021	0.013	0.012	0.010			
	>12D	0.02	0.30	0.018	0.010	0.009	0.008			
1.2	≤ 6D	0.06	0.52	0.035	0.032	0.028	0.025			
	≤ 8D	0.05	0.48	0.032	0.026	0.023	0.020			
	≤ 10D	0.04	0.44	0.028	0.020	0.018	0.016			
	≤ 12D	0.03	0.39	0.025	0.015	0.014	0.012			
1.5	>12D	0.03	0.36	0.021	0.011	0.010	0.009			
	≤ 6D	0.08	0.65	0.045	0.041	0.036	0.032			
	≤ 8D	0.06	0.61	0.041	0.033	0.029	0.026			
	≤ 10D	0.05	0.55	0.036	0.026	0.023	0.020			
2	≤ 12D	0.04	0.49	0.032	0.020	0.018	0.015			
	>12D	0.03	0.44	0.027	0.015	0.013	0.011			
	≤ 6D	0.10	0.87	0.060	0.054	0.048	0.042			
	≤ 8D	0.09	0.81	0.054	0.044	0.039	0.034			
	≤ 10D	0.07	0.74	0.048	0.035	0.031	0.027			
	≤ 12D	0.06	0.65	0.042	0.026	0.024	0.021			
>12D	0.05	0.59	0.036	0.019	0.017	0.015				



$\alpha$	n (rpm)	Vf (mm/min)
45°	x 1.65	x 1.65
30°	x 1.30	x 1.30
15°	x 1.15	x 1.15

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# UHCSB2

cylindrical shank, 2 flutes ball nose

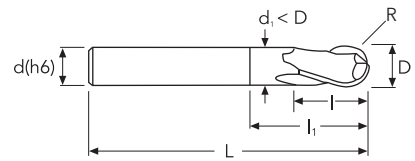


CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

P	M	K	N	S	H
☆		☆			★

★ 1st choice ☆ suitable



D	D Tol.	R	R Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
1	0/-0.012	0.50	0/-0.010	6	1.5		40	2	UHCSB2010	●
1.5	0/-0.012	0.75	0/-0.010	6	2.5		40	2	UHCSB2015	●
2	0/-0.012	1.00	0/-0.010	6	3		40	2	UHCSB2020	●
2.5	0/-0.012	1.25	0/-0.010	6	3		50	2	UHCSB2025	●
3	0/-0.012	1.50	0/-0.010	6	4.5		50	2	UHCSB2030	●
4	0/-0.012	2.00	0/-0.010	6	6		50	2	UHCSB2040	●
5	0/-0.012	2.50	0/-0.010	6	7.5		50	2	UHCSB2050	●
6	0/-0.015	3.00	0/-0.010	6	9		50	2	UHCSB2060	●
8	0/-0.015	4.00	0/-0.010	8	12		50	2	UHCSB2080	●
10	0/-0.015	5.00	0/-0.010	10	15		60	2	UHCSB2100	●
12	0/-0.015	6.00	0/-0.010	12	18		60	2	UHCSB2120	●
14	0/-0.020	7.00	0/-0.020	14	32		90	2	UHCSB2140	●
16	0/-0.020	8.00	0/-0.020	16	32		90	2	UHCSB2160	●
18	0/-0.020	9.00	0/-0.020	18	38		100	2	UHCSB2180	●
20	0/-0.020	10.00	0/-0.020	20	38		100	2	UHCSB2200	●

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH**

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

**UHCSB2**

Material Group ISO 513		P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
Hardness/Rm		≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae		<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>
Vc (m/min)		<b>140÷180</b>	<b>100÷140</b>	<b>80÷100</b>	<b>60÷80</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.44	0.009	0.008	0.007	0.006
<b>1.5</b>	0.79	0.012	0.011	0.010	0.008
<b>2</b>	1.20	0.012	0.011	0.010	0.008
<b>2.5</b>	1.65	0.015	0.014	0.012	0.011
<b>3</b>	2.14	0.018	0.016	0.014	0.013
<b>4</b>	3.20	0.025	0.023	0.020	0.018
<b>5</b>	4.33	0.032	0.029	0.026	0.022
<b>6</b>	5.50	0.038	0.034	0.030	0.027
<b>8</b>	7.84	0.048	0.043	0.038	0.034
<b>10</b>	10.00	0.057	0.051	0.046	0.040
<b>12</b>	11.76	0.067	0.060	0.054	0.047
<b>14</b>	12.83	0.080	0.072	0.064	0.056
<b>16</b>	12.80	0.095	0.086	0.076	0.067
<b>18</b>	10.80	0.108	0.097	0.086	0.076
<b>20</b>	12.00	0.108	0.097	0.086	0.076



	α	n (rpm)	Vf (mm/min)
	15°	x 1.1	x 1.1

INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS END-MILLS

CARBIDE BURRS



## CUTTING PARAMETERS

## UH250

Material Group ISO 513		P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
Hardness/Rm		≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae		<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>
Vc (m/min)		<b>120÷160</b>	<b>100÷130</b>	<b>70÷90</b>	<b>50÷70</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.44	0.015	0.014	0.012	0.011
<b>2</b>	0.87	0.021	0.019	0.017	0.015
<b>3</b>	1.31	0.027	0.024	0.022	0.019
<b>4</b>	1.74	0.037	0.033	0.029	0.026
<b>5</b>	2.18	0.045	0.041	0.036	0.032
<b>6</b>	2.62	0.051	0.046	0.041	0.036
<b>8</b>	3.49	0.060	0.054	0.048	0.042
<b>10</b>	4.36	0.068	0.061	0.054	0.048
<b>12</b>	5.23	0.077	0.069	0.061	0.054
<b>14</b>	6.10	0.089	0.080	0.071	0.062
<b>16</b>	6.97	0.102	0.092	0.082	0.071
<b>18</b>	7.85	0.115	0.103	0.092	0.080
<b>20</b>	8.72	0.132	0.119	0.106	0.092



$\alpha$	n (rpm)	Vf (mm/min)
30°	x 0.8	x 0.8
15°	x 0.7	x 0.7
0°	x 0.6	x 0.6



INFO

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF-VH/UP  
 MEF  
 ALU  
 MEX/MH  
**UH/MH**
HSS  
END-MILLSCARBIDE  
BURRS



CUTTING PARAMETERS

UH253

Material Group ISO 513		P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
Hardness/Rm		≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae		<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>	<b>0.05D x 0.2D</b>
Vc (m/min)		<b>110÷150</b>	<b>80÷120</b>	<b>50÷90</b>	<b>40÷60</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>1</b>	0.44	0.015	0.014	0.012	0.011
<b>2</b>	0.87	0.021	0.019	0.017	0.015
<b>3</b>	1.31	0.027	0.024	0.022	0.019
<b>4</b>	1.74	0.037	0.033	0.029	0.026
<b>5</b>	2.18	0.045	0.041	0.036	0.032
<b>6</b>	2.62	0.051	0.046	0.041	0.036
<b>8</b>	3.49	0.060	0.054	0.048	0.042
<b>10</b>	4.36	0.068	0.061	0.054	0.048
<b>12</b>	5.23	0.077	0.069	0.061	0.054
<b>14</b>	6.10	0.089	0.080	0.071	0.062
<b>16</b>	6.97	0.102	0.092	0.082	0.071
<b>18</b>	7.85	0.115	0.103	0.092	0.080
<b>20</b>	8.72	0.132	0.119	0.106	0.092



α	n (rpm)	Vf (mm/min)
30°	x 0.8	x 0.8
15°	x 0.7	x 0.7
0°	x 0.6	x 0.6



INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
**UH/MH**

HSS END-MILLS

CARBIDE BURRS





## HSS END MILLS


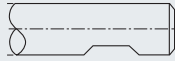






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🇮🇹 Legenda 🇩🇪 Verzeichnis 🇫🇷 Légende 🇪🇸 Leyenda 🇷🇺 Условные обозначения

STOCK		
●	<ul style="list-style-type: none"> <li>🇩🇪 stock standard</li> <li>🇮🇹 stock standard</li> <li>🇩🇪 Standard Lager</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 stock standard</li> <li>🇪🇸 stock estándar</li> <li>🇷🇺 складская позиция</li> </ul>
○	<ul style="list-style-type: none"> <li>🇩🇪 non-standard stock</li> <li>🇮🇹 stock non standard</li> <li>🇩🇪 nicht Standard Lager</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 stock non standard</li> <li>🇪🇸 stock no estándar</li> <li>🇷🇺 не складская позиция</li> </ul>
▽	<ul style="list-style-type: none"> <li>🇩🇪 stock exhaustion</li> <li>🇮🇹 esaurimento stock</li> <li>🇩🇪 Vorraterschöpfung</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 épuisement du stock</li> <li>🇪🇸 agotamiento de stock</li> <li>🇷🇺 складские остатки</li> </ul>




🇩🇪 APPLICATION GUIDELINES 🇮🇹 INDICAZIONI PER L'APPLICAZIONE 🇩🇪 LEITFADEN ZUR ANWENDUNG 🇫🇷 INDICATIONS POUR L'APPLICATION 🇪🇸 INDICACIONES PARA SU APLICACIÓN 🇷🇺 УКАЗАНИЯ ПО ПРИМЕНЕНИЮ		
★	<ul style="list-style-type: none"> <li>🇩🇪 1st choice</li> <li>🇮🇹 1° scelta</li> <li>🇩🇪 1. Wahl</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 1er choix</li> <li>🇪🇸 1ª elección</li> <li>🇷🇺 1-й выбор</li> </ul>
☆	<ul style="list-style-type: none"> <li>🇩🇪 suitable</li> <li>🇮🇹 adatto</li> <li>🇩🇪 geeignet</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 adapté</li> <li>🇪🇸 adecuado</li> <li>🇷🇺 пригоден</li> </ul>



🇩🇪 SHANK 🇮🇹 ATTACCO 🇩🇪 SCHAFT 🇫🇷 QUEUE 🇪🇸 MANGO 🇷🇺 ХВОСТОВИК		
	<ul style="list-style-type: none"> <li>🇩🇪 cylindrical shank</li> <li>🇮🇹 attacco cilindrico</li> <li>🇩🇪 zylindrischer Schaft</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 queue cylindrique</li> <li>🇪🇸 mango cilíndrico</li> <li>🇷🇺 цилиндрическое крепление</li> </ul>
	Weldon	

🇩🇪 MILLING STRATEGY 🇮🇹 STRATEGIA DI FRESATURA 🇩🇪 FRÄSSTRATEGIE 🇫🇷 STRATÉGIES DE FRAISAGE 🇪🇸 ESTRATEGIA DE FRESADO 🇷🇺 СТРАТЕГИЯ ФРЕЗЕРОВАНИЯ		
	<ul style="list-style-type: none"> <li>🇩🇪 slotting</li> <li>🇮🇹 fresatura di cave</li> <li>🇩🇪 Nutfräsen</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 fraisage de pièce taillée dans la masse</li> <li>🇪🇸 fresado de una sola pieza</li> <li>🇷🇺 фрезерование пазов</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 side milling</li> <li>🇮🇹 contornatura</li> <li>🇩🇪 Konturfräsen</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 contournage</li> <li>🇪🇸 perfiladura</li> <li>🇷🇺 фрезерование по контуру</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 copying</li> <li>🇮🇹 copiatura</li> <li>🇩🇪 Kopieren</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 copiage</li> <li>🇪🇸 copia</li> <li>🇷🇺 копирование</li> </ul>
	<ul style="list-style-type: none"> <li>🇩🇪 drilling</li> <li>🇮🇹 foratura</li> <li>🇩🇪 Bohren</li> </ul>	<ul style="list-style-type: none"> <li>🇫🇷 perçage</li> <li>🇪🇸 perforación</li> <li>🇷🇺 сверление</li> </ul>

🇮🇹 Legenda 🇩🇪 Verzeichnis 🇫🇷 Légende 🇪🇸 Leyenda 🇷🇺 Условные обозначения

🇩🇪 MILLING STRATEGY 🇮🇹 STRATEGIA DI FRESATURA 🇩🇪 FRÄSSTRATEGIE 🇫🇷 STRATÉGIES DE FRAISAGE 🇪🇸 ESTRATEGIA DE FRESADO 🇷🇺 СТРАТЕГИЯ ФРЕЗЕРОВАНИЯ		
	🇩🇪 rounding 🇮🇹 raggatura concava 🇩🇪 Konkavradius	🇫🇷 rayon concave 🇪🇸 redondeo cóncavo 🇷🇺 кругление
	dovetail A	
	dovetail B	
	🇩🇪 T slot 🇮🇹 cave a T 🇩🇪 T Nut	🇫🇷 rainure en T 🇪🇸 ranurado en T 🇷🇺 обработка T-образного паза
	Woodruff	



🇩🇪 APPLICATION RANGE 🇮🇹 GAMMA DI APPLICAZIONE 🇩🇪 ANWENDUNGSBEREICH 🇫🇷 GAMME D'APPLICATION 🇪🇸 RANGO DE APLICACIÓN 🇷🇺 ОБЛАСТЬ ПРИМЕНЕНИЯ		
	🇩🇪 general purpose 🇮🇹 uso generico 🇩🇪 allgemeine Anwendung	🇫🇷 applications génériques 🇪🇸 uso genérico 🇷🇺 общего назначения
	🇩🇪 HSSP high performance 🇮🇹 HSSP alto rendimento 🇩🇪 HSSP hochleistung	🇫🇷 HSSP haute performance 🇪🇸 HSSP alto rendimiento 🇷🇺 Высокопроизводительная быстрорежущая сталь
	🇩🇪 for aluminium 🇮🇹 per alluminio 🇩🇪 für Aluminium	🇫🇷 pour aluminium 🇪🇸 para aluminio 🇷🇺 для алюминия


🇩🇪 TYPE 🇮🇹 TIPO 🇩🇪 TYP 🇫🇷 TYPE 🇪🇸 TIPO 🇷🇺 ТИП		
	🇩🇪 sharp corner 🇮🇹 spigolo vivo 🇩🇪 scharfe Kante	🇫🇷 arête vive 🇪🇸 arista viva 🇷🇺 острая кромка
	🇩🇪 ball nose 🇮🇹 raggata 🇩🇪 runder Stirn	🇫🇷 bout hémisphérique 🇪🇸 fresa de bola 🇷🇺 сферическая

🇮🇹 Legenda 🇩🇪 Verzeichnis 🇫🇷 Légende 🇪🇸 Leyenda 🇷🇺 Условные обозначения



















✦ NR. OF FLUTES 🇮🇹 N. DI TAGLIENTI 🇩🇪 ANZAHL DER SCHNEIDEN 🇫🇷 NOMBRE DE DENTS 🇪🇸 N. DE LABIOS 🇷🇺 КОЛИЧЕСТВО РЕЖУЩИХ КРОМОК		
 Z2	✦ 2 flutes 🇮🇹 2 taglienti 🇩🇪 2 Schneiden	🇫🇷 2 arêtes de coupe 🇪🇸 2 filos 🇷🇺 2 зуба
 Z3	✦ 3 flutes 🇮🇹 3 taglienti 🇩🇪 3 Schneiden	🇫🇷 3 arêtes de coupe 🇪🇸 3 filos 🇷🇺 3 зуба
 Z4	✦ 4 flutes 🇮🇹 4 taglienti 🇩🇪 4 Schneiden	🇫🇷 4 arêtes de coupe 🇪🇸 4 filos 🇷🇺 4 зуба
 Z6	✦ 6 flutes 🇮🇹 6 taglienti 🇩🇪 6 Schneiden	🇫🇷 6 arêtes de coupe 🇪🇸 6 filos 🇷🇺 6 зубьев
 Z6	✦ >6 flutes 🇮🇹 >6 taglienti 🇩🇪 >6 Schneiden	🇫🇷 >6 arêtes de coupe 🇪🇸 >6 filos 🇷🇺 >6 зубьев

✦ CHIPBREAKER STYLE 🇮🇹 TIPO DI ROMPIRUCIOLO 🇩🇪 SPÄNEBRECHER TYP 🇫🇷 TYPE DE BRISE-COPEAUX 🇪🇸 TIPO DE ROMPEVIRUTAS 🇷🇺 ТИП СТРУЖКОЛОМА		
 NR COARSE	✦ roughing coarse pitch 🇮🇹 sgrossare passo grosso 🇩🇪 Schruppfräser Regelgewinde	🇫🇷 ébauche pas gros 🇪🇸 desbaste paso grueso 🇷🇺 черновая с крупным шагом
 HR FINE	✦ roughing fine pitch 🇮🇹 sgrossare passo fine 🇩🇪 Schruppfräser Feingewinde	🇫🇷 ébauche pas fin 🇪🇸 desbaste paso fino 🇷🇺 черновая с мелким шагом

✦ MATERIAL 🇮🇹 MATERIALE 🇩🇪 WERKSTOFF 🇫🇷 MATIÈRE 🇪🇸 MATERIAL 🇷🇺 МАТЕРИАЛ		
 HSS/Co ...	✦ high speed steel 5%÷8% Co 🇮🇹 acciaio super rapido 5%÷8% Co 🇩🇪 Hochleistungsschnellschnittstahl 5%÷8% Co	🇫🇷 acier rapide 5%÷8% Co 🇪🇸 acero súper rápido 5%÷8% Co 🇷🇺 быстрорежущая сталь с кобальтом 5÷8%
 HSS-P ..	✦ powder steel 🇮🇹 acciaio sinterizzato 🇩🇪 Sinterstahl	🇫🇷 acier fritté 🇪🇸 acero sinterizado 🇷🇺 порошковая сталь

✦ SURFACE TREATMENT 🇮🇹 TRATTAMENTO SUPERFICIALE 🇩🇪 OBERFLÄCHENBEHANDLUNG 🇫🇷 TRAITMENT DE SURFACE 🇪🇸 TRATAMIENTO SUPERFICIAL 🇷🇺 ОБРАБОТКА ПОВЕРХНОСТИ		
 ... BR	✦ uncoated 🇮🇹 non rivestito 🇩🇪 unbeschichtet	🇫🇷 non revêtu 🇪🇸 no revestido 🇷🇺 без покрытия

 Legenda 
  Verzeichnis 
  Légende 
  Leyenda 
  Условные обозначения










 COATINGS  RIVESTIMENTI  BESCHICHTUNGEN  REVÊTEMENTS  RECUBRIMIENTOS  ПОКРЫТИЕ		
		<div style="border: 1px solid black; padding: 2px; text-align: center;">           ...  <b>PV200</b> </div>
 hardness (HV)  durezza (HV)  Härte (HV)	 dureté (HV)  dureza (HV)  твёрдость (HV)	3300
 friction coefficient  coefficiente d'attrito  Reibungskoeffizient	 coefficient de frottement  coeficiente de rozamiento  коэффициент трения	0.3
 thickness (μ)  spessore (μ)  dicke (μ)	 épaisseur (μ)  espesor (μ)  толщина (мкм)	3
 max working temperature (°C)  temperatura max (°C)  höchste Temperatur (°C)	 température maximale (°C)  temperatura máx (°C)  макс. температура (°C)	950

	ITEM No.	PAGE	
HSS/Co - HSSP general purpose, square	<b>WS2</b>	640	
	<b>TAWS2</b>	640	
	<b>UMWS2</b>	640	
	<b>WL2</b>	643	
	<b>TAWL2</b>	643	
	<b>WSA2</b>	645	
	<b>WS3</b>	647	
	<b>TAWS3</b>	647	
	<b>WL3</b>	649	
	<b>TAWL3</b>	649	
	<b>TAWSH3</b>	651	
	<b>WS4(6)</b>	653	
	<b>TAWS4(6)</b>	653	
	<b>UMWS4</b>	653	
	<b>WL4(6)</b>	655	
<b>TAWL4(6)</b>	655		
HSS/Co - HSSP general purpose, roughing	<b>TAWSR</b>	657	
	<b>WSFR</b>	659	
	<b>TAWSFR</b>	659	
	<b>UMWSFR</b>	659	
	<b>WLFR</b>	661	
	<b>TAWLFR</b>	661	
HSS/Co general purpose, ball nose	<b>WSB2</b>	663	
	<b>TAWSB2</b>	663	
	<b>WLB2</b>	665	
	<b>TAWLB2</b>	665	

RANGE	NORM	TYPE	MATERIAL / COATING	HELIX ANGLE	GEOMETRY	Z	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H
1-30	DIN 327	N	HSS/Co BR	30°	SQUARE	2	★	☆	★	☆		
1-25	DIN 327	N	HSS/Co PV200	30°	SQUARE	2	★	☆	★	☆		
2-20	DIN 327	UM	HSSP PV200	30°	SQUARE	2	★	★	★			
3-30	DIN 844	N	HSS/Co BR	30°	SQUARE	2	★	☆	★	☆		
3-20	DIN 844	N	HSS/Co PV200	30°	SQUARE	2	★	☆	★	☆		
2-20	DIN 844	ALU	HSS/Co BR	42°	SQUARE	2				★		
1-32	DIN 844	N	HSS/Co BR	30°	SQUARE	3	★	☆	★	☆		
1-25	DIN 844	N	HSS/Co PV200	30°	SQUARE	3	★	☆	★	☆		
3-25	DIN 844	N	HSS/Co BR	30°	SQUARE	3	★	☆	★	☆		
3-20	DIN 844	N	HSS/Co PV200	30°	SQUARE	3	★	☆	★	☆		
6-20	DIN 844	N	HSS/Co PV200	45°	SQUARE	3	★	☆	★	☆		
2-30	DIN 844	N	HSS/Co BR	30°	SQUARE	4-6	★	☆	★	☆		
2-40	DIN 844	N	HSS/Co PV200	30°	SQUARE	4-6	★	☆	★	☆		
3-20	DIN 844	UM	HSSP PV200	30°	SQUARE	4	★	★	★			
3-25	DIN 844	N	HSS/Co BR	30°	SQUARE	4-6	★	☆	★	☆		
3-40	DIN 844	N	HSS/Co PV200	30°	SQUARE	4-6	★	☆	★	☆		
6-20	DIN 844	N - NR	HSS/Co PV200	30°	SQUARE	3-4	★	☆	★	☆		
6-20	DIN 844	N - HR	HSS/Co BR	30°	SQUARE	3-4	★	☆	★	☆		
6-40	DIN 844	N - HR	HSS/Co PV200	30°	SQUARE	3-6	★	☆	★	☆		
6-20	DIN 844	UM - HR	HSSP PV200	30°	SQUARE	3-4	★	★	★			
6-20	DIN 844	N - HR	HSS/Co BR	30°	SQUARE	3-4	★	☆	★	☆		
6-40	DIN 844	N - HR	HSS/Co PV200	30°	SQUARE	3-6	★	☆	★	☆		
2-30	DIN 327	N	HSS/Co BR	30°	BALL NOSE	2	★	☆	★	☆		
2-20	DIN 327	N	HSS/Co PV200	30°	BALL NOSE	2	★	☆	★	☆		
3-20	DIN 1889	N	HSS/Co BR	30°	BALL NOSE	2	★	☆	★	☆		
3-20	DIN 1889	N	HSS/Co PV200	30°	BALL NOSE	2	★	☆	★	☆		

★ 1st choice ☆ suitable



	ITEM No.	PAGE	
HSS/Co general purpose, shell	<b>FM</b>	667	
	<b>TAFM</b>	667	
	<b>FFR</b>	669	
HSS/Co general purpose, shell	<b>TAFFR</b>	669	
HSS/Co general purpose, corner rounding	<b>WCR</b>	671	
HSS/Co general purpose, dovetail	<b>WDC</b>	673	
	<b>WDD</b>	675	
HSS/Co general purpose, T-slot	<b>WTM</b>	677	
HSS/Co general purpose, woodruff	<b>WWK</b>	679	



Indice grafico 
 Auswahlhilfe 
 Indice graphique 
 Índice gráfico 
 Руководство по выбору

RANGE	NORM	TYPE	MATERIAL / COATING	HELIX ANGLE	GEOMETRY	Z	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H
40-100	DIN 1880	N	HSS/Co BR	30°	SQUARE	8-10	★	☆	★	☆		
40-100	DIN 1880	N	HSS/Co PV200	30°	SQUARE	8-10	★	☆	★	☆		
40-100	DIN 1880	N - HR	HSS/Co BR	30°	SQUARE	6-10	★	☆	★	☆		
40-100	DIN 1880	N - HR	HSS/Co PV200	30°	SQUARE	6-10	★	☆	★	☆		
R1-R11	DIN 6518	N	HSS/Co BR	0°	RADIUS	4	★	☆	★	☆		
16-38	DIN 1833	N	HSS/Co BR	45°-60°	SQUARE	6-12	★	☆	★	☆		
16-38	DIN 1833	N	HSS/Co BR	45°-60°	SQUARE	6-12	★	☆	★	☆		
12.5-36	DIN 851	N	HSS/Co BR	15°	SQUARE	6-8	★	☆	★	☆		
10.5-32.5	DIN850	N	HSS/Co BR	10°	SQUARE	8-12	★	☆	★	☆		

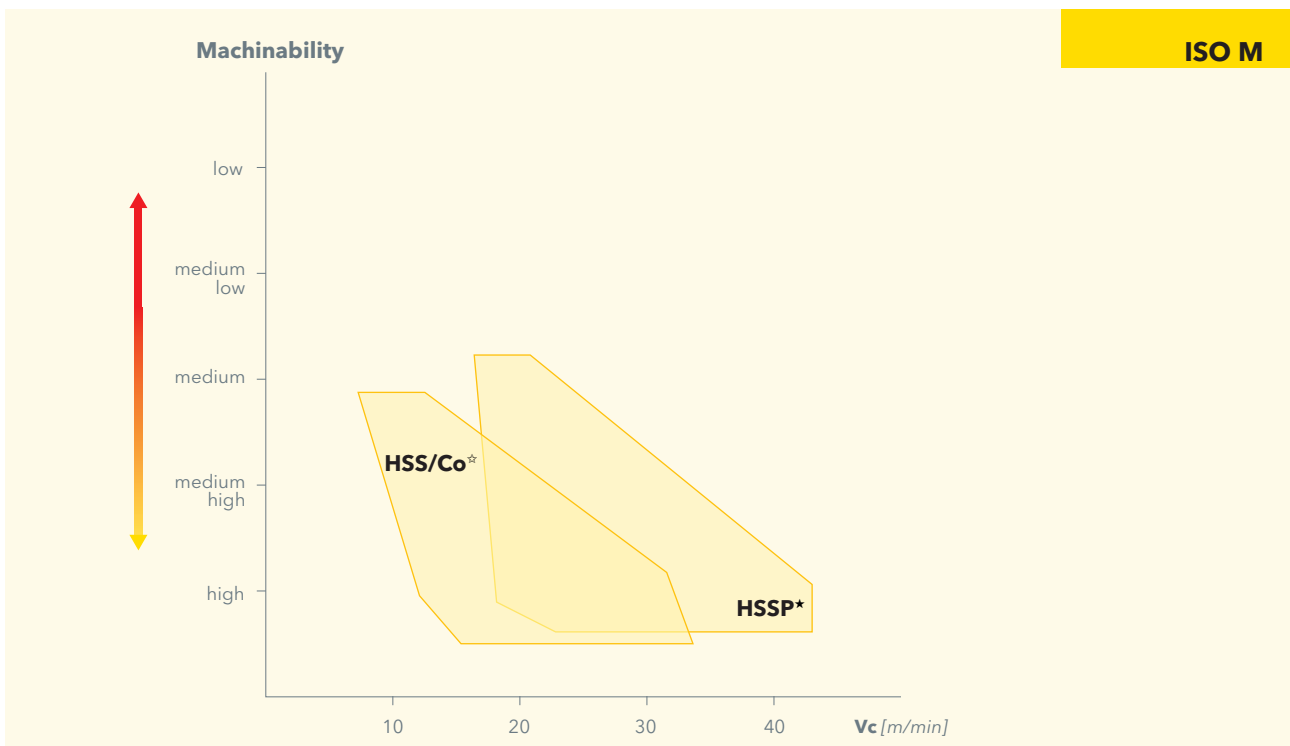
★ 1st choice ☆ suitable

STEEL APPLICATION



★ 1st choice ☆ suitable

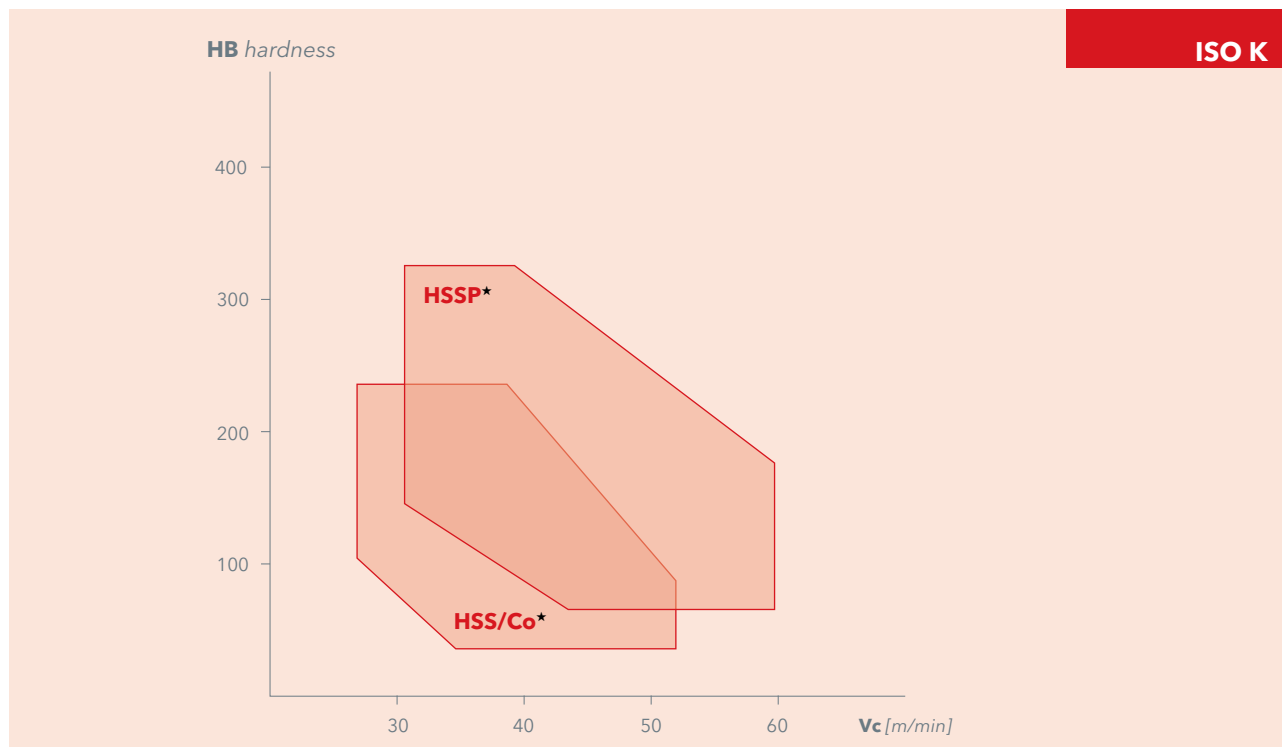
STAINLESS STEEL APPLICATION



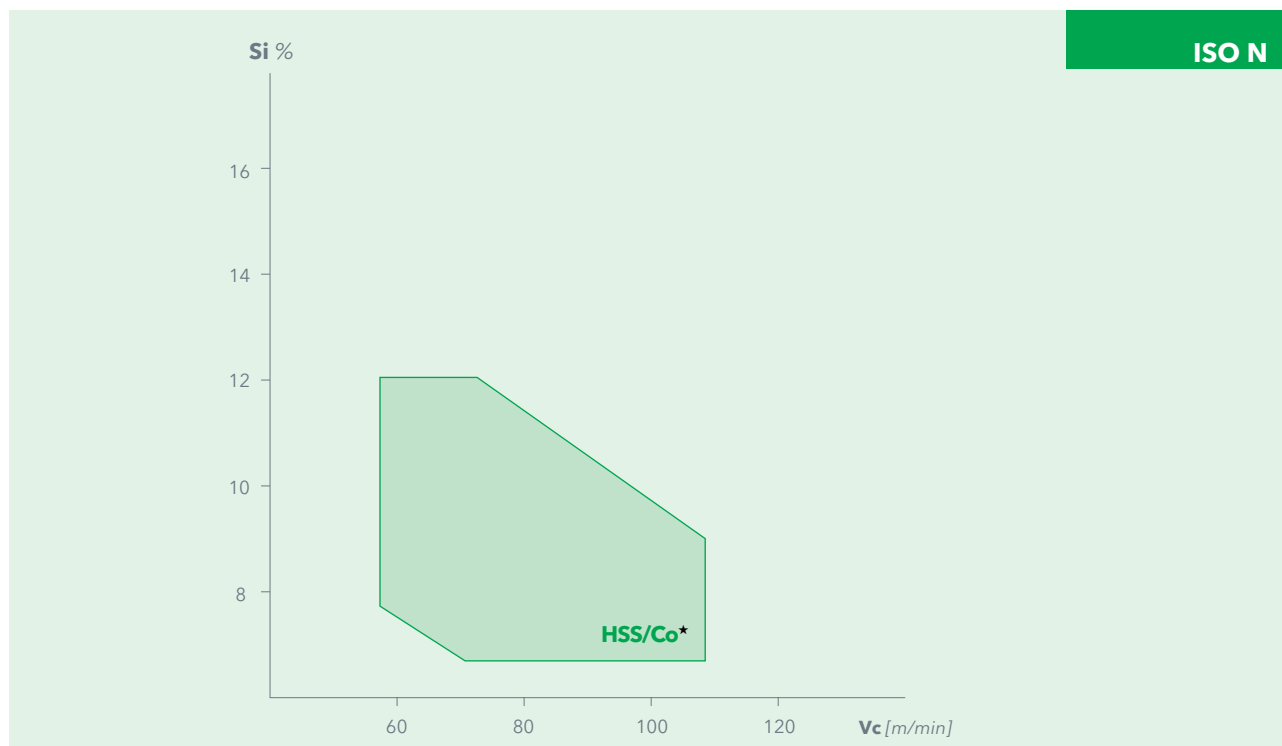
★ 1st choice ☆ suitable

HSS/Co : general purpose (page 640)  
 HSSP : high performance (page 640)

CAST IRON APPLICATION



NON-FERROUS MATERIALS APPLICATION



HSS/Co : general purpose (page 640)  
 HSSP : high performance (page 640)





INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

## HSS/CO - HSSP

GENERAL PURPOSE

🇬🇧 The Osawa catalogue includes a wide range of HSS/Co - HSSP end mills, both coated and uncoated.

🇮🇹 Il catalogo Osawa include un'ampia scelta di frese in HSS/Co - HSSP nudo e rivestito.

🇩🇪 Der Osawa Katalog umfasst eine große Auswahl an beschichteten und unbeschichteten Fräsern aus HSS/Co - HSSP.

🇫🇷 Le catalogue Osawa inclut une large gamme de fraises en HSS/Co - HSSP, soit revêtues, soit non revêtues.

🇪🇸 El catálogo Osawa incluye una amplia variedad de fresas de HSS/Co - HSSP con o sin recubrimiento.

🇷🇺 В каталоге Osawa также представлена широкая гамма концевых фрез изготовленных из HSS/Co - HSSP с покрытием и без покрытия.

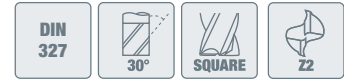
HSS  
END-MILLS

CARBIDE  
BURRS

INFO

# WS2-TAWS2-UMWS2

weldon shank, 2 flutes



WS2

**N** HSS/Co  
BR



TAWS2

**N** HSS/Co  
PV200



UMWS2

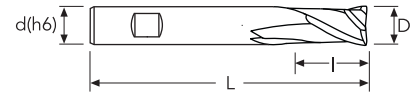
**UM** HSS-P  
PV200

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		
★	★	★			

WS2-TAWS2  
UMWS2



★ 1st choice ☆ suitable

D(e8)	D Tol.	d(h6)	l	l1	L	z	WS2		TAWS2		UMWS2	
							EDP No.	Stock	EDP No.	Stock	EDP No.	Stock
1	-0.014/-0.028	6	2.5		47	2	WS2010	●	TAWS2010	●		
1.5	-0.014/-0.028	6	3		47	2	WS2015	●	TAWS2015	●		
2	-0.014/-0.028	6	4		48	2	WS2020	●	TAWS2020	●	UMWS2020	●
2.5	-0.014/-0.028	6	5		49	2	WS2025	●	TAWS2025	●		
3	-0.014/-0.028	6	5		49	2	WS2030	●	TAWS2030	●	UMWS2030	●
3.5	-0.020/-0.038	6	6		50	2	WS2035	●	TAWS2035	●		
4	-0.020/-0.038	6	7		51	2	WS2040	●	TAWS2040	●	UMWS2040	●
4.5	-0.020/-0.038	6	7		51	2	WS2045	●	TAWS2045	●		
5	-0.020/-0.038	6	8		52	2	WS2050	●	TAWS2050	●	UMWS2050	●
5.5	-0.020/-0.038	6	8		52	2	WS2055	●	TAWS2055	●		
6	-0.020/-0.038	6	8		52	2	WS2060	●	TAWS2060	●	UMWS2060	●
6.5	-0.025/-0.047	10	10		60	2	WS2065	●	TAWS2065	●		
7	-0.025/-0.047	10	10		60	2	WS2070	●	TAWS2070	●		
7.5	-0.025/-0.047	10	10		60	2	WS2075	●	TAWS2075	●		
8	-0.025/-0.047	10	11		61	2	WS2080	●	TAWS2080	●	UMWS2080	●
8.5	-0.025/-0.047	10	11		61	2	WS2085	●	TAWS2085	●		
9	-0.025/-0.047	10	11		61	2	WS2090	●	TAWS2090	●		
9.5	-0.025/-0.047	10	11		61	2	WS2095	●	TAWS2095	●		
10	-0.025/-0.047	10	13		63	2	WS2100	●	TAWS2100	●	UMWS2100	●
10.5	-0.032/-0.059	12	13		70	2	WS2105	●	TAWS2105	●		
11	-0.032/-0.059	12	13		70	2	WS2110	●	TAWS2110	●		
11.5	-0.032/-0.059	12	13		70	2	WS2115	●	TAWS2115	●		
12	-0.032/-0.059	12	16		73	2	WS2120	●	TAWS2120	●	UMWS2120	●
12.5	-0.032/-0.059	12	16		73	2	WS2125	●	TAWS2125	●		
13	-0.032/-0.059	12	16		73	2	WS2130	●	TAWS2130	●		
13.5	-0.032/-0.059	12	16		73	2	WS2135	●	TAWS2135	●		
14	-0.032/-0.059	12	16		73	2	WS2140	●	TAWS2140	●	UMWS2140	●
15	-0.032/-0.059	12	16		73	2	WS2150	●	TAWS2150	●		
16	-0.032/-0.059	16	19		79	2	WS2160	●	TAWS2160	●	UMWS2160	●
17	-0.032/-0.059	16	19		79	2	WS2170	●	TAWS2170	●		
18	-0.032/-0.059	16	19		79	2	WS2180	●	TAWS2180	●	UMWS2180	●
19	-0.040/-0.073	16	19		79	2	WS2190	●	TAWS2190	●		
20	-0.040/-0.073	20	22		88	2	WS2200	●	TAWS2200	●	UMWS2200	●
22	-0.040/-0.073	20	22		88	2	WS2220	●	TAWS2220	●		
24	-0.040/-0.073	25	26		102	2	WS2240	●				
25	-0.040/-0.073	25	26		102	2	WS2250	●	TAWS2250	●		
26	-0.040/-0.073	25	26		102	2	WS2260	●				
28	-0.040/-0.073	25	26		102	2	WS2280	●				
30	-0.040/-0.073	25	26		102	2	WS2300	●				

● stock standard ○ non-standard stock ▽ stock exhaustion

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# TAWS2

UMWS2 (Vc = +20%) - WS2 (Vc = -20% ÷ -30%)

	Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
	ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
	Vc (m/min)	<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.003	0.003	0.002	0.002	
2	0.006	0.005	0.005	0.004	
3	0.009	0.008	0.007	0.006	
4	0.013	0.012	0.010	0.009	
5	0.017	0.015	0.013	0.012	
6	0.022	0.020	0.017	0.015	
8	0.032	0.029	0.024	0.022	
10	0.040	0.036	0.030	0.028	
12	0.048	0.043	0.036	0.034	
14	0.057	0.051	0.043	0.040	
16	0.067	0.060	0.050	0.047	
18	0.077	0.069	0.058	0.054	
20	0.088	0.079	0.066	0.062	
22	0.098	0.088	0.074	0.069	
24	0.105	0.095	0.079	0.074	
25	0.110	0.099	0.083	0.077	
26	0.116	0.104	0.087	0.081	
28	0.122	0.110	0.092	0.085	
30	0.128	0.115	0.096	0.090	
ap x ae	≤ D3	0.25D x D			

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

	Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
	ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
	Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>	<b>20÷30</b>
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.003	0.003	0.003	0.003	
2	0.007	0.006	0.006	0.004	
3	0.007	0.006	0.006	0.005	
4	0.011	0.010	0.009	0.008	
5	0.016	0.014	0.012	0.011	
6	0.020	0.018	0.016	0.014	
8	0.026	0.024	0.021	0.018	
10	0.038	0.035	0.031	0.027	
12	0.048	0.043	0.038	0.034	
14	0.058	0.052	0.046	0.040	
16	0.068	0.062	0.055	0.048	
18	0.080	0.072	0.064	0.056	
20	0.092	0.083	0.074	0.065	
22	0.106	0.095	0.084	0.074	
24	0.118	0.106	0.094	0.082	
25	0.126	0.113	0.101	0.088	
26	0.132	0.119	0.106	0.092	
28	0.139	0.125	0.111	0.097	
30	0.146	0.132	0.117	0.102	
ap x ae	≤ D3	1.5D x 0.25D	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# TAWS2

UMWS2 (Vc= +20%) - WS2 (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>30÷50</b>	<b>25÷35</b>	<b>20÷30</b>	<b>12÷18</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.005	0.003	0.002	0.002
<b>4</b>	0.007	0.004	0.003	0.003
<b>5</b>	0.009	0.006	0.005	0.005
<b>6</b>	0.011	0.008	0.006	0.006
<b>8</b>	0.016	0.010	0.008	0.008
<b>10</b>	0.020	0.014	0.012	0.011
<b>12</b>	0.024	0.018	0.015	0.014
<b>14</b>	0.029	0.022	0.018	0.017
<b>16</b>	0.034	0.026	0.021	0.020
<b>18</b>	0.039	0.030	0.025	0.023
<b>20</b>	0.044	0.035	0.029	0.027
<b>22</b>	0.049	0.040	0.033	0.031
<b>24</b>	0.053	0.044	0.037	0.034
<b>25</b>	0.055	0.047	0.039	0.037
<b>26</b>	0.058	0.050	0.041	0.039
<b>28</b>	0.061	0.052	0.044	0.041
<b>30</b>	0.064	0.055	0.046	0.043

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



# WL2-TAWL2

weldon shank, 2 flutes, long

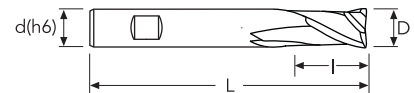
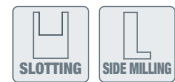
DIN 844	N	HSS/Co BR	HSS/Co PV200	30°	SQUARE	ZZ
		WL2	TAWL2			

INFO



P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

D(e8)	D Tol.	d(h6)	l	l1	L	z	WL2		TAWL2	
							EDP No.	Stock	EDP No.	Stock
3	-0.014/-0.028	6	8		56	2	WL2030	●	TAWL2030	●
4	-0.020/-0.038	6	11		63	2	WL2040	●	TAWL2040	●
5	-0.020/-0.038	6	13		68	2	WL2050	●	TAWL2050	●
6	-0.020/-0.038	6	13		68	2	WL2060	●	TAWL2060	●
7	-0.025/-0.047	10	16		80	2	WL2070	●		
8	-0.025/-0.047	10	19		88	2	WL2080	●	TAWL2080	●
9	-0.025/-0.047	10	19		88	2	WL2090	●		
10	-0.025/-0.047	10	22		95	2	WL2100	●	TAWL2100	●
11	-0.032/-0.059	12	22		102	2	WL2110	●		
12	-0.032/-0.059	12	26		110	2	WL2120	●	TAWL2120	●
13	-0.032/-0.059	12	26		110	2	WL2130	●		
14	-0.032/-0.059	12	26		110	2	WL2140	●	TAWL2140	●
15	-0.032/-0.059	12	26		110	2	WL2150	●		
16	-0.032/-0.059	16	32		123	2	WL2160	●	TAWL2160	●
18	-0.032/-0.059	16	32		123	2	WL2180	●	TAWL2180	●
20	-0.040/-0.073	20	38		141	2	WL2200	●	TAWL2200	●
22	-0.040/-0.073	20	38		141	2	WL2220	●		
24	-0.040/-0.073	25	45		166	2	WL2240	○		
25	-0.040/-0.073	25	45		166	2	WL2250	●		
28	-0.040/-0.073	25	45		166	2	WL2280	●		
30	-0.040/-0.073	25	45		166	2	WL2300	●		

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAWL2

WL2 (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>
Vc (m/min)	<b>30+50</b>	<b>25+35</b>	<b>20+30</b>	<b>12+18</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.006	0.005	0.005	0.004
4	0.008	0.007	0.007	0.006
5	0.011	0.010	0.009	0.008
6	0.014	0.012	0.011	0.010
8	0.020	0.018	0.016	0.015
10	0.025	0.023	0.020	0.019
12	0.030	0.027	0.024	0.023
14	0.036	0.032	0.029	0.027
16	0.042	0.038	0.034	0.032
18	0.048	0.043	0.038	0.036
20	0.053	0.048	0.043	0.040
22	0.060	0.054	0.048	0.045
25	0.070	0.063	0.056	0.053
28	0.077	0.069	0.062	0.058
30	0.084	0.076	0.067	0.063

HSS  
DRILLS

ap x ae	≤ D5	0.25D x D
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LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>0.2D x 0.1D</b>	<b>0.2D x 0.1D</b>	<b>0.2D x 0.1D</b>	<b>0.2D x 0.1D</b>
Vc (m/min)	<b>35+55</b>	<b>30+40</b>	<b>25+35</b>	<b>12+20</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.006	0.006	0.005	0.005
4	0.009	0.008	0.007	0.007
5	0.012	0.011	0.009	0.009
6	0.015	0.014	0.012	0.011
8	0.022	0.020	0.018	0.017
10	0.028	0.025	0.022	0.021
12	0.033	0.030	0.027	0.025
14	0.040	0.036	0.032	0.030
16	0.046	0.042	0.037	0.035
18	0.052	0.047	0.042	0.039
20	0.059	0.053	0.047	0.044
22	0.065	0.059	0.052	0.049
25	0.077	0.069	0.062	0.058
28	0.085	0.076	0.068	0.064
30	0.092	0.083	0.074	0.069

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

ap x ae	≤ D5	1.5D x 0.05D
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CARBIDE  
BURRS



INFO

### WSA2

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513	N1	N2	N3 N4	N5
Hardness/Rm				
ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
Vc (m/min)	90±110	70±90	60±80	100±140
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.015	0.014	0.012	0.018
3	0.020	0.018	0.016	0.024
4	0.030	0.027	0.024	0.036
5	0.035	0.032	0.028	0.042
6	0.042	0.038	0.034	0.050
8	0.056	0.050	0.045	0.067
10	0.073	0.066	0.058	0.088
12	0.090	0.081	0.072	0.108
14	0.106	0.095	0.085	0.127
16	0.120	0.108	0.096	0.144
18	0.135	0.122	0.108	0.162
20	0.150	0.135	0.120	0.180
ap x ae	≤ D3		0.2D x D	

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513	N1	N2	N3 N4	N5
Hardness/Rm				
ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.5D
Vc (m/min)	100±140	90±110	70±90	130±150
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.018	0.016	0.014	0.020
3	0.018	0.016	0.014	0.020
4	0.024	0.022	0.019	0.027
5	0.036	0.032	0.029	0.040
6	0.042	0.038	0.034	0.047
8	0.050	0.045	0.040	0.056
10	0.067	0.060	0.054	0.075
12	0.088	0.079	0.070	0.098
14	0.108	0.097	0.086	0.121
16	0.127	0.114	0.102	0.142
18	0.144	0.130	0.115	0.161
20	0.162	0.146	0.130	0.181
ap x ae	≤ D3		1.2D x 0.1D	

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH



Material Group ISO 513	N1	N2	N3 N4	N5
Hardness/Rm				
ap x ae	0.5D x 0.5D	0.5D x 0.5D	0.5D x 0.5D	0.5D x 0.5D
Vc (m/min)	70±90	55±75	50±60	90±110
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.010	0.007	0.006	0.009
4	0.015	0.009	0.008	0.012
5	0.018	0.014	0.012	0.018
6	0.021	0.016	0.014	0.021
8	0.028	0.019	0.017	0.025
10	0.037	0.025	0.022	0.034
12	0.045	0.033	0.029	0.044
14	0.053	0.041	0.036	0.054
16	0.060	0.048	0.042	0.064
18	0.068	0.054	0.048	0.072
20	0.075	0.061	0.054	0.081

HSS END-MILLS

CARBIDE BURRS

# WS3-TAWS3

weldon shank, 3 flutes

DIN 844	N	HSS/Co BR	HSS/Co PV200	30°	SQUARE	Z3
		WS3	TAWS3			

INFO



WS3

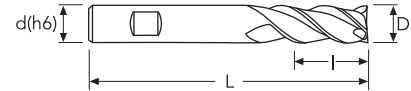


TAWS3

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable

SLOTTING	SIDE MILLING
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D(e8)	D Tol.	d(h6)	l	l1	L	z	WS3		TAWS3	
							EDP No.	Stock	EDP No.	Stock
1	-0.014/-0.028	6	3		47	3	WS3010	●	TAWS3010	○
1.5	-0.014/-0.028	6	7		51	3	WS3015	●	TAWS3015	○
2	-0.014/-0.028	6	7		51	3	WS3020	●	TAWS3020	●
2.5	-0.014/-0.028	6	8		52	3	WS3025	●	TAWS3025	●
3	-0.014/-0.028	6	8		52	3	WS3030	●	TAWS3030	●
3.5	-0.020/-0.038	6	10		54	3	WS3035	●	TAWS3035	●
4	-0.020/-0.038	6	11		55	3	WS3040	●	TAWS3040	●
4.5	-0.020/-0.038	6	11		55	3	WS3045	●	TAWS3045	●
5	-0.020/-0.038	6	13		57	3	WS3050	●	TAWS3050	●
5.5	-0.020/-0.038	6	13		57	3	WS3055	●	TAWS3055	●
6	-0.020/-0.038	6	13		57	3	WS3060	●	TAWS3060	●
6.5	-0.025/-0.047	10	16		66	3	WS3065	●	TAWS3065	●
7	-0.025/-0.047	10	16		66	3	WS3070	●	TAWS3070	●
8	-0.025/-0.047	10	19		69	3	WS3080	●	TAWS3080	●
8.5	-0.025/-0.047	10	19		69	3	WS3085	●	TAWS3085	●
9	-0.025/-0.047	10	19		69	3	WS3090	●	TAWS3090	●
10	-0.025/-0.047	10	22		72	3	WS3100	●	TAWS3100	●
11	-0.032/-0.059	12	22		79	3	WS3110	●	TAWS3110	●
12	-0.032/-0.059	12	26		83	3	WS3120	●	TAWS3120	●
13	-0.032/-0.059	12	26		83	3	WS3130	●	TAWS3130	●
14	-0.032/-0.059	12	26		83	3	WS3140	●	TAWS3140	●
15	-0.032/-0.059	12	26		83	3	WS3150	●	TAWS3150	●
16	-0.032/-0.059	16	32		92	3	WS3160	●	TAWS3160	●
18	-0.032/-0.059	16	32		92	3	WS3180	●	TAWS3180	●
20	-0.040/-0.073	20	38		104	3	WS3200	●	TAWS3200	●
22	-0.040/-0.073	20	38		104	3	WS3220	●	TAWS3220	●
25	-0.040/-0.073	25	45		121	3	WS3250	●	TAWS3250	●
30	-0.040/-0.073	25	45		121	3	WS3300	●		
32	-0.050/-0.089	32	53		133	3	WS3320	●		

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAWS3

WS3 (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>
ap x ae	<b>0.3D x D</b>			
Vc (m/min)	<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.003	0.002	0.002	0.002
2	0.005	0.005	0.004	0.004
3	0.008	0.007	0.006	0.006
4	0.012	0.011	0.009	0.008
5	0.015	0.014	0.011	0.011
6	0.020	0.018	0.015	0.014
8	0.029	0.026	0.022	0.020
10	0.036	0.032	0.027	0.025
12	0.043	0.039	0.032	0.030
14	0.051	0.046	0.038	0.036
16	0.060	0.054	0.045	0.042
18	0.069	0.062	0.052	0.049
20	0.079	0.071	0.059	0.055
22	0.088	0.079	0.066	0.062
25	0.099	0.089	0.074	0.069
28	0.122	0.110	0.090	0.085
30	0.128	0.115	0.093	0.090
32	0.136	0.116	0.095	0.093
ap x ae	≤ D3			
0.25D x D				

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>
ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.003	0.003	0.002	0.002
2	0.006	0.006	0.005	0.005
3	0.006	0.006	0.005	0.005
4	0.010	0.009	0.008	0.007
5	0.014	0.013	0.011	0.010
6	0.018	0.017	0.015	0.013
8	0.024	0.021	0.019	0.017
10	0.035	0.031	0.028	0.024
12	0.043	0.039	0.035	0.030
14	0.052	0.047	0.041	0.036
16	0.062	0.055	0.049	0.043
18	0.072	0.065	0.058	0.051
20	0.083	0.075	0.067	0.058
22	0.095	0.086	0.076	0.067
25	0.113	0.102	0.091	0.079
28	0.139	0.125	0.111	0.097
30	0.143	0.130	0.115	0.100
32	0.146	0.132	0.117	0.102
ap x ae	≤ D3	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# TAWL3

WL3 (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>
ap x ae	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.2D x D</b>
Vc (m/min)	<b>30÷50</b>	<b>25÷35</b>	<b>20÷30</b>	<b>12÷18</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.006	0.005	0.005	0.004
<b>4</b>	0.008	0.007	0.007	0.006
<b>5</b>	0.011	0.010	0.009	0.008
<b>6</b>	0.014	0.012	0.011	0.010
<b>8</b>	0.020	0.018	0.016	0.015
<b>10</b>	0.025	0.023	0.020	0.019
<b>12</b>	0.030	0.027	0.024	0.023
<b>14</b>	0.036	0.032	0.029	0.027
<b>16</b>	0.042	0.038	0.034	0.032
<b>18</b>	0.048	0.043	0.038	0.036
<b>20</b>	0.053	0.048	0.043	0.040
<b>22</b>	0.060	0.054	0.048	0.045
<b>25</b>	0.070	0.063	0.056	0.053
ap x ae	≤ D5			
0.25D x D				

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>
ap x ae	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>
Vc (m/min)	<b>40÷50</b>	<b>30÷40</b>	<b>25÷35</b>	<b>10÷20</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	0.006	0.006	0.005	0.005
<b>4</b>	0.009	0.008	0.007	0.007
<b>5</b>	0.012	0.011	0.009	0.009
<b>6</b>	0.015	0.014	0.012	0.011
<b>8</b>	0.022	0.020	0.018	0.017
<b>10</b>	0.028	0.025	0.022	0.021
<b>12</b>	0.033	0.030	0.027	0.025
<b>14</b>	0.040	0.036	0.032	0.030
<b>16</b>	0.046	0.042	0.037	0.035
<b>18</b>	0.052	0.047	0.042	0.039
<b>20</b>	0.059	0.053	0.047	0.044
<b>22</b>	0.065	0.059	0.052	0.049
<b>25</b>	0.077	0.069	0.062	0.058
ap x ae	≤ D5			
1.5D x 0.05D				

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS





INFO

## TAWSH3

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA


Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>	<b>0.3D x D</b>
Vc (m/min)	<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.020	0.018	0.015	0.014
<b>8</b>	0.029	0.026	0.022	0.020
<b>10</b>	0.036	0.032	0.027	0.025
<b>12</b>	0.043	0.039	0.032	0.030
<b>14</b>	0.051	0.046	0.038	0.036
<b>16</b>	0.060	0.054	0.045	0.042
<b>18</b>	0.069	0.062	0.052	0.049
<b>20</b>	0.079	0.071	0.059	0.055

HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO

Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.018	0.017	0.015	0.013
<b>8</b>	0.024	0.021	0.019	0.017
<b>10</b>	0.035	0.031	0.028	0.024
<b>12</b>	0.043	0.039	0.035	0.030
<b>14</b>	0.052	0.047	0.041	0.036
<b>16</b>	0.062	0.055	0.049	0.043
<b>18</b>	0.072	0.065	0.058	0.051
<b>20</b>	0.083	0.075	0.067	0.058

CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS

# WS4(6)-TAWS4(6)-UMWS4

weldon shank, 4 flutes-6 flutes



INFO



**N** HSS/Co  
BR



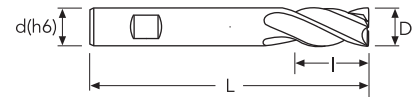
**N** HSS/Co  
PV200



**UM** HSS-P  
PV200

P	M	K	N	S	H
★	☆	★	☆		
★	★	★			

WS4(6)-TAWS4(6)  
UMWS4



★ 1st choice ☆ suitable

D	D Tol.	d(h6)	l	l1	L	z	WS4(6)		TAWS4(6)		UMWS4	
							EDP No.	Stock	EDP No.	Stock	EDP No.	Stock
2	0/+0.040	6	7		51	4	WS4020	●	TAWS4020	●		
3	0/+0.040	6	8		52	4	WS4030	●	TAWS4030	●	UMWS4030	●
4	0/+0.040	6	11		55	4	WS4040	●	TAWS4040	●	UMWS4040	●
5	0/+0.040	6	13		57	4	WS4050	●	TAWS4050	●	UMWS4050	●
6	0/+0.040	6	13		57	4	WS4060	●	TAWS4060	●	UMWS4060	●
7	0/+0.040	10	16		66	4	WS4070	●	TAWS4070	●		
8	0/+0.040	10	19		69	4	WS4080	●	TAWS4080	●	UMWS4080	●
9	0/+0.040	10	19		69	4	WS4090	●	TAWS4090	●		
10	0/+0.040	10	22		72	4	WS4100	●	TAWS4100	●	UMWS4100	●
11	0/+0.040	12	22		79	4	WS4110	●	TAWS4110	●		
12	0/+0.040	12	26		83	4	WS4120	●	TAWS4120	●	UMWS4120	●
13	0/+0.040	12	26		83	4	WS4130	●	TAWS4130	●		
14	0/+0.040	12	26		83	4	WS4140	●	TAWS4140	●	UMWS4140	●
15	0/+0.040	12	26		83	4	WS4150	●	TAWS4150	●		
16	0/+0.040	16	32		92	4	WS4160	●	TAWS4160	●	UMWS4160	●
17	0/+0.040	16	32		92	4			TAWS4170	●		
18	0/+0.040	16	32		92	4	WS4180	●	TAWS4180	●	UMWS4180	●
19	0/+0.040	16	32		92	4			TAWS4190	●		
20	0/+0.040	20	38		104	4	WS4200	●	TAWS4200	●	UMWS4200	●
22	0/+0.040	20	38		104	4	WS4220	●	TAWS4220	●		
24	0/+0.040	25	45		121	6	WS6240	●				
25	0/+0.040	25	45		121	4	WS4250	●	TAWS4250	●		
28	0/+0.040	25	45		121	6	WS6280	●	TAWS6280	●		
30	0/+0.040	25	45		121	6	WS6300	●	TAWS6300	●		
32	0/+0.040	32	53		133	6			TAWS6320	●		
36	0/+0.040	32	53		133	6			TAWS6360	●		
40	0/+0.040	40	63		155	6			TAWS6400	●		

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAWS4

UMWS4 (Vc = +20%) - WS4 (Vc = -20% ÷ -30%)

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)		<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>	<b>20÷30</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	4	0.006	0.005	0.005	0.004
3	4	0.006	0.005	0.005	0.004
4	4	0.009	0.008	0.007	0.006
5	4	0.012	0.011	0.010	0.009
6	4	0.016	0.015	0.013	0.012
8	4	0.021	0.019	0.017	0.016
10	4	0.031	0.028	0.025	0.023
12	4	0.038	0.035	0.031	0.029
14	4	0.046	0.041	0.037	0.035
16	4	0.055	0.049	0.044	0.041
18	4	0.064	0.058	0.051	0.048
20	4	0.074	0.067	0.059	0.055
22	4	0.084	0.076	0.068	0.063
24	6	0.088	0.079	0.071	0.066
25	4	0.106	0.095	0.084	0.079
28	6	0.102	0.092	0.082	0.077
30	6	0.108	0.097	0.086	0.081
32	6	0.113	0.102	0.091	0.085
36	6	0.127	0.114	0.101	0.095
40	6	0.139	0.125	0.111	0.104
ap x ae	≤ D3	1.5D x 0.25D	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

# WL4(6)-TAWL4(6)

weldon shank, 4 flutes-6 flutes, long

DIN  
844

N

HSS/Co  
BR

HSS/Co  
PV200

30°

SQUARE

Z4-Z6

WL4(6) TAWL4(6)

INFO



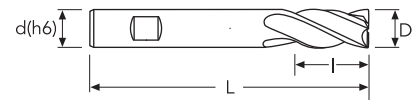
WL4(6)



TAWL4(6)

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D	D Tol.	d(h6)	l	l1	L	z	WL4(6)		TAWL4(6)	
							EDP No.	Stock	EDP No.	Stock
3	0/+0.040	6	12		56	4	WL4030	●	TAWL4030	●
4	0/+0.040	6	19		63	4	WL4040	●	TAWL4040	●
5	0/+0.040	6	24		68	4	WL4050	●	TAWL4050	●
6	0/+0.040	6	24		68	4	WL4060	●	TAWL4060	●
7	0/+0.050	10	30		80	4	WL4070	●	TAWL4070	●
8	0/+0.050	10	38		88	4	WL4080	●	TAWL4080	●
9	0/+0.050	10	38		88	4	WL4090	●	TAWL4090	●
10	0/+0.050	10	45		95	4	WL4100	●	TAWL4100	●
11	0/+0.050	12	45		102	4	WL4110	●	TAWL4110	●
12	0/+0.050	12	53		110	4	WL4120	●	TAWL4120	●
13	0/+0.050	12	53		110	4	WL4130	●	TAWL4130	●
14	0/+0.050	12	53		110	4	WL4140	●	TAWL4140	●
15	0/+0.050	12	53		110	4	WL4150	●	TAWL4150	●
16	0/+0.050	16	63		123	4	WL4160	●	TAWL4160	●
17	0/+0.050	16	63		123	4	WL4170	●	TAWL4170	●
18	0/+0.050	16	63		123	4	WL4180	●	TAWL4180	●
19	0/+0.050	16	63		123	4	WL4190	●	TAWL4190	●
20	0/+0.050	20	75		141	4	WL4200	●	TAWL4200	●
22	0/+0.050	20	75		141	6	WL6220	●	TAWL6220	●
25	0/+0.050	25	90		166	6	WL6250	●	TAWL6250	●
30	0/+0.050	25	90		166	6			TAWL6300	●
32	0/+0.050	32	106		186	6			TAWL6320	●
36	0/+0.050	32	106		186	6			TAWL6360	●
40	0/+0.050	40	125		217	6			TAWL6400	●

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

# TAWL4

WL4 (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>2D x 0.1D</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>	<b>2D x 0.1D</b>
Vc (m/min)		<b>40÷50</b>	<b>30÷40</b>	<b>25÷35</b>	<b>10÷20</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	4	0.004	0.004	0.003	0.003
4	4	0.006	0.005	0.005	0.004
5	4	0.009	0.008	0.007	0.006
6	4	0.012	0.011	0.010	0.009
8	4	0.015	0.013	0.012	0.011
10	4	0.021	0.019	0.017	0.016
12	4	0.027	0.024	0.021	0.020
14	4	0.032	0.029	0.026	0.024
16	4	0.038	0.034	0.030	0.028
18	4	0.045	0.040	0.036	0.033
20	4	0.050	0.045	0.040	0.038
22	6	0.056	0.051	0.045	0.042
25	6	0.068	0.061	0.054	0.051
30	6	0.074	0.066	0.059	0.053
32	6	0.077	0.069	0.062	0.054
36	6	0.085	0.077	0.068	0.060
40	6	0.095	0.086	0.076	0.067
ap x ae		≤ D5	1.5D x 0.05D	1.2D x 0.05D	1.2D x 0.05D

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

## TAWSR

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA


Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>
Vc (m/min)	<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.022	0.020	0.018	0.017
<b>8</b>	0.028	0.025	0.022	0.019
<b>10</b>	0.035	0.032	0.028	0.025
<b>12</b>	0.045	0.041	0.036	0.032
<b>14</b>	0.055	0.050	0.044	0.039
<b>16</b>	0.065	0.059	0.052	0.046
<b>18</b>	0.075	0.068	0.060	0.053
<b>20</b>	0.085	0.077	0.068	0.060

HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO

Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae	<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)	<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>	<b>20÷30</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>6</b>	0.026	0.024	0.021	0.018
<b>8</b>	0.033	0.030	0.026	0.023
<b>10</b>	0.042	0.038	0.034	0.029
<b>12</b>	0.054	0.049	0.043	0.038
<b>14</b>	0.066	0.059	0.053	0.046
<b>16</b>	0.078	0.070	0.062	0.055
<b>18</b>	0.090	0.081	0.072	0.063
<b>20</b>	0.102	0.092	0.082	0.071

CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS





INFO

# TAWSFR

UMWSFR (Vc = +20%) - WSFR (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>D x D</b>	<b>D x D</b>	<b>D x D</b>	<b>0.5D x D</b>
Vc (m/min)		<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	3	0.022	0.020	0.018	0.017
8	3	0.028	0.025	0.022	0.019
10	4	0.035	0.032	0.028	0.025
12	4	0.045	0.041	0.036	0.032
14	4	0.055	0.050	0.044	0.039
16	4	0.065	0.059	0.052	0.046
18	4	0.075	0.068	0.060	0.053
20	4	0.085	0.077	0.068	0.060
22	5	0.086	0.077	0.068	0.060
25	5	0.099	0.089	0.079	0.069
28	6	0.100	0.090	0.080	0.070
30	6	0.108	0.097	0.086	0.076
32	6	0.116	0.104	0.093	0.081
36	6	0.130	0.111	0.104	0.091
40	6	0.145	0.123	0.116	0.102

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>1.5D x 0.5D</b>	<b>1.5D x 0.5D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>
Vc (m/min)		<b>50÷70</b>	<b>40÷60</b>	<b>30÷40</b>	<b>20÷30</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	3	0.026	0.024	0.021	0.018
8	3	0.033	0.030	0.026	0.023
10	4	0.042	0.038	0.034	0.029
12	4	0.054	0.049	0.043	0.038
14	4	0.066	0.059	0.053	0.046
16	4	0.078	0.070	0.062	0.055
18	4	0.090	0.081	0.072	0.063
20	4	0.102	0.092	0.082	0.071
22	5	0.103	0.092	0.082	0.072
25	5	0.119	0.107	0.095	0.083
28	6	0.120	0.108	0.096	0.084
30	6	0.130	0.117	0.104	0.091
32	6	0.139	0.125	0.111	0.097
36	6	0.156	0.140	0.125	0.109
40	6	0.174	0.157	0.139	0.122

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS

# WLFR-TAWLFR

weldon shank, roughing HR, long

DIN 844	N	HSS/Co BR	HSS/Co PV200	30°	SQUARE	HR FINE	Z3-Z6
		WLFR	TAWLFR				

INFO



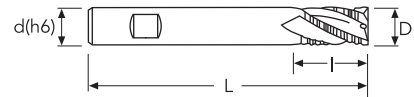
WLFR



TAWLFR

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



D(js12)	D Tol.	d(h6)	l	l1	L	z	WLFR		TAWLFR	
							EDP No.	Stock	EDP No.	Stock
6	+/-0.060	6	24		68	3	WLFR060	●	TAWLFR060	●
8	+/-0.075	10	38		88	3	WLFR080	●	TAWLFR080	●
10	+/-0.075	10	45		95	4	WLFR100	●	TAWLFR100	●
12	+/-0.090	12	53		110	4	WLFR120	●	TAWLFR120	●
14	+/-0.090	12	53		110	4	WLFR140	●	TAWLFR140	●
16	+/-0.090	16	63		123	4	WLFR160	●	TAWLFR160	●
18	+/-0.090	16	63		123	4	WLFR180	●	TAWLFR180	●
20	+/-0.105	20	75		141	4	WLFR200	●	TAWLFR200	●
22	+/-0.105	20	75		141	5			TAWLFR220	●
25	+/-0.105	25	90		166	5			TAWLFR250	●
30	+/-0.105	25	90		166	6			TAWLFR300	●
32	+/-0.105	32	106		186	6			TAWLFR320	●
36	+/-0.125	32	106		186	6			TAWLFR360	●
40	+/-0.125	32	125		217	6			TAWLFR400	●

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF-VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

INFO

# TAWLFR

WLFR (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.5D x D</b>	<b>0.3D x D</b>
Vc (m/min)		<b>35÷45</b>	<b>25÷35</b>	<b>20÷30</b>	<b>10÷20</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	3	0.014	0.013	0.011	0.011
8	3	0.020	0.018	0.016	0.014
10	4	0.025	0.022	0.020	0.017
12	4	0.032	0.028	0.025	0.022
14	4	0.039	0.035	0.031	0.027
16	4	0.046	0.041	0.036	0.032
18	4	0.053	0.047	0.042	0.037
20	4	0.060	0.054	0.048	0.042
22	5	0.060	0.054	0.048	0.042
25	5	0.069	0.062	0.055	0.049
28	6	0.070	0.063	0.056	0.049
30	6	0.076	0.068	0.060	0.053
32	6	0.081	0.073	0.065	0.057
36	6	0.091	0.077	0.073	0.064
40	6	0.102	0.086	0.081	0.071

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.3D</b>	<b>1.5D x 0.2D</b>
Vc (m/min)		<b>35÷45</b>	<b>25÷35</b>	<b>20÷30</b>	<b>10÷20</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	3	0.017	0.015	0.013	0.012
8	3	0.024	0.022	0.019	0.017
10	4	0.029	0.026	0.024	0.021
12	4	0.038	0.034	0.030	0.026
14	4	0.046	0.042	0.037	0.032
16	4	0.055	0.049	0.044	0.038
18	4	0.063	0.057	0.050	0.044
20	4	0.071	0.064	0.057	0.050
22	5	0.072	0.065	0.057	0.050
25	5	0.083	0.075	0.067	0.058
28	6	0.084	0.076	0.067	0.059
30	6	0.091	0.082	0.073	0.064
32	6	0.097	0.088	0.078	0.068
36	6	0.109	0.098	0.087	0.076
40	6	0.122	0.110	0.097	0.085

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# TAWSB2

WSB2 (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>0.1D x 0.2D</b>	<b>0.1D x 0.2D</b>	<b>0.1D x 0.2D</b>	<b>0.1D x 0.2D</b>
Vc (m/min)		<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>2</b>	1.20	0.020	0.018	0.016	0.015
<b>3</b>	1.80	0.040	0.036	0.032	0.030
<b>4</b>	2.40	0.060	0.054	0.048	0.045
<b>5</b>	3.00	0.070	0.063	0.056	0.053
<b>6</b>	3.60	0.082	0.074	0.066	0.062
<b>8</b>	4.80	0.094	0.085	0.075	0.071
<b>10</b>	6.00	0.110	0.099	0.088	0.083
<b>12</b>	7.20	0.130	0.117	0.104	0.098
<b>14</b>	8.40	0.150	0.135	0.120	0.113
<b>16</b>	9.60	0.170	0.153	0.136	0.128
<b>18</b>	10.80	0.190	0.171	0.152	0.143
<b>20</b>	12.00	0.210	0.189	0.168	0.158
<b>22</b>	13.20	0.232	0.209	0.186	0.174
<b>25</b>	15.00	0.262	0.236	0.210	0.197
<b>28</b>	16.80	0.285	0.257	0.228	0.214
<b>30</b>	18.00	0.292	0.263	0.233	0.219



α	n (rpm)	Vf (mm/min)
15°	x 1.1	x 1.1

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

**TAWLB2****WLB2 (Vc = -20% ÷ -30%)**CARBIDE  
DRILLSPU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>0.1D x 0.2D</b>	<b>0.1D x 0.2D</b>	<b>0.1D x 0.2D</b>	<b>0.1D x 0.2D</b>
Vc (m/min)		<b>30÷40</b>	<b>25÷35</b>	<b>20÷30</b>	<b>12÷18</b>
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>3</b>	1.80	0.034	0.031	0.027	0.026
<b>4</b>	2.40	0.051	0.046	0.041	0.038
<b>5</b>	3.00	0.060	0.054	0.048	0.045
<b>6</b>	3.60	0.070	0.063	0.056	0.052
<b>8</b>	4.80	0.080	0.072	0.064	0.060
<b>10</b>	6.00	0.094	0.084	0.075	0.070
<b>12</b>	7.20	0.111	0.099	0.088	0.083
<b>14</b>	8.40	0.128	0.115	0.102	0.096
<b>16</b>	9.60	0.145	0.130	0.116	0.108
<b>18</b>	10.80	0.162	0.145	0.129	0.121
<b>20</b>	12.00	0.179	0.161	0.143	0.134



$\alpha$	n (rpm)	Vf (mm/min)
15°	x 1.1	x 1.1

HSS  
DRILLSLFTA  
SUTA  
HSS-HSS/COCARBIDE  
END-MILLSG2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MHHSS  
END-MILLSCARBIDE  
BURRS





INFO

# TAFFM

FM (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>0.25D x 0.75D</b>	<b>0.25D x 0.75D</b>	<b>0.25D x 0.75D</b>	<b>0.25D x 0.75D</b>
Vc (m/min)		<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>40</b>	8	0.060	0.054	0.048	0.045
<b>50</b>	8	0.070	0.063	0.056	0.053
<b>63</b>	8	0.080	0.072	0.064	0.060
<b>80</b>	10	0.100	0.090	0.080	0.075
<b>100</b>	10	0.120	0.108	0.096	0.090

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# TAFFR

FFR (Vc = -20% ÷ -30%)

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm <sup>2</sup>	600÷800 N/mm <sup>2</sup>	800÷1000 N/mm <sup>2</sup>	900÷1200 N/mm <sup>2</sup>
ap x ae		<b>0.25D x 0.75D</b>	<b>0.25D x 0.75D</b>	<b>0.25D x 0.75D</b>	<b>0.25D x 0.75D</b>
Vc (m/min)		<b>40÷60</b>	<b>30÷50</b>	<b>25÷35</b>	<b>15÷25</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>40</b>	8	0.080	0.072	0.064	0.060
<b>50</b>	8	0.100	0.090	0.080	0.075
<b>63</b>	8	0.120	0.108	0.096	0.090
<b>80</b>	10	0.120	0.108	0.096	0.090
<b>100</b>	10	0.140	0.126	0.112	0.105

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# WCR

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

Material Group ISO 513	P1 P2 P3 P4	P7 M1	K1 K2	N1 N2 N3 N4
Hardness/Rm	≤800 N/mm <sup>2</sup>	≤750 N/mm <sup>2</sup>	≤350 HB	
ap x ae	<b>0.2D x 0.2D</b>	<b>0.2D x 0.2D</b>	<b>0.2D x 0.2D</b>	<b>0.2D x 0.2D</b>
Vc (m/min)	<b>30+50</b>	<b>15+25</b>	<b>30+40</b>	<b>60+80</b>
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
8	0.006	0.004	0.005	0.007
9	0.008	0.006	0.007	0.009
10	0.010	0.007	0.009	0.011
11	0.012	0.008	0.010	0.013
12	0.015	0.010	0.012	0.016
13	0.017	0.012	0.014	0.019
14	0.020	0.014	0.017	0.021
15	0.023	0.016	0.019	0.025
16	0.025	0.018	0.021	0.028
17	0.026	0.018	0.022	0.029
18	0.027	0.019	0.023	0.030
19	0.029	0.020	0.024	0.031
20	0.030	0.021	0.026	0.033
21	0.033	0.023	0.028	0.036
22	0.035	0.025	0.030	0.039
23	0.038	0.026	0.032	0.041
24	0.040	0.028	0.034	0.044
25	0.042	0.029	0.035	0.046
26	0.043	0.030	0.037	0.047
27	0.045	0.031	0.038	0.049
28	0.046	0.032	0.039	0.051
32	0.050	0.035	0.043	0.055



INFO

## WDC 45° - 60°

Material Group ISO 513		P1 P2 P3 P4				P7 M1		K1 K2		N1 N2 N3 N4			
		≤800 N/mm <sup>2</sup>				≤750 N/mm <sup>2</sup>		≤350 HB					
Hardness/Rm													
ap x ae		0.2D x 0.15D				0.2D x 0.15D		0.2D x 0.15D		0.2D x 0.15D			
Vc (m/min)		30÷50				15÷25		30÷40		50÷70			
D (mm)	z	fz (mm/z)				fz (mm/z)		fz (mm/z)		fz (mm/z)			
<b>16</b>	6	0.015				0.011		0.013		0.017			
<b>20</b>	6	0.017				0.012		0.014		0.018			
<b>22</b>	6	0.018				0.013		0.015		0.020			
<b>25</b>	8	0.020				0.014		0.017		0.022			
<b>28</b>	8	0.023				0.016		0.019		0.025			
<b>32</b>	10	0.025				0.018		0.021		0.028			
<b>38</b>	12	0.028				0.020		0.024		0.031			

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS





INFO

## WDD 45° - 60°

Material Group ISO 513		P1 P2 P3 P4				P7 M1		K1 K2		N1 N2 N3 N4			
		≤800 N/mm <sup>2</sup>				≤750 N/mm <sup>2</sup>		≤350 HB					
Hardness/Rm													
ap x ae		0.2D x 0.15D				0.2D x 0.15D		0.2D x 0.15D		0.2D x 0.15D			
Vc (m/min)		30÷50				15÷25		30÷40		50÷70			
D (mm)	z	fz (mm/z)				fz (mm/z)		fz (mm/z)		fz (mm/z)			
<b>16</b>	6	0.015				0.011		0.013		0.017			
<b>20</b>	6	0.017				0.012		0.014		0.018			
<b>22</b>	6	0.018				0.013		0.015		0.020			
<b>25</b>	8	0.020				0.014		0.017		0.022			
<b>28</b>	8	0.023				0.016		0.019		0.025			
<b>32</b>	10	0.025				0.018		0.021		0.028			
<b>38</b>	12	0.028				0.020		0.024		0.031			

CARBIDE  
DRILLS
 PU-HPU  
 TA-4HTA  
 SUH  
 ALH  
 HRC  
 SUH MINI  
 HL  
 HSD  
 C-SD-TA
HSS  
DRILLS
 LFTA  
 SUTA  
 HSS-HSS/CO
CARBIDE  
END-MILLS
 G2  
 MDTA  
 HF VH/UP  
 MEF  
 ALU  
 MEX/MH  
 UH/MH
HSS  
END-MILLSCARBIDE  
BURRS



INFO

# WTM

CARBIDE  
DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513		P1 P2 P3 P4	P7 M1	K1 K2	N1 N2 N3 N4
Hardness/Rm		≤800 N/mm <sup>2</sup>	≤750 N/mm <sup>2</sup>	≤350 HB	
ap x ae		<b>DIN Norm 650</b>	<b>DIN Norm 650</b>	<b>DIN Norm 650</b>	<b>DIN Norm 650</b>
Vc (m/min)		<b>25+35</b>	<b>12+18</b>	<b>20+30</b>	<b>40+60</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>12.5</b>	6	0.010	0.007	0.009	0.011
<b>16</b>	6	0.025	0.018	0.021	0.028
<b>18</b>	6	0.030	0.021	0.026	0.033
<b>19</b>	6	0.035	0.025	0.030	0.039
<b>21</b>	6	0.040	0.028	0.034	0.044
<b>22</b>	6	0.043	0.030	0.036	0.047
<b>25</b>	6	0.045	0.032	0.038	0.050
<b>28</b>	6	0.050	0.035	0.043	0.055
<b>32</b>	8	0.057	0.040	0.048	0.063
<b>36</b>	8	0.065	0.046	0.055	0.072

HSS  
DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE  
END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS  
END-MILLS

CARBIDE  
BURRS



INFO

# WWK

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA



Material Group ISO 513		P1 P2 P3 P4	P7 M1	K1 K2	N1 N2 N3 N4
Hardness/Rm		≤800 N/mm <sup>2</sup>	≤750 N/mm <sup>2</sup>	≤350 HB	
ap x ae		<b>DIN Norm 6888</b>	<b>DIN Norm 6888</b>	<b>DIN Norm 6888</b>	<b>DIN Norm 6888</b>
Vc (m/min)		<b>25+35</b>	<b>12+18</b>	<b>20+30</b>	<b>40+60</b>
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
<b>10.5</b>	8	0.010	0.007	0.009	0.011
<b>13.5</b>	8	0.018	0.012	0.015	0.019
<b>16.5</b>	8	0.025	0.018	0.021	0.028
<b>19.5</b>	8	0.033	0.023	0.028	0.036
<b>22.5</b>	10	0.040	0.028	0.034	0.044
<b>25.5</b>	10	0.045	0.032	0.038	0.050
<b>28.5</b>	10	0.050	0.035	0.043	0.055
<b>32.5</b>	12	0.055	0.039	0.047	0.061

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

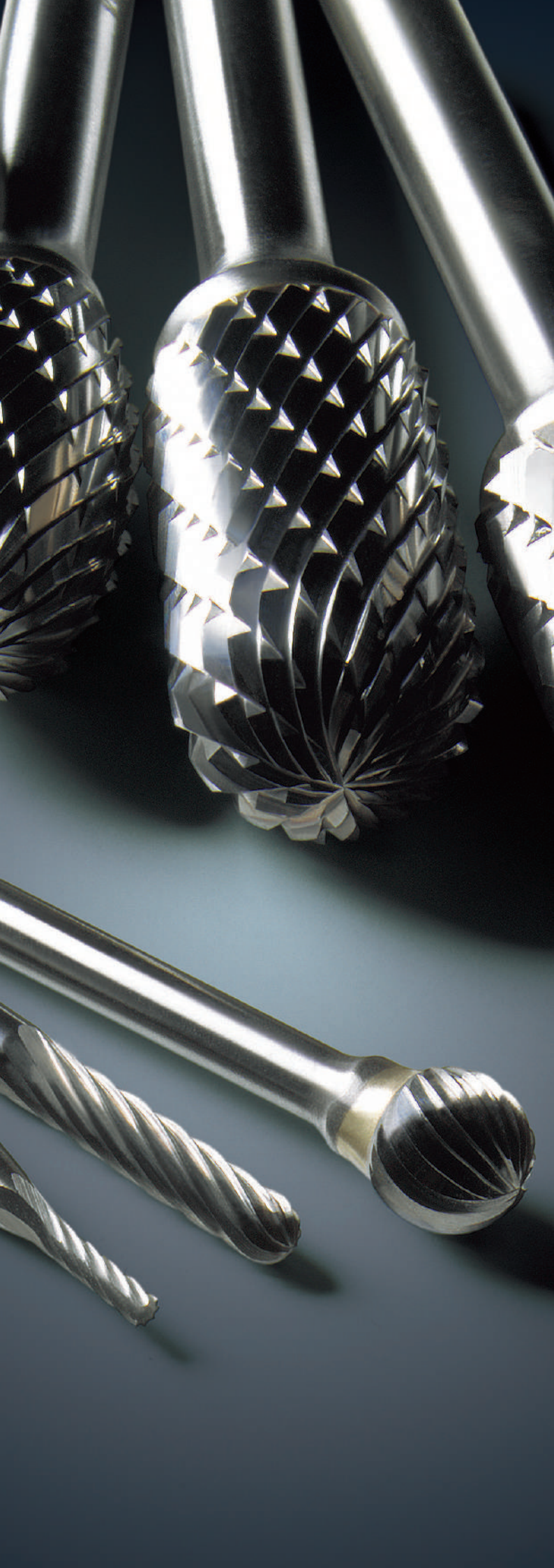
CARBIDE BURRS

**CARBIDE BURRS**



ITEM No.	PAGE	Ø3 mm	Ø6 mm
<b>SA</b>	685		
<b>SB</b>	686		
<b>SC</b>	687		
<b>SD</b>	688		
<b>SE</b>	689		
<b>SF</b>	690		
<b>SG</b>	691		
<b>SH</b>	692		
<b>SJ</b>	693		
<b>SK</b>	694		
<b>SL</b>	695		
<b>SM</b>	696		
<b>SN</b>	697		





INFO

CARBIDE  
DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA

HSS  
DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE  
END-MILLS

G2  
MDTA  
HF-VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

## CARBIDE BURRS

🇬🇧 Don't miss the Osawa quality on carbide rotary burrs, available in a wide variety of shapes and geometries.

🇮🇹 Ritrovate tutta la qualità Osawa anche nella gamma di lime rotative in metallo duro, disponibili in un'ampia scelta di forme e geometrie.

🇩🇪 Die Osawa- Qualität steht auch für Hartmetall-Rotierfräser. Diese sind in einer breiten Auswahl an Formen und Geometrien erhältlich.

🇫🇷 Retrouvez toute la qualité Osawa dans la gamme de limes rotatives carbure, disponibles dans une grande variété de formes et géométries.

🇪🇸 Toda la calidad Osawa también se propone en la gama de limas rotativas de metal duro, disponibles con una amplia variedad de formas y geometrías.

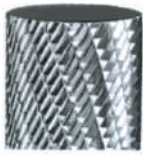
🇷🇺 Широкий выбор форм и геометрии в сочетании с высочайшим качеством характеризует линию твёрдосплавных борфрез Osawa.

HSS  
END-MILLS

CARBIDE  
BURRS

CARBIDE BURRS

INFO



M

M

- Double cut
- Doppio taglio
- 2 Schneiden

- Coupe double
- Doble corte
- Двойная заточка

MPC

- Plain cut
- Taglio piano
- Flachschnide

- Coupe plane
- Corte plano
- Обычная заточка

MFN

Alucut



MPC



MFN

CARBIDE DRILLS

- PU-HPU
- TA-4HTA
- SUH
- ALH
- HRC
- SUH MINI
- HL
- HSD
- C-SD-TA

HSS DRILLS

- LFTA
- SUTA
- HSS-HSS/CO

CARBIDE END-MILLS

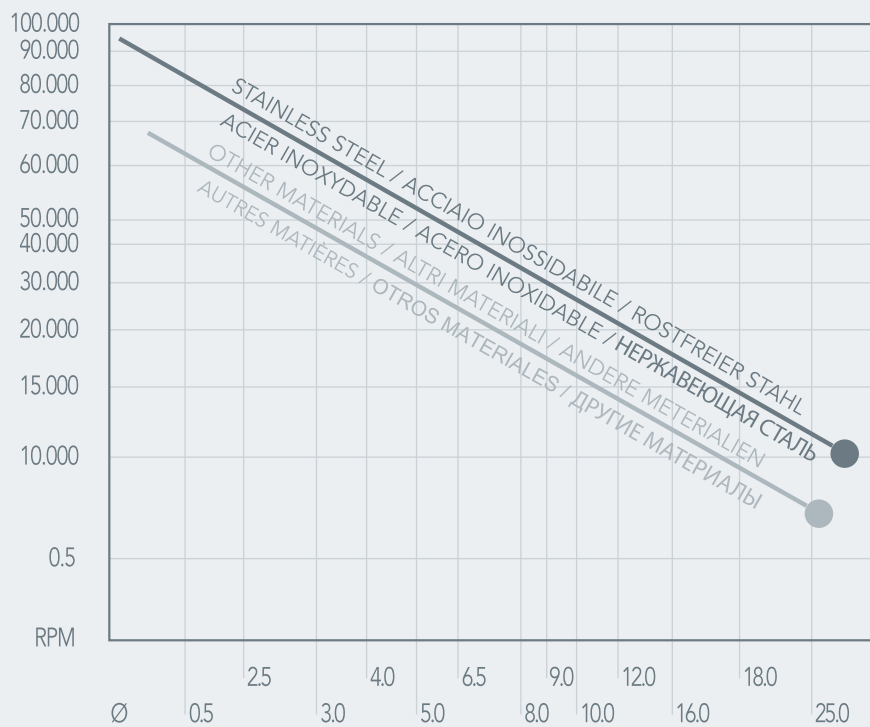
- G2
- MDTA
- HF VH/UP
- MEF
- ALU
- MEX/MH
- UH/MH

HSS END-MILLS

CARBIDE BURRS

SPEED TABLE  
 TABELLA VELOCITÀ  
 GESCHWINDIGKEITSTABELLE

TABLEAU DE VITESSE  
 TABLA DE VELOCIDAD  
 ТАБЛИЦА СКОРОСТЕЙ





























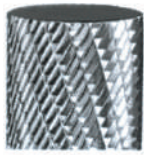




INFO

CARBIDE DRILLS

PU-HPU  
TA-4HTA  
SUH  
ALH  
HRC  
SUH MINI  
HL  
HSD  
C-SD-TA



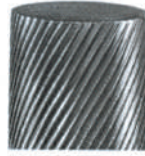
**M**



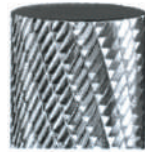
**BUR10 M TYPE**

Set 10pcs. - shank Ø6 mm

SA1 - SB1 - SC1 - SD1 - SE1 - SF1 - SG1 - SL1 - SM1 - SN1



**MPC**



**M**



**A15FW MPC TYPE**

Set 15pcs. - shank Ø3 mm

SA41 - SA42 - SA43 - SA52 - SB43 - SC42 - SD41 - SD42 - SD53 - SE41 - SG43 - SL42 - SM42 - SM43 - SN42

**A16FW M TYPE**

Set 15pcs. - shank Ø3 mm

SA41 - SA42 - SA43 - SA52 - SB43 - SC42 - SD41 - SD42 - SD53 - SE41 - SG43 - SL42 - SM42 - SM43 - SN42

HSS DRILLS

LFTA  
SUTA  
HSS-HSS/CO

CARBIDE END-MILLS

G2  
MDTA  
HF VH/UP  
MEF  
ALU  
MEX/MH  
UH/MH

HSS END-MILLS

CARBIDE BURRS

















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