



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



OSW21 CATALOGUE

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

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 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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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

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681. CARBIDE BURRS

683.....	Carbide burrs

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107.....	TYPHOON SUH MINI short, long and extra long - 5xD+30D
139.....	TYPHOON HL long and extra-long - 12xD+30D
173.....	TYPHOON HSD step drill for 90° chamfering
179.....	C-SD-TA NC spotting

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3 **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

4 **427. HSS END MILLS**

639.....	HSS/Co - HSSP general purpose

5 **681. CARBIDE BURRS**

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 HAUBTABSCHNITTE

- 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

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Alphanumeric index

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347..... HP (HAP) universal and multi purp

463..... MEF stainless steel and super alloy

477..... All non ferrous materials

503..... MBS (B-SS HRC) MH (35-70 HRC) an

563..... UH (<70 HRC) MH (35-70 HRC) steel an

627 HSS END MILLS

639..... HSS/Co - HSSP general purpose

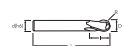
681 CARBIDE BURRS

683..... Carbide burrs

G2 - General purpose - Ball nose

G2CSB2

cylindrical shank, 2 flutes ball nose

D	Wt	R	Rt	HR	L	T1	L	R	EXP No.	Stock
1	0/0-020	0.50	1/0-015	A	2	30	2	G2CSB210	•	
1.5	0/0-020	0.75	1/0-015	A	3	30	2	G2CSB215	•	
2	0/0-020	1.00	1/0-015	A	4	30	2	G2CSB220	•	
2.5	0/0-020	1.25	1/0-015	A	5	30	2	G2CSB225	•	
3	0/0-020	1.50	1/0-015	A	6	30	2	G2CSB230	•	
3.5	0/0-020	1.75	1/0-015	A	7	30	2	G2CSB235	•	
4	0/0-020	2.00	1/0-015	A	8	30	2	G2CSB240	•	
4.5	0/0-020	2.25	1/0-015	A	9	30	2	G2CSB245	•	
5	0/0-020	2.50	1/0-015	A	10	30	2	G2CSB250	•	
5.5	0/0-020	2.75	1/0-015	A	11	30	2	G2CSB255	•	
6	0/0-020	3.00	1/0-015	A	12	30	2	G2CSB260	•	
6.5	0/0-020	3.25	1/0-015	A	13	40	2	G2CSB265	•	
7	0/0-020	3.50	1/0-015	A	14	40	2	G2CSB270	•	
8	0/0-020	4.00	1/0-015	B	16	40	2	G2CSB280	•	
9	0/0-020	4.50	1/0-015	B	18	75	2	G2CSB290	•	
10	0/0-020	5.00	1/0-015	B	20	75	2	G2CSB300	•	
12	0/0-020	6.00	1/0-015	B	24	75	2	G2CSB320	•	
16	0/0-020	8.00	1/0-015	B	30	100	2	G2CSB360	•	
20	0/0-020	10.00	1/0-015	B	36	100	2	G2CSB400	•	

• stock standard □ non standard stock ▽ not available

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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 • Auswahlhilfe • Índice graphique • Índice gráfico • Руководство по выбору

	ITEM No.	PAGE
PU-HPU universal application 3xD - 5xD	353PU	43
	353HPU	43
	353PU	52
	353HPU	52
TA-4HTA general purpose 3xD - 8xD	343TA	44
	318A	44
	3544HTA	70
	3550H	79
SUH stainless steel 3xD - 5xD	3550H	85
ALH non-ferrous material 3xD - 5xD	3550H	93
HRC hardened steel 45-62 HRC 3xD	3550H	97
SUH MINI short, long and extra long 5xD - 30xD	3550H MINI	114
	3550H MINI	118
	3550H MINI	122
	3550H MINI	126
HL long and extra long 12xD - 30xD	3513HL	147
	3515HL	152
	3520HL	157
	3520HL	162
HSD step drill for 90° chamfering	370HSD	175
NC spotting 90° - 120°	CS-D-1A-90	180
	CS-D-1A-120	180

Selection Guide

Indice grafico • Auswahlhilfe • Índice graphique • Índice gráfico • Руководство по выбору

RANGE	DRILLING DEPTH	ITEM	TYPE	MATERIAL / COATING	HRC	POINT ANGLE	HELIX ANGLE	COATING	DOF	DOF	DOF	DOF	DOF
3-20	3xD	DN1612K	PU	MS P2550		140°	30°	45°	★	★	★	★	★
3-20	3xD	DN1612K	HPU	MS P2550		140°	30°	45°	★	★	★	★	★
3-20	3xD	DN1612L	PU	MS P2550		140°	30°	45°	★	★	★	★	★
3-20	5xD	DN1612L	HPU	MS P2550		140°	30°	45°	★	★	★	★	★
1-14	3xD	DN1612P	TA	MS P2550		140°	30°		★	★	★	★	★
1-12	3xD	DN1612P	TA	MS P2550		140°	30°		★	★	★	★	★
3-14	8xD	OSAWA	ALH	MS P2550		140°	30°		★	★	★	★	★
3-20	3xD	DN1612K	SUH	MS P2550		140°	30°		★	★	★	★	★
3-20	3xD	DN1612L	SUH	MS P2550		140°	30°		★	★	★	★	★
3-20	5xD	DN1612K	ALH	MS P2550		140°	30°		★	★	★	★	★
3-20	3xD	DN1612L	ALH	MS P2550		130°	30°		★	★	★	★	★
3-20	5xD	DN1612L	ALH	MS P2550		130°	30°		★	★	★	★	★
2.6-14.2	3xD	DN1612K	HRC	MS P2550	60-62	100°	10°	45°	★	★	★	★	★
1-3	3xD	OSAWA	GAH	MS P2550		130°	30°		★	★	★	★	★
1-3	8xD	OSAWA	GAH	MS P2550		130°	30°		★	★	★	★	★
1-3	12xD	OSAWA	GAH	MS P2550		130°	30°		★	★	★	★	★
1-3	20xD	OSAWA	GAH	MS P2550		130°	30°		★	★	★	★	★
1-3	25xD	OSAWA	GAH	MS P2550		130°	30°		★	★	★	★	★
1-3	30xD	OSAWA	GAH	MS P2550		130°	30°		★	★	★	★	★
1-1-10	12xD	OSAWA	HL	MS P2550		130°	30°		★	★	★	★	★
1-1-10	15xD	OSAWA	HL	MS P2550		130°	30°		★	★	★	★	★
1-1-10	20xD	OSAWA	HL	MS P2550		130°	30°		★	★	★	★	★
1-1-10	25xD	OSAWA	HL	MS P2550		130°	30°		★	★	★	★	★
1-1-10	30xD	OSAWA	HL	MS P2550		130°	30°		★	★	★	★	★
3-3-10-2	3xD	OSAWA	HSD	MS P2550		140°	30°	90°	★	★	★	★	★
6-16	OSAWA	SD	MS P2550		90°	30°			★	★	★	★	★
6-16	OSAWA	SD	MS P2550		120°	30°			★	★	★	★	★

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144 sheets • 9 variants

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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

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.

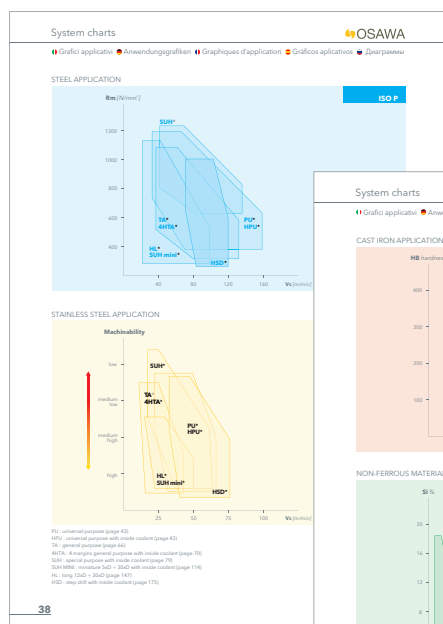
ПОМОЩНИК ПО ПОДБОРУ

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

PRODUCT SEARCH

-  RICERCA PRODOTTI
 PRODUKTSUCHE
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 BÚSQUEDA PRODUCTOS
 ПОДБОР ИНСТРУМЕНТА

4



PRODUCT PAGE

PAGINA PRODOTTO
 SEITE DES PRODUKTS
 PAGE PRODUIT
 PÁGINA PRODUCTO
 СТРАНИЦА АРТИКУЛА

G2 - General purpose - Square

G2CS2
cylindrical shank, 2 flutes

OSAWA

ISO 9001 N ISO 9001 PV200

Icons:

ISO Materials table with black or white stars to indicate applicability

Machining icons available also in the parameters tables (Only for milling)

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	15		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	G2CS2115	●
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

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

ISO CLASSIFICATION . 15
WORKPIECE MATERIALS . 18
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MATERIALS			HARDNESS/Rm
P1	- Free cutting steel and structural steel - Acciai automatici e acciai strutturali - Automatenstähle und Baustähle	- Aciers pour décolletage et aciers structurels - Aceros de fácil mecanización y aceros de construcción - Автоматные и конструкционные стали	< 500 N/mm ²
P2	- Carbon steel and low alloy steel - Acciai al carbonio e acciai basso legati - Kohlenstoff-Stähle und niedriglegierte Stähle	- Aciers au carbone et aciers faiblement alliés - Aceros al carbono y aceros de baja aleación - Углеродистые и низколегированные стали	500 ÷ 700 N/mm ²
P3	- Medium alloy steel and heat treated steel - Acciai medio legati e acciai di bonifica - Mittellegierte Stähle und Vergütungsstähle	- Aciers moyennement alliés et aciers trempés et recuits - Aceros de media aleación y aceros bonificados - Среднелегированные и отожженные стали	600 ÷ 800 N/mm ²
P4	- High alloy steel - Acciai alto legati - Hochlegierte Stähle	- Aciers fortement alliés - Aceros de alta aleación - Высоколегированные стали	800 ÷ 1000 N/mm ²
P5	- Tool steel - Acciai per utensili - Werkzeugstähle	- Aciers pour outils - Aceros para herramientas - Инструментальные стали	900 ÷ 1200 N/mm ²
P6	- High tensile strength steel - Acciai ad alta resistenza - HSLA-Stähle	- Aciers haute résistance - Aceros de alta resistencia - Высокопрочная сталь	1200 ÷ 1480 N/mm ² 38 ÷ 45 HRC
P7	- Ferritic - Martensitic stainless steel - Acciai inossidabili ferritici e martensitici - Ferritische-Martensitische Stähle	- Aciers inoxydables ferritiques-martensitiques - Aceros inoxidables ferríticos-martensíticos - Ферритно-мартенситная нержавеющая сталь	
P8	- PH stainless steel - Acciai inossidabili PH - indurenti per precipitazione - Ausscheidungshartbare Edelstähle	- Aciers inoxydables à durcissement par précipitation - Aceros inoxidables PH - Дисперсионно-твердеющая нержавеющая сталь	
M1	- Austenitic stainless steel (good machinability) - Acciai inossidabili austenitici (buona lavorabilità) - Austenitische Edelstähle (niedriglegiert)	- Aciers inoxydables austénitiques (faiblement allié) - Aceros inoxidables Austeníticos (fácil mecanizado) - Аустенитная нержавеющая сталь	
M2	- Austenitic stainless steel (medium machinability) and Duplex - Acciai inossidabili austenitici (buona lavorabilità) - Austenitische Edelstähle (niedriglegiert)	- Aciers inoxydables austénitiques (faiblement allié) - Aceros inoxidables Austeníticos (fácil mecanizado) - Аустенитная нержавеющая сталь	
M3	- Super austenitic stainless steel and super Duplex - Acciai inossidabili austenitici (media lavorabilità) e Duplex - Austenitische Edelstähle (mittel-legiert) und Duplex	- Aciers inoxydables austénitiques (moyennement allié) et Duplex - Aceros inoxidables Austeníticos (medio mecanizado) y 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-MILLSCARBIDE
BURRS

INFO

MATERIALS

HARDNESS/Rm

CARBIDE DRILLS	K1	 Grey cast iron  Ghise grigia  Grauguss	 Fonte grise  Fundición gris  Серый чугун	150 ÷ 250 HB
	K2	 Nodular cast iron  Ghise sferoidali  Sphäroguss	 Fonte nodulaire  Fundición nodular  Чугун с шаровидным графитом	150 ÷ 350 HB
	K3	 Austenitic cast iron  Ghise austenitiche  Austenitischer Guss	 Fonte austénitique  Fundición austenítica  Аустенитный чугун	120 ÷ 260 HB
	K4	 ADI cast iron  Ghise ADI  ADI Guss	 Fonte ADI  Fundición ADI  Отпущенный ковкий чугун	250 ÷ 500 HB
HSS DRILLS	N1	 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	
	N2	 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-магнєвые сплавы	
	N3	 Copper alloy  Leghe di rame  Kupferlegierungen	 Alliages de cuivre  Aleación de cobre  Медные сплавы	
	N4	 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	
	N5	 Plastic material  Polimeri  Polymere	 Polymères  Material plástico  Пластики	
CARBIDE END-MILLS	N6	 Carbon fiber and composite  Fibra di carbonio e compositi  Faserwerkstoffe und Verbundwerkstoffe	 Fibres et composites  Fibra de carbonio y compositos  Углеволокно и композиты	

HSS
DRILLSLFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLSG2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

INFO

MATERIALS		HARDNESS/Rm
S1	- Heat resistant super alloys (HRSA) Ni base (good machinability) - Leghe a base di nichel resistenti al calore (buona lavorabilità) - Warmfeste Superlegierungen (HRSA) Nickel-Legierungen (einfach zu bearbeiten)	- Base Ni de superalliages résistants à la chaleur (HRSA) (bonne usinabilité) - Super aleaciones resistentes al calor (HRSA) base Nickel (fácil mecanizado) - Жаропрочные сплавы (HRSA) Ni(легкообрабатываемые) < 25 HRC
S2	- Heat resistant super alloys (HRSA) Ni base (medium machinability) - Leghe a base di nichel resistenti al calore (media lavorabilità) - Warmfeste Superlegierungen (HRSA) Nickel-Legierungen (mittlere Bearbeitbarkeit)	- Superaliages résistants à la chaleur (HRSA) Ni base (usinabilité moyenne) - Super aleaciones resistentes al calor (HRSA) base Nickel (medio mecanizado) - Жаропрочные сплавы (HRSA) Ni(среднеобрабатываемые) 25 ÷ 35 HRC
S3	- Heat resistant super alloys (HRSA) Ni base (low machinability) - Leghe a base di nichel resistenti al calore (difficile lavorabilità) - Warmfeste Superlegierungen (HRSA) Nickel-Legierungen (schwierig zu bearbeiten)	- Superaliages résistants à la chaleur (HRSA) Ni base (faible usinabilité) - Super aleaciones resistentes al calor (HRSA) base Nickel (difícil mecanizado) - Жаропрочные сплавы (HRSA) Ni(труднообрабатываемые) 35 ÷ 45 HRC
S4	- Low Titanium base alloy (good machinability) - Leghe di titanio basso legate (buona lavorabilità) - Titanlegierung (gut Bearbeitbarkeit)	- Alliages de base à faible teneur en titane (bonne usinabilité) - Aleaciones a bajo contenido Titanio (fácil mecanizado) - Сплавы с низким содержанием Ti(легкообрабатываемые)
S5	- High Titanium base alloy (medium machinability) - Leghe di titanio alto legate (media lavorabilità) - Hochfeste Titanlegierung (mittlere Bearbeitbarkeit)	- Alliages à base de titane élevé (usinabilité moyenne) - Aleaciones a alto contenido Titanio (medio mecanizado) - Сплавы с высоким содержанием Ti (среднеобрабатываемые)

CARBIDE
DRILLS

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

H1	- Hardened steel - Acciai temprati generali - Allgemeine gehärtete Stähle	- Aciers trempés - Aceros templados - Закаленные стали 50 ÷ 56 HRC
H2	- Hardened bearing steel - Acciai temprati per cuscinetti - Gehärtete Kugellagerstähle	- Aciers trempés pour roulements - Aceros templados para rodamientos - Закаленные подшипниковые стали 54 ÷ 62 HRC
H3	- Hardened tool steel - Acciai temprati per utensili - Gehärtete Werkzeugstähle	- Aciers trempés pour outils - Aceros templados para herramientas - Закаленные инструментальные стали 60 ÷ 65 HRC
H4	- Hardened martensitic stainless steel - Acciai inossidabili martensitici temprati - Gehärtete martensitische Edelstähle	- Aciers inoxydables martensitiques trempés - Aceros inoxidables martensíticos templados - Закаленные мартенситные нержавеющие стали 50 ÷ 56 HRC
H5	- Hardened white cast iron - Ghise bianche temprate - Gehärteter Weißguss	- Fonte blanche trempée - Fundición blanca templada - Закаленный белый чугун 48 ÷ 55 HRC

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
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

Gr.	Materials	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
P1	Free cutting steel and structural steel Rm < 500 N/mm ²	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
P2	Carbon steel and low alloy steel Rm 500÷700 N/mm ²		Ck 25			C 25	060 A 25	S 25 C	XC 25
		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 ²	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

 Materiali
  Werkstoffmaterialien
  Matériaux
  Materiales
  Материалы

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 L 14			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-MILLSCARBIDE
BURRS

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

Gr.	Materials	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
P4	High alloy steel Rm 800÷1000 N/mm ²	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 ²	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 DKCVW 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 ² 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				

🇮🇹 Materiali 🇩🇪 Werkstoffmaterialien 🇫🇷 Matériaux 🇪🇸 Materiales 🇷🇺 Материалы

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-MILLSCARBIDE
BURRS

🇮🇹 Materiali 🇩🇪 Werkstoffmaterialien 🇫🇷 Matériaux 🇪🇸 Materiales 🇷🇺 Материалы

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

Gr.	Materials	W.-Nr	DIN	EN-Nr.	EN	UNI	BS	JIS	AFNOR
M1	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
M2	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	X2 CrNiMo 18 16			X2CrNiMo18 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	X10 CrNiTi 18 9	1.4541		X6CrNiTi18 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	X10 CrNiMoTi 18 10			X6CrNiMoTi 17 12	320 S 17	-	Z 6 CNDT 17.12
		1.4893	X 9 CrNiSiNCE 21 11 2	1.4835	X 9 CrNiSiNCE 21 11 2		310 S 31		
M3	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	SUH 660	Z 6 NCTDV 25.15
K1	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
K2	Nodular cast iron 150 ÷ 350 HB	0.7033	GGG 35.3	5.3100	EN-GJS-350-22		Grade 350/22	FCD 350-22L	FGS 370-17
		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				
K3	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				
K4	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-MILLSCARBIDE
BURRS

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

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			CN102		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

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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-MILLSCARBIDE
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INFO

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DRILLS

PU/HPU
TA/4HTA
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SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

G2
MDTA
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ALU
MEX/MH
UH/MH

HSS
END-MILLSCARBIDE
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

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

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

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						
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
H3	Hardened tool steel 60 ÷ 65 HRC	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	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 CrMoW 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 DKCWV 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

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

 Durezza
  Härte
  Dureté
  Dureza
  Твёрдость

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

HRC	VICKERS	BRINELL HARDNESS		ROCKWELL HARDNESS			ROCKWELL SUPERFICIAL HARDNESS			SHORE HARDNESS	N/mm ² 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)

🇮🇹 Formule 🇩🇪 Formeln 🇫🇷 Formules 🇪🇸 Fórmulas 🇷🇺 Формулы

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

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

⚙️ SPINDLE 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

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

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

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



INFO

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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
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HSS
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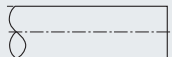
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STOCK		
●	🇩🇪 stock standard 🇮🇹 stock standard 🇩🇪 Standard Lager	🇫🇷 stock standard 🇪🇸 stock estándar 🇷🇺 складская позиция
○	🇩🇪 non-standard stock 🇮🇹 stock non standard 🇩🇪 nicht Standard Lager	🇫🇷 stock non standard 🇪🇸 stock no estándar 🇷🇺 не складская позиция
▽	🇩🇪 stock exhaustion 🇮🇹 esaurimento stock 🇩🇪 Vorraterschöpfung	🇫🇷 épuisement du stock 🇪🇸 agotamiento de stock 🇷🇺 складские остатки

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

★	🇩🇪 1st choice 🇮🇹 1a scelta 🇩🇪 1. Wahl	🇫🇷 1er choix 🇪🇸 1ª elección 🇷🇺 1-й выбор
☆	🇩🇪 suitable 🇮🇹 adatto 🇩🇪 geeignet	🇫🇷 adapté 🇪🇸 adecuado 🇷🇺 пригоден

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

	🇩🇪 cylindrical shank 🇮🇹 attacco cilindrico 🇩🇪 zylindrischer Schaft	🇫🇷 queue cylindrique 🇪🇸 mango cilíndrico 🇷🇺 цилиндрическое крепление

🇩🇪 GEOMETRY 🇮🇹 GEOMETRIA 🇩🇪 GEOMETRIE 🇫🇷 GÉOMÉTRIE 🇪🇸 GEOMETRÍA 🇷🇺 ГЕОМЕТРИЯ

			🇩🇪 universal application 🇮🇹 applicazione universale 🇩🇪 Universelle Anwendung	🇫🇷 application universelle 🇪🇸 aplicación universal 🇷🇺 универсальное применение
			🇩🇪 universal application with inside coolant 🇮🇹 applicazione universale con refrigerazione interna 🇩🇪 Universelle Anwendung mit Innenkühlung	🇫🇷 application universelle avec lubrification interne 🇪🇸 aplicación universal con refrigeración interna 🇷🇺 универсальное применение с внутренним охлаждением
			🇩🇪 general purpose 🇮🇹 uso generico 🇩🇪 allgemeine Anwendung	🇫🇷 applications génériques 🇪🇸 uso genérico 🇷🇺 общего назначения
			🇩🇪 4 guides chamfer with inside coolant 🇮🇹 4 fasi con refrigerazione interna 🇩🇪 4 Führungsfasen mit innerer Kühlmittelzuführung	🇫🇷 4 listels à trous d'huile 🇪🇸 4 fases con refrigeración interna 🇷🇺 4 направляющих с внутренней подачей СОЖ
			🇩🇪 stainless steel with inside coolant 🇮🇹 acciaio inossidabile con refrigerazione interna 🇩🇪 rostfreien Stahl mit innerer Kühlmittelzuführung	🇫🇷 acier inoxydable à trous d'huile 🇪🇸 acero inoxidable con refrigeración interna 🇷🇺 нержавеющая сталь с внутренней подачей СОЖ
			🇩🇪 aluminium with inside coolant 🇮🇹 alluminio con refrigerazione interna 🇩🇪 Aluminium mit innerer Kühlmittelzuführung	🇫🇷 aluminium à trous d'huile 🇪🇸 aluminio con refrigeración interna 🇷🇺 алюминий с внутренней подачей СОЖ
			🇩🇪 hardened steel 🇮🇹 acciaio temprato 🇩🇪 Hartstahl	🇫🇷 acier trempé 🇪🇸 acero templado 🇷🇺 закалённая сталь

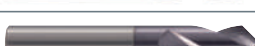
🇮🇹 Legenda 🇩🇪 Verzeichnis 🇫🇷 Légende 🇪🇸 Leyenda 🇷🇺 Условные обозначения

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

🇬🇧 MATERIAL 🇮🇹 MATERIALE 🇩🇪 WERKSTOFF 🇫🇷 MATIÈRE 🇪🇸 MATERIAL 🇷🇺 МАТЕРИАЛ					
			🇬🇧 micrograin 🇮🇹 micrograna 🇩🇪 Mikrokörnung	🇫🇷 micrograin 🇪🇸 micrograno 🇷🇺 микрозернистый твёрдый сплав	

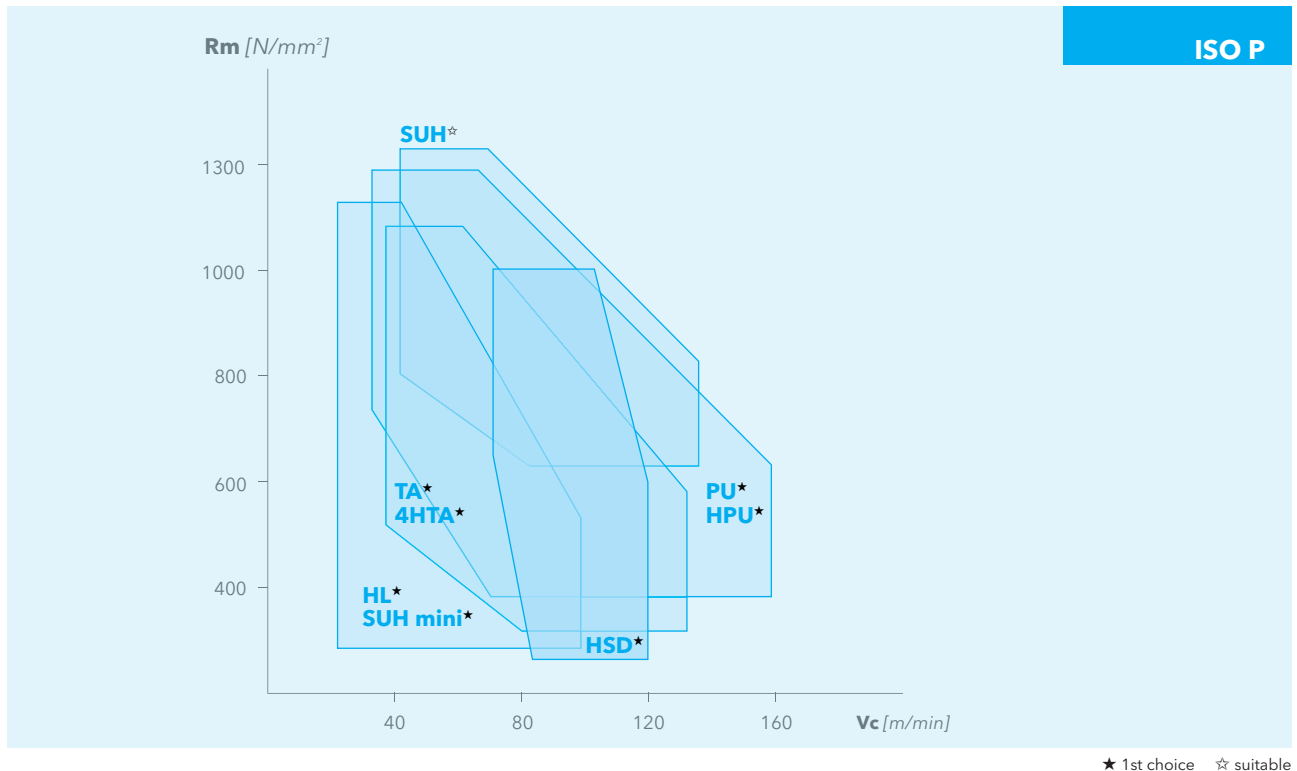
🇬🇧 SURFACE TREATMENT 🇮🇹 TRATTAMENTO SUPERFICIALE 🇩🇪 OBERFLÄCHENBEHANDLUNG 🇫🇷 TRAITEMENT DE SURFACE 🇪🇸 TRATAMIENTO SUPERFICIAL 🇷🇺 ОБРАБОТКА ПОВЕРХНОСТИ					
			🇬🇧 uncoated 🇮🇹 non rivestito 🇩🇪 unbeschichtet	🇫🇷 non revêtu 🇪🇸 no revestido 🇷🇺 без покрытия	
			🇬🇧 polished 🇮🇹 lappato 🇩🇪 geläpft	🇫🇷 poli 🇪🇸 pulido 🇷🇺 полированный	

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

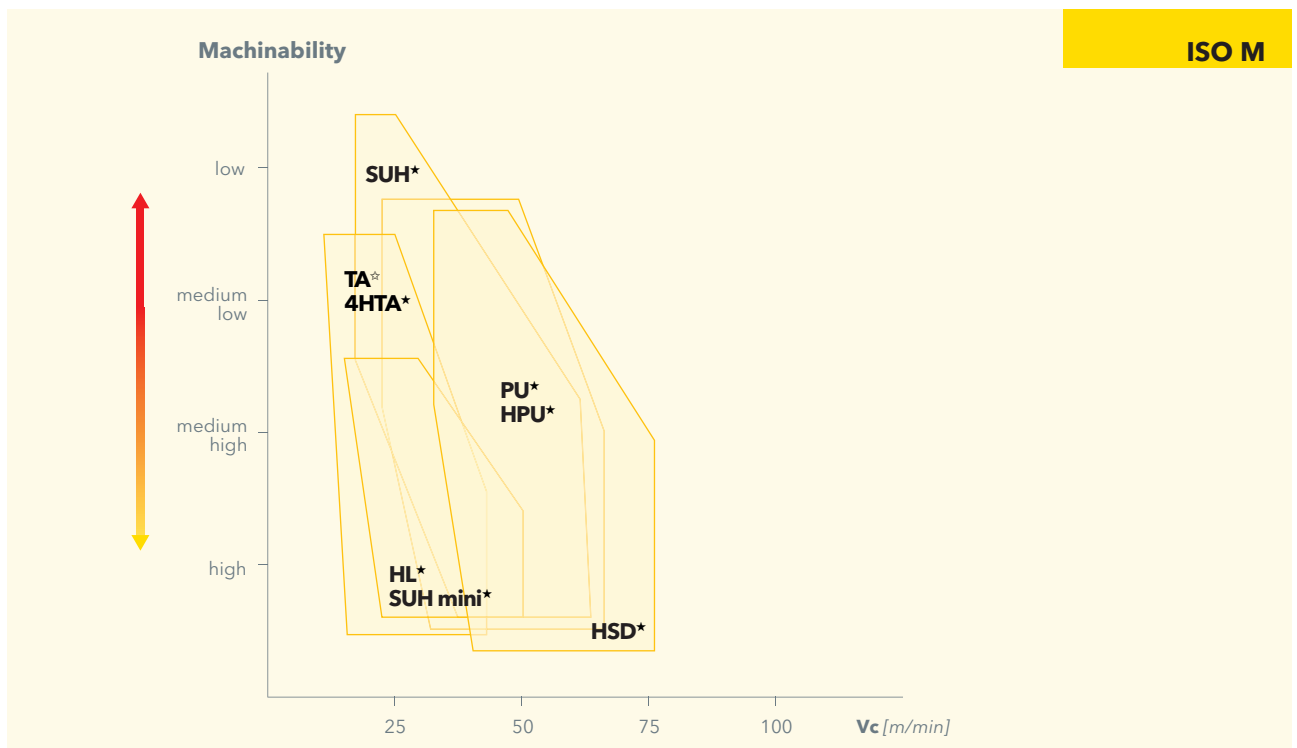
	ITEM No.	PAGE	
PU-HPU universal application 3xD - 5xD	353PU	43	
	353HPU	43	
	355PU	52	
	355HPU	52	
TA-4HTA general purpose 3xD - 8xD	343TA	66	
	318N	66	
	3584HTA	70	
SUH stainless steel 3xD - 5xD	353SUH	79	
	355SUH	85	
ALH non-ferrous material 3xD - 5xD	353ALH	93	
	355ALH	97	
HRC hardened steel 45-62 HRC 3xD	353HRC	103	
SUH MINI short, long and extra long 5xD ÷ 30xD	355SUH MINI	114	
	358SUH MINI	118	
	3512SUH MINI	122	
	3520SUH MINI	126	
	3525SUH MINI	130	
	3530SUH MINI	134	
HL long and extra long 12xD ÷ 30xD	3512HL	147	
	3515HL	152	
	3520HL	157	
	3525HL	162	
	3530HL	167	
HSD step drill for 90° chamfering	372HSD	175	
NC spotting 90° - 120°	CS-D-TA 90	180	
	CS-D-TA 120	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)

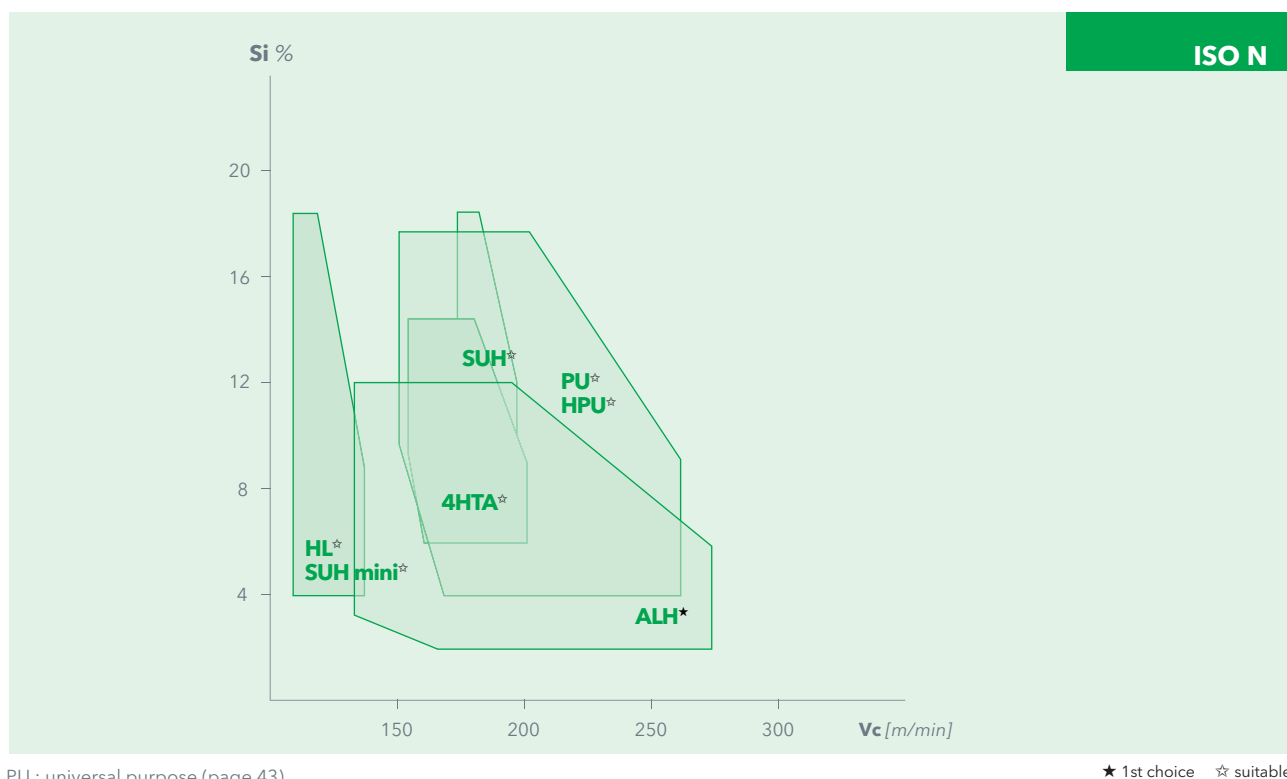
HL : long 12xD ÷ 30xD (page 147)

HSD : step drill with inside coolant (page 175)

CAST IRON APPLICATION



NON-FERROUS MATERIALS 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)

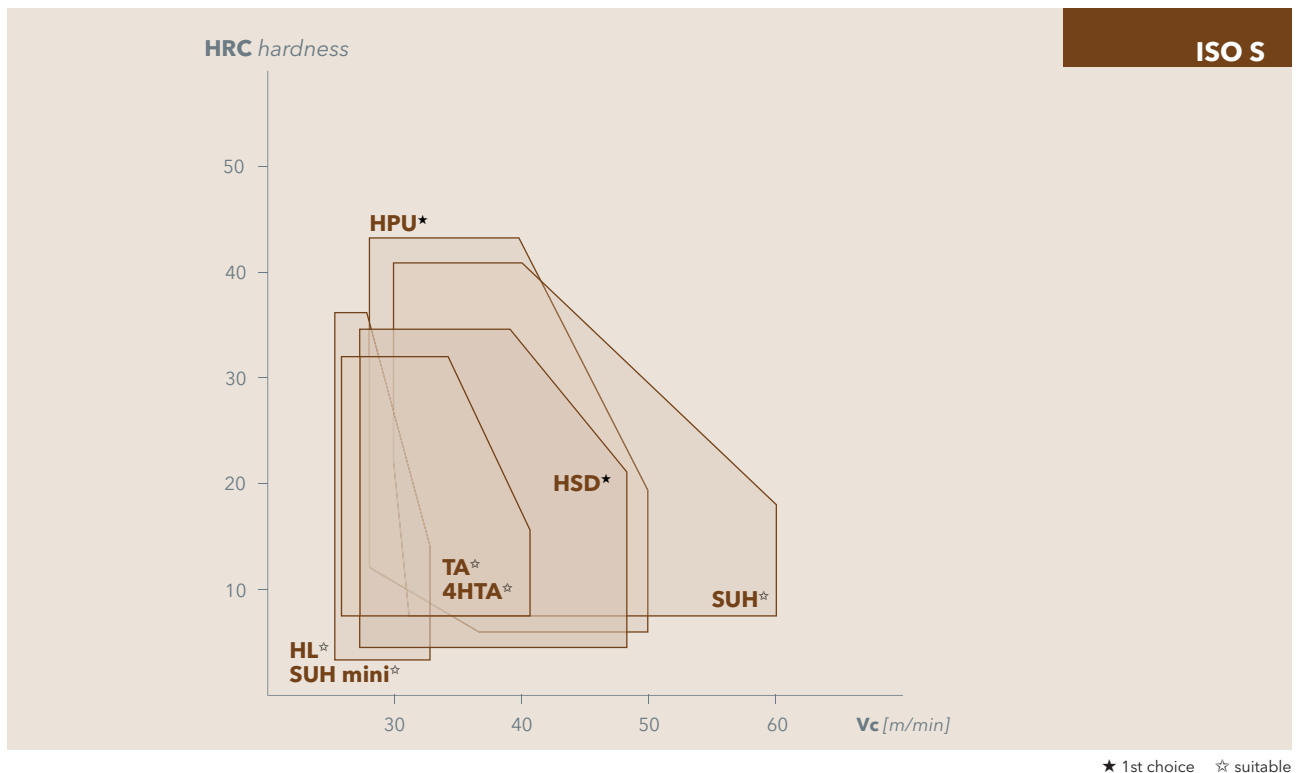
SUH : special purpose with inside coolant (page 79)

ALH : special purpose with inside coolant (page 93)

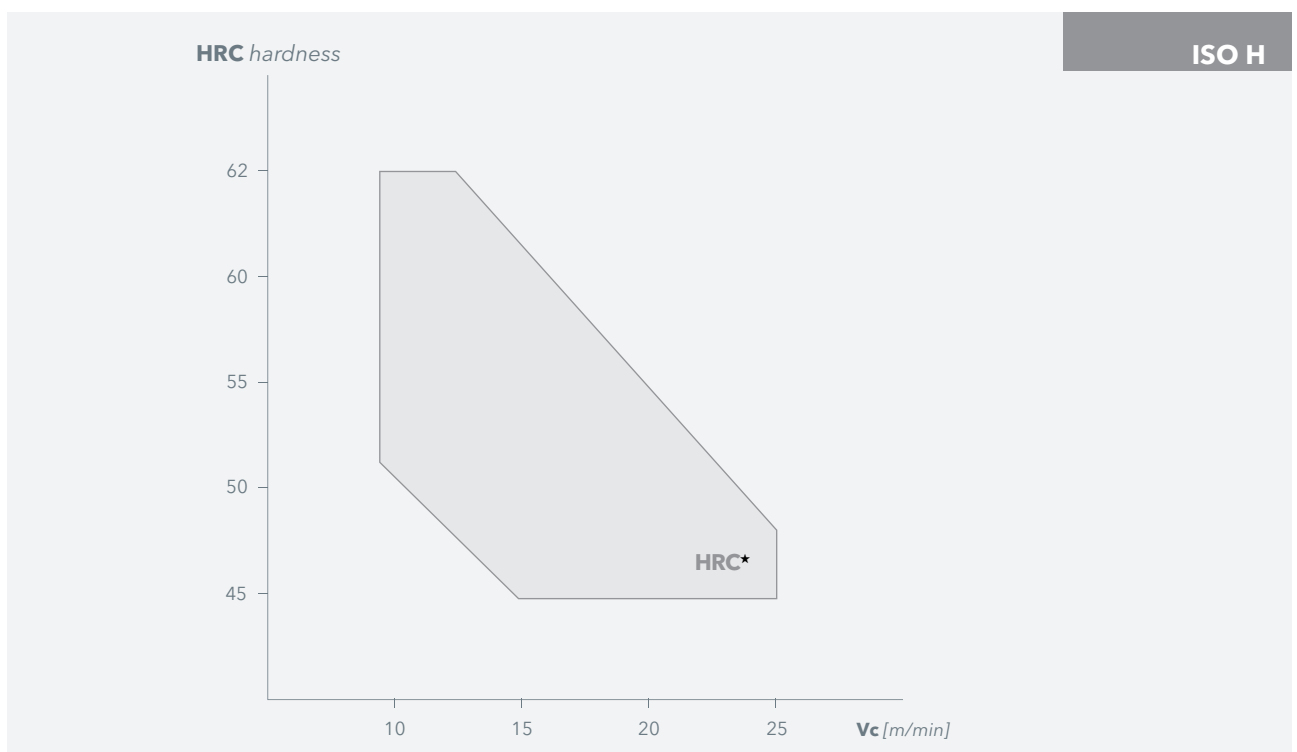
SUH MINI : miniature 5xD ÷ 30xD with inside coolant (page 114)

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



353PU 353HPU

INFO



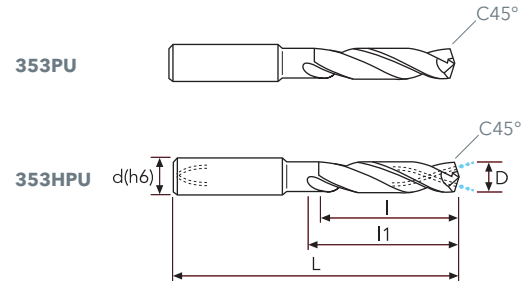
353PU



353HPU

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	●
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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	●
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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

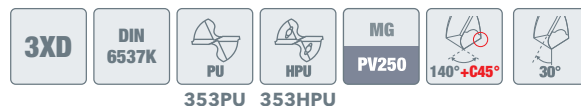
CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

353PU-353HPU

universal application, high productivity



353PU



353HPU

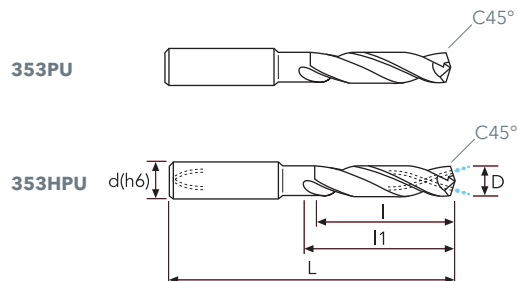
CARBIDE
DRILLS

PU-HPU

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

P	M	K	N	S	H
★	★	★	☆	★	

★ 1st choice ☆ suitable



353PU

353HPU

						353PU		353HPU	
D(m7)	D Tol.	d(h6)	l	l1	L	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
HF VH/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



353PU 353HPU

INFO



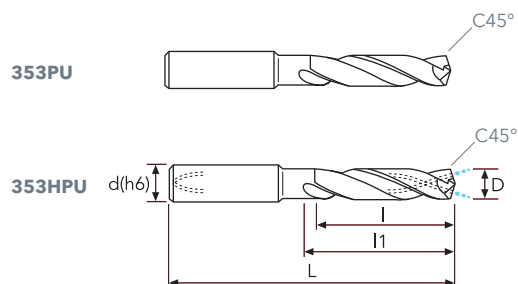
353PU



353HPU

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	●		

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

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

HSS
END-MILLS

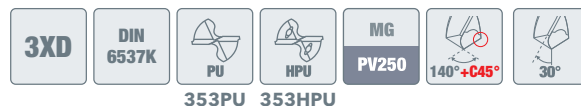
CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

353PU-353HPU

universal application, high productivity



353PU



353HPU

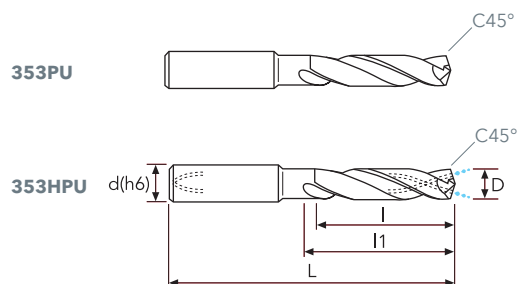
CARBIDE
DRILLS

PU-HPU

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

P	M	K	N	S	H
★	★	★	☆	★	

★ 1st choice ☆ suitable



353PU

353HPU

						353PU		353HPU	
D(m7)	D Tol.	d(h6)	l	l1	L	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	●

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

353PU

INFO

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	Vc (m/min)	100÷140	80÷120	60÷85	50÷65	35÷50	20÷30
	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

CARBIDE
DRILLS

PU-HPU

TA-4HTA

SUH

ALH

HRC

SUH MINI

HL

HSD

C-SD-TA

353HPU

HSS
DRILLS

LFTA

SUTA

HSS-HSS/CO

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	Vc (m/min)	120÷160	100÷140	70÷100	60÷80	50÷70	25÷40
	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

CARBIDE
END-MILLS

G2

MDTA

HF-VH/UP

MEF

ALU

MEX/MH

UH/MH

HSS
END-MILLS

CARBIDE
BURRS

INFO

CUTTING PARAMETERS

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 ²	550÷850 N/mm ²	650÷950 N/mm ²			
Vc (m/min)	35÷50	30÷45	20÷35			
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 ²	550÷850 N/mm ²	650÷950 N/mm ²			
Vc (m/min)	50÷70	40÷60	30÷45			
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

INFO

	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)	110÷150	90÷120	60÷80	40÷60		
	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	0.354	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		

CARBIDE
DRILLS

PU-HPU

TA-4HTA

SUH

ALH

HRC

SUH MINI

HL

HSD

C-SD-TA

HSS
DRILLS

LFTA

SUTA

HSS-HSS/CO

353HPU

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

CARBIDE
END-MILLS

G2

MDTA

HF-VH/UP

MEF

ALU

MEX/MH

UH/MH

HSS
END-MILLS

CARBIDE
BURRS

INFO

CUTTING PARAMETERS

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)	220÷260	200÷240	160÷200	160÷200		
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

353HPU

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)	260÷300	220÷260	180÷220	180÷220		
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

INFO

353PU

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	15÷25	10÷20	20÷30	15÷25		
	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		

CARBIDE
DRILLS

PU-HPU

TA-4HTA
SUH
ALH
HRC
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HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

353HPU

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	30÷40	25÷35	40÷50	30÷40		
	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		

CARBIDE
END-MILLS

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

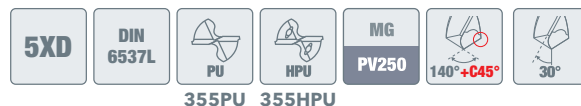
HSS
END-MILLS

CARBIDE
BURRS


INFO

355PU-355HPU

universal application, high productivity



355PU



355HPU

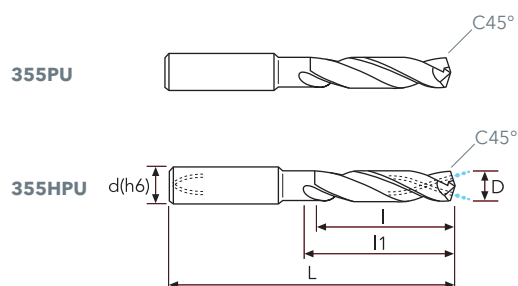
CARBIDE
DRILLS

PU-HPU

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

P	M	K	N	S	H
★	★	★	☆	★	

★ 1st choice ☆ suitable



355PU

355HPU

						355PU		355HPU	
D(m7)	D Tol.	d(h6)	l	l1	L	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	●

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

G2
MDTA
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MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLS

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

355PU-355HPU

universal application, high productivity



355PU 355HPU

INFO



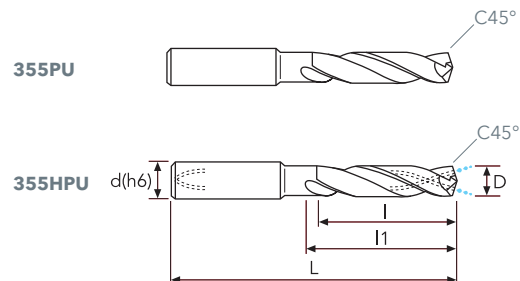
355PU



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

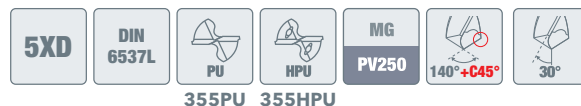
CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

355PU-355HPU

universal application, high productivity



355PU



355HPU

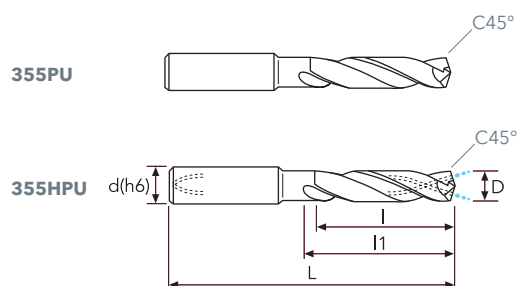
CARBIDE
DRILLS

PU-HPU

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

P	M	K	N	S	H
★	★	★	☆	★	

★ 1st choice ☆ suitable



355PU

355HPU

						355PU		355HPU	
D(m7)	D Tol.	d(h6)	l	l1	L	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



355PU 355HPU

INFO



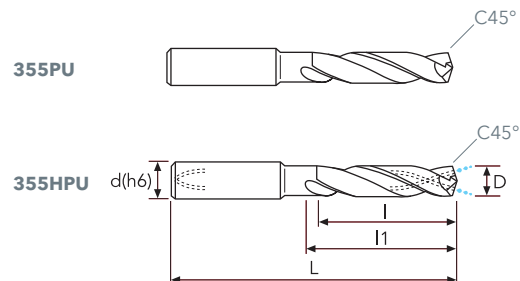
355PU



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

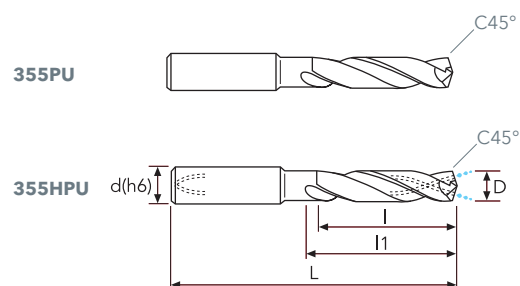
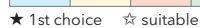
universal application, high productivity



355PU 355HPU



C-SD-TA



● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

355PU

INFO

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	Vc (m/min)	100÷140	80÷120	60÷85	50÷65	35÷50	20÷30
	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	

CARBIDE
DRILLS

PU-HPU

TA-4HTA

SUH

ALH

HRC

SUH MINI

HL

HSD

C-SD-TA

355HPU

HSS
DRILLS

LFTA

SUTA

HSS-HSS/CO

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	Vc (m/min)	120÷160	100÷140	70÷100	60÷80	50÷70	25÷40
	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	

CARBIDE
END-MILLS

G2

MDTA

HF-VH/UP

MEF

ALU

MEX/MH

UH/MH

HSS
END-MILLS

CARBIDE
BURRS

INFO

CUTTING PARAMETERS

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 ²	550÷850 N/mm ²	650÷950 N/mm ²			
Vc (m/min)	35÷50	30÷45	20÷35			
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 ²	550÷850 N/mm ²	650÷950 N/mm ²			
Vc (m/min)	50÷70	40÷60	30÷45			
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

INFO

	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)	110÷150	90÷120	60÷80	40÷60		
	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		

CARBIDE
DRILLS

PU-HPU

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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

355HPU

	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)	120÷160	100÷140	80÷100	60÷80		
	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		

CARBIDE
END-MILLS

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

HSS
END-MILLS

CARBIDE
BURRS

INFO

CUTTING PARAMETERS

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)	220÷260	200÷240	160÷200	160÷200		
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)	260÷300	220÷260	180÷220	180÷220		
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


CUTTING PARAMETERS

355PU

INFO

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	15÷25	10÷20	20÷30	15÷25		
	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		


CARBIDE
DRILLS

PU-HPU

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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

355HPU

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	30÷40	25÷35	40÷50	30÷40		
	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		


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/mm².

🇮🇹 La soluzione ideale per la foratura di materiali ISO P, M, K sino a 1100 N/mm².

🇩🇪 Die optimale Lösung für das Bohren der Materialien ISO P, M, K bis zu 1100 N/mm².

🇫🇷 La solution idéale pour le perçage de matériaux ISO P, M, K jusqu'à 1100 N/mm².

🇪🇸 La solución ideal para el taladro de materiales ISO P, M, K hasta 1100 N/mm².

🇷🇺 Идеальное решение для сверления материалов по ISO P, M, K до 1100 Н/мм².

TYPHOON TA-HTA-4HTA

HIGH PERFORMANCE - GENERAL PURPOSE

INFO

CARBIDE
DRILLS

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



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 accentuada 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

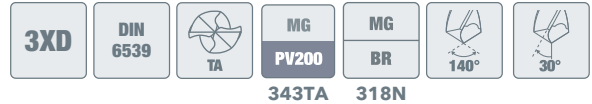
 HSS
END-MILLS

 CARBIDE
BURRS

INFO

343TA-318N

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



343TA



318N

CARBIDE
DRILLS

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

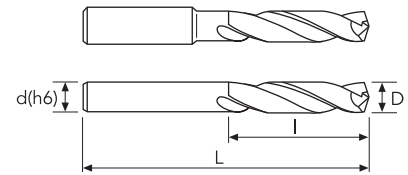
P	M	K	N	S	H
★	☆	☆	☆		
★	☆	☆	☆		

★ 1st choice ☆ suitable

343TA
318N

< ø2 mm

≥ ø2 mm



						343TA		318N	
D(h7)	D Tol.	d(h6)	l	l1	L	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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

343TA-318N

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



INFO



343TA



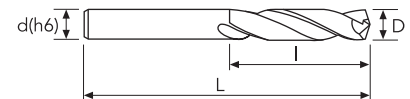
318N

P	M	K	N	S	H
★	☆	☆	☆		
★	☆	☆	☆		

343TA

318N

★ 1st choice ☆ suitable



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

						343TA		318N	
D(h7)	D Tol.	d(h6)	I	I1	L	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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

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



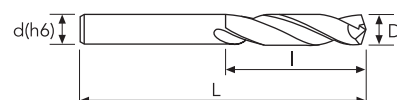
318N



C-SD-TA

318N

★ 1st choice ☆ suitable



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 ²	<700 N/mm ²	<750 N/mm ²	150÷250 HB		
	Vc (m/min)	80÷100	35÷45	35÷45	80÷100	140÷180	
	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 ²	<700 N/mm ²	<750 N/mm ²	150÷250 HB		
	Vc (m/min)	60÷80	20÷30	20÷30	50÷70	100÷140	
	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

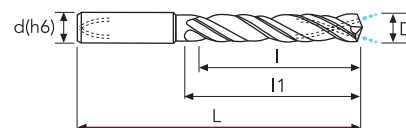
4-margin lands, long (8xD)


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)	I	I1	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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

3584HTA

4-margin lands, long (8xD)



P	M	K	N	S	H
★	★	★	☆	☆	

★ 1st choice ☆ suitable

8XD

OSAWA
NORM

4HTA

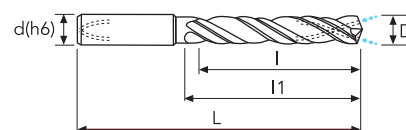
MG
PV300

140°

30°

INFO

CARBIDE
DRILLS

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


D(m7)	D Tol.	d(h6)	I	I1	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

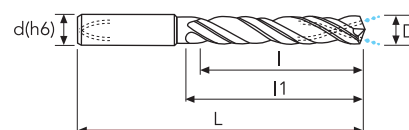
● stock standard ○ non-standard stock ▽ stock exhaustion

3584HTA

8XD	OSAWA NORM	 4HTA	MG PV300	 140°	 30°



★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

3584HTA

Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
Vc (m/min)	100÷120	80÷100	50÷70	40÷60	40÷50	15÷25
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

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)	40÷50	30÷40	20÷30			
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			

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

3584HTA

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)	100÷120	80÷100	50÷70	40÷60		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3	0.072	0.065	0.058	0.050		
4	0.089	0.080	0.071	0.062		
5	0.106	0.095	0.085	0.074		
6	0.122	0.110	0.098	0.085		
7	0.139	0.125	0.111	0.097		
8	0.155	0.140	0.124	0.109		
9	0.172	0.155	0.138	0.120		
10	0.188	0.169	0.150	0.132		
11	0.205	0.185	0.164	0.144		
12	0.221	0.199	0.177	0.155		
13	0.238	0.214	0.190	0.167		
14	0.254	0.229	0.203	0.178		
15	0.270	0.243	0.216	0.189		
16	0.286	0.257	0.229	0.200		

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

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

HSS
END-MILLS

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

CARBIDE
BURRS


CUTTING PARAMETERS

3584HTA

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

HSS END-MILLS

CARBIDE BURRS

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.

TYPHOON SUH

HIGH PERFORMANCE - STAINLESS STEEL

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: 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

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

353SUH

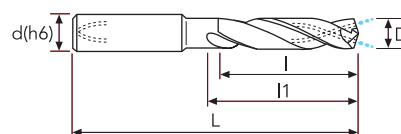
stainless steel, polished flutes



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	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	●

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

stainless steel, polished flutes



CARBIDE DRILLS

PU-HPU
TA-4HTA

SUH

ALH

HRC

SUH MINI

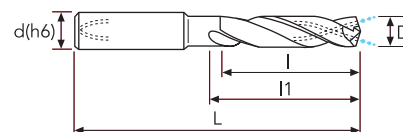
HL

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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

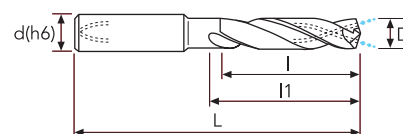
stainless steel, polished flutes



| INFO



★ 1st choice ☆ suitable



C-SD-1A

[illegible]

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
Vc (m/min)	130÷150	100÷140	80÷100	55÷75	50÷70	20÷30
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

CARBIDE
END-MILLS

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

HSS
END-MILLS

Material Group ISO 513	M1	M2	M3			
Hardness/Rm						
Vc (m/min)	50÷70	40÷60	30÷40			
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			



CUTTING PARAMETERS

353SUH

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		
	Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
	Vc (m/min)	110÷130	90÷110	70÷90	55÷75		
	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)	180÷220	160÷200				
	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

CUTTING PARAMETERS

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

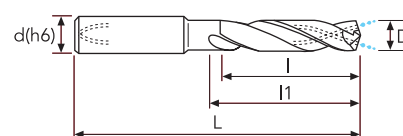
stainless steel, polished flutes



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

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	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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

355SUH

stainless steel, polished flutes

5XD

DIN
6537L

MG
PV300

CARBIDE
DRILLS

PU-HPU
TA-4HTA

SUH

ALH

HRC

SUH MINI

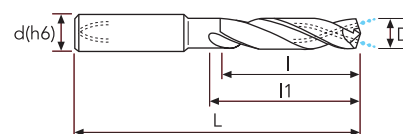
HL

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

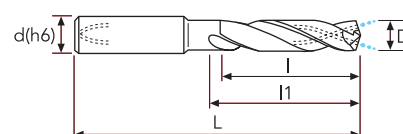
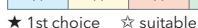
CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

stainless steel, polished flutes



| INFO



C-SD-1A

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
Vc (m/min)	120÷140	100÷120	70÷90	45÷65	40÷60	15÷25
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

CARBIDE
END-MILLS

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

HSS
END-MILLS

Material Group ISO 513	M1	M2	M3			
Hardness/Rm						
Vc (m/min)	40÷60	30÷50	25÷35			
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
BURRS

CUTTING PARAMETERS

355SUH

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		
	Hardness/Rm	150÷250 HB	150÷350 HB	120÷260 HB	250÷500 HB		
	Vc (m/min)	100÷120	80÷100	55÷75	40÷60		
	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)	180÷220	160÷200				
	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

CUTTING PARAMETERS

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)

25÷45
15÷35
40÷60
30÷50
D

(mm)

fn

(mm/rev)

fn

(mm/rev)

fn

(mm/rev)

fn

(mm/rev)

3

0.045

0.032

0.043

0.036

4

0.053

0.037

0.051

0.043

5

0.062

0.043

0.059

0.049

6

0.070

0.049

0.066

0.056

7

0.078

0.055

0.074

0.063

8

0.086

0.060

0.082

0.069

9

0.095

0.066

0.090

0.076

10

0.103

0.072

0.098

0.082

11

0.107

0.075

0.102

0.086

12

0.115

0.081

0.109

0.092

13

0.123

0.086

0.117

0.099

14

0.132

0.092

0.125

0.105

15

0.140

0.098

0.133

0.112

16

0.148

0.104

0.141

0.118

17

0.152

0.106

0.145

0.122

18

0.156

0.109

0.148

0.125

19

0.160

0.112

0.152

0.128

20

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).

TYPHOON ALH

HIGH PERFORMANCE - NON-FERROUS MATERIALS

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

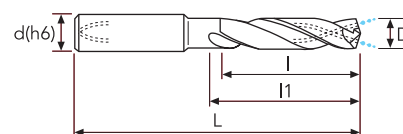


★ 1st choice ☆ suitable



INFO

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

INFO

353ALH

aluminium, polished flutes

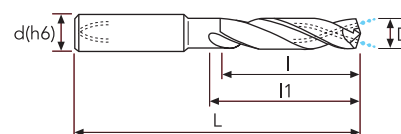


CARBIDE DRILLS

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	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

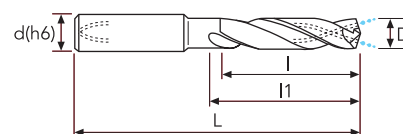
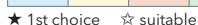
aluminium, polished flutes

DIN
6537K

MG



INFO



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

CUTTING PARAMETERS

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



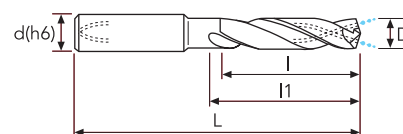
★ 1st choice ☆ suitable



INFO

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

5XD

DIN
6537L

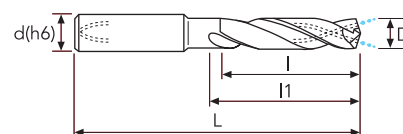
MG
POLISHED

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	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

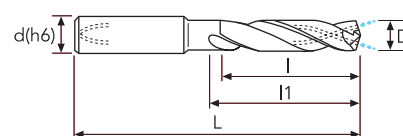
aluminium, polished flutes



| INFO



★ 1st choice ☆ suitable



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

[illegible]

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLSCARBIDE
BURRS

INFO

CUTTING PARAMETERS

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



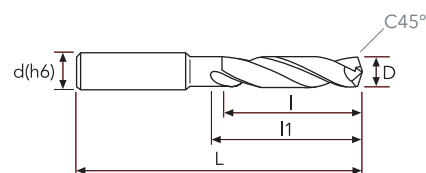
★ 1st choice ☆ suitable



INFO

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

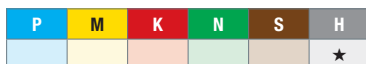
CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

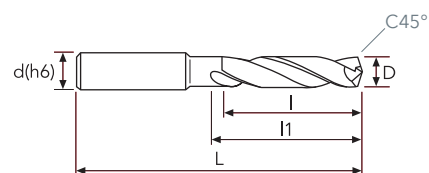
hardened steel 45÷62 HRC



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



★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

353HRC

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

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) Kleinstdriller 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.

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



- 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)



- Kleinstbohrer 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)

HSS DRILLS

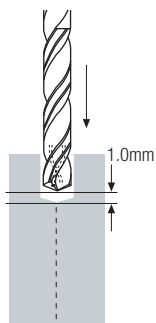
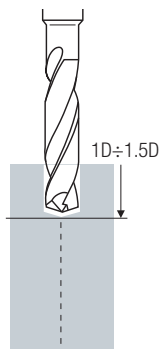
LFTA
SUTA
HSS-HSS/CO

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**
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.


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

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

**СВЕРЛЕНИЕ ГЛУБОКИХ ОТВЕРСТИЙ ПЕРПЕНДИКУЛЯРНО
ОБРАБАТЫВАЕМОЙ ПОВЕРХНОСТИ**


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.



Percer 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.



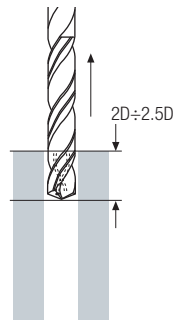
Taladre sin step para la descarga de virutas. En el caso de agujeros pasantes, 1 mm antes de haber completado el agujero, reduzca el avance un 30%. Pare el refrigerante. Aplicar taladrado a step (por pasos) en el caso de problemas de evacuación de viruta.



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).

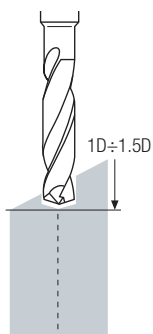


Complete el último tramo de retroceso con velocidad reducida y constante (200-300 rpm).



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

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).

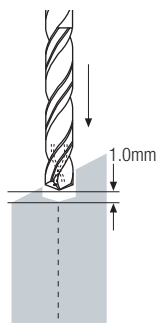
TYPHOON SUH MINI

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.

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.



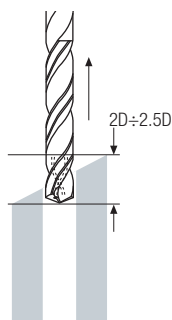
Für die Späneabführung Stufenlos bohren. Bei Durchgangsbohrungen 1 mm vor Fertigstellung der Bohrung den Vorschub um 30% reduzieren. Die Kühlung deaktivieren.



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 fn, 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

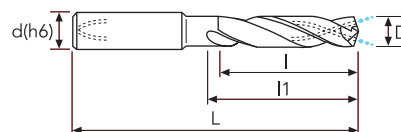
CARBIDE BURRS

3 mm shank, polished flutes



C-SD-TA

★ 1st choice ☆ suitable



● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

355SUH MINI

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	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)
	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

CARBIDE
DRILLS

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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

*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)	55÷65*	50÷60*	40÷50*			
	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			

CARBIDE
END-MILLS

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

HSS
END-MILLS

*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
BURRS


INFO

CUTTING PARAMETERS

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)	80÷90*	70÷80*	60÷70*	55÷65*		
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)

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						
Vc (m/min)	140÷150*	120÷130*	110÷120*	155÷165*		
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
BURRS

CUTTING PARAMETERS

355SUH MINI

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	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	26÷30*	24÷26*	34÷36*	28÷32*		
	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)

358SUH MINI

8XD	OSAWA NORM	 SUH MINI	MG PV300	 135°	 30°



C-SD-TA

P	M	K	N	S	H
★	★	★	☆	☆	

Technical drawing of a screw with dimensions: $d(h6)$ for the outer diameter, l for the thread length, l_1 for the total length, and L for the shank length.

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

358SUH MINI

INFO

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	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)
	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


CARBIDE
DRILLS

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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

*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)	55÷65*	50÷60*	40÷50*			
	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			


CARBIDE
END-MILLS

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

HSS
END-MILLS

*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
BURRS


INFO

CUTTING PARAMETERS

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)	80÷90*	70÷80*	60÷70*	55÷65*		
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)

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						
Vc (m/min)	140÷150*	120÷130*	110÷120*	155÷165*		
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
BURRS

CUTTING PARAMETERS

358SUH MINI

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	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	26÷30*	24÷26*	34÷36*	28÷32*		
	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)

3 mm shank, polished flutes



CARBIDE DRILLS

PU-HPU
TA-4HTA

ALH

MINI

SUB MINI

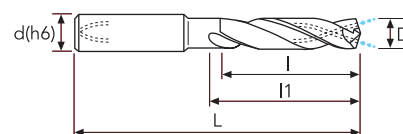
HL
UCD

HSD
CSD TA

C-SD-TA

P	M	K	N	S	H
★	★	★	☆	☆	

★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

3512SUH MINI

INFO

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	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)
	1.0	0.012	0.010	0.010	0.007	0.008	0.007
	1.1	0.013	0.011	0.012	0.008	0.009	0.008
	1.2	0.014	0.012	0.013	0.008	0.010	0.008
	1.3	0.015	0.014	0.014	0.009	0.011	0.009
	1.4	0.016	0.015	0.015	0.010	0.011	0.010
	1.5	0.017	0.016	0.016	0.010	0.012	0.011
	1.6	0.020	0.019	0.018	0.013	0.014	0.013
	1.7	0.021	0.020	0.019	0.014	0.015	0.013
	1.8	0.023	0.021	0.020	0.014	0.016	0.014
	1.9	0.024	0.022	0.021	0.015	0.017	0.015
	2.0	0.025	0.023	0.022	0.016	0.018	0.016
	2.1	0.028	0.027	0.024	0.019	0.020	0.018
	2.2	0.030	0.028	0.025	0.020	0.021	0.019
	2.3	0.031	0.029	0.027	0.021	0.022	0.020
	2.4	0.032	0.031	0.028	0.022	0.023	0.021
	2.5	0.034	0.032	0.029	0.023	0.024	0.022
	2.6	0.037	0.035	0.031	0.027	0.026	0.024
	2.7	0.038	0.037	0.033	0.028	0.027	0.025
	2.8	0.039	0.038	0.034	0.029	0.028	0.026
	2.9	0.041	0.039	0.035	0.030	0.029	0.027
	3.0	0.042	0.041	0.036	0.031	0.030	0.028


CARBIDE
DRILLS

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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

*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			


CARBIDE
END-MILLS

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

HSS
END-MILLS

*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
BURRS


CUTTING PARAMETERS

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)	75÷85*	60÷70*	50÷60*	48÷52*		
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)

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						
Vc (m/min)	125÷135*	110÷120*	100÷110*	140÷150*		
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
BURRS

CUTTING PARAMETERS

INFO

3512SUH MINI

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	26÷30*	24÷26*	34÷36*	28÷32*		
	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)

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

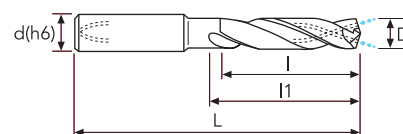
CARBIDE
BURRS

3 mm shank, polished flutes



C-SD-TA

★ 1st choice ☆ suitable



● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

3520SUH MINI

INFO

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	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)
	1.0	0.012	0.010	0.010	0.007	0.008	0.007
	1.1	0.013	0.011	0.012	0.008	0.009	0.008
	1.2	0.014	0.012	0.013	0.008	0.010	0.008
	1.3	0.015	0.014	0.014	0.009	0.011	0.009
	1.4	0.016	0.015	0.015	0.010	0.011	0.010
	1.5	0.017	0.016	0.016	0.010	0.012	0.011
	1.6	0.020	0.019	0.018	0.013	0.014	0.013
	1.7	0.021	0.020	0.019	0.014	0.015	0.013
	1.8	0.023	0.021	0.020	0.014	0.016	0.014
	1.9	0.024	0.022	0.021	0.015	0.017	0.015
	2.0	0.025	0.023	0.022	0.016	0.018	0.016
	2.1	0.028	0.027	0.024	0.019	0.020	0.018
	2.2	0.030	0.028	0.025	0.020	0.021	0.019
	2.3	0.031	0.029	0.027	0.021	0.022	0.020
	2.4	0.032	0.031	0.028	0.022	0.023	0.021
	2.5	0.034	0.032	0.029	0.023	0.024	0.022
	2.6	0.037	0.035	0.031	0.027	0.026	0.024
	2.7	0.038	0.037	0.033	0.028	0.027	0.025
	2.8	0.039	0.038	0.034	0.029	0.028	0.026
	2.9	0.041	0.039	0.035	0.030	0.029	0.027
	3.0	0.042	0.041	0.036	0.031	0.030	0.028


CARBIDE
DRILLS

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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

*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			


CARBIDE
END-MILLS

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

HSS
END-MILLS

*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
BURRS

INFO

CUTTING PARAMETERS

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)	75÷85*	60÷70*	50÷60*	48÷52*		
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)

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						
Vc (m/min)	125÷135*	110÷120*	100÷110*	140÷150*		
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
BURRS

CUTTING PARAMETERS

3520SUH MINI

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	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	26÷30*	24÷26*	34÷36*	28÷32*		
	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		



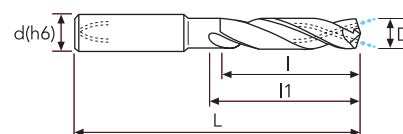
*if the machine tool or the equipment wouldn't allow to reach the requested rpm, please use the max. available rpm recalculating the Vf value
(Vf=n available x fn)

3 mm shank, polished flutes



C-SD-TA

★ 1st choice ☆ suitable



● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

3525SUH MINI

INFO

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	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)
	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


CARBIDE
DRILLS

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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

*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	0.005	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			


CARBIDE
END-MILLS

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

HSS
END-MILLS

*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
BURRS

INFO

CUTTING PARAMETERS

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)	75÷85*	60÷70*	50÷60*	45÷55*		
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)

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						
Vc (m/min)	125÷135*	105÷115*	96÷104*	135÷140*		
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
BURRS

CUTTING PARAMETERS

3525SUH MINI

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	26÷30*	24÷26*	34÷36*	28÷32*		
	D (mm)	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

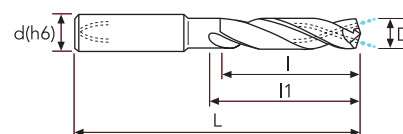
CARBIDE
BURRS

3 mm shank, polished flutes



C-SD-TA

★ 1st choice ☆ suitable



● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

3530SUH MINI

INFO

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	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)
	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


CARBIDE
DRILLS

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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

*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	0.005	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			


CARBIDE
END-MILLS

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

HSS
END-MILLS

*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
BURRS

CUTTING PARAMETERS

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)	75÷85*	60÷70*	50÷60*	45÷55*		
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)

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						
Vc (m/min)	125÷135*	105÷115*	96÷104*	135÷140*		
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
BURRS

CUTTING PARAMETERS

3530SUH MINI

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	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	26÷30*	24÷26*	34÷36*	28÷32*		
	D (mm)	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

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

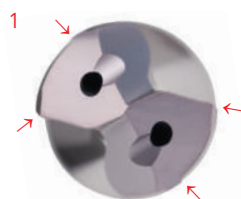
LFTA
SUTA
HSS-HSS/CO

CARBIDE END-MILLS

G2
MDTA
HF VH/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 progettata 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-lunghe (30xD)

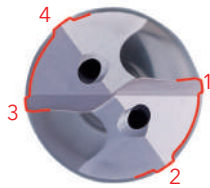


- Forets conçus pour le perçage profond de matériaux ISO P, M, K, N, S
- Géométrie de l'arête : « 4 listels » pour l'exécution de trous profonds précis et droits
- Elle garantit stabilité et fiabilité même en présence de trous avec sortie inclinée ou de trous croisés
- Large entaille ③ pour protéger 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
- Schneidkanten-geometrie: 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: geläppt, um Probleme durch Verkleben zu reduzieren und um die Späneabfuhr 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

* < Ø3.1 = SUH MINI

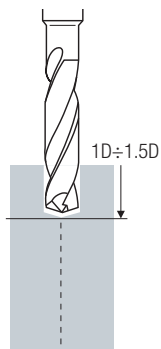
TYPHOON HL

HIGH PERFORMANCE - LONG AND EXTRA-LONG

INFO

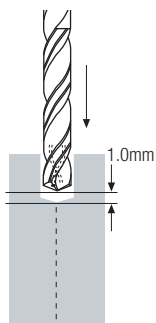
CARBIDE DRILLS

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
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 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.



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.



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.



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



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.



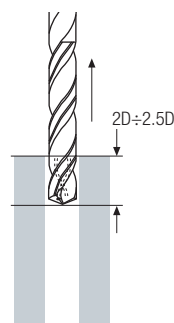
Taladre sin step para la descarga de virutas.
En el caso de agujeros pasantes, 1 mm antes de haber completado el agujero, reduzca el avance un 30%. Pare el refrigerante.



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

CARBIDE DRILLS

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



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.



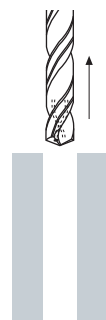
Выньте сверло до уровня 2xD, используя максимальную частоту вращения и двойную подачу.

HSS DRILLS

LFTA
SUTA
HSS-HSS/CO

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.



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 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

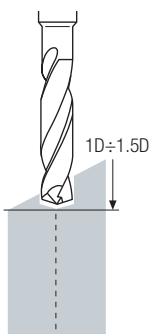


HSS DRILLS

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 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 tagliente 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).

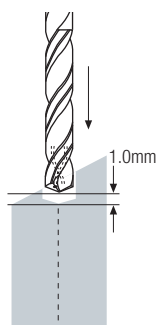
Utiliser un foret 353HTA ou 353HPU avec un angle en bout de 140° (HL=135°) et une tolérance m7 (HL=h7), pour effectuer un trou pilote (1xD ÷ 1.5xD) très précis.

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).



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

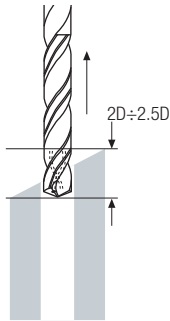
TYPHOON HL

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 fn, 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°

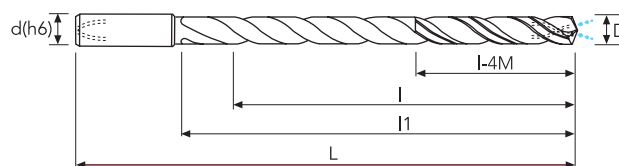
30°

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	l-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	●

* Ø1+Ø3 = 3512 SUH MINI page 148

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

4-margin lands, polished flutes



CUTTING PARAMETERS

3512HL

INFO

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	Vc (m/min)	70÷90	60÷80	50÷70	45÷65	40÷60	35÷40
	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

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)	40÷60	40÷60	35÷55			
	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			

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

CUTTING PARAMETERS

3512HL

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)	65÷85	60÷80	45÷65	45÷65		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
3.0	0.048	0.045	0.048	0.047		
3.5	0.058	0.055	0.057	0.056		
4.0	0.069	0.064	0.067	0.066		
4.5	0.080	0.075	0.079	0.078		
5.0	0.093	0.087	0.090	0.089		
5.5	0.105	0.097	0.103	0.101		
6.0	0.117	0.109	0.114	0.113		
6.5	0.133	0.122	0.130	0.128		
7.0	0.149	0.136	0.143	0.142		
7.5	0.161	0.152	0.157	0.155		
8.0	0.179	0.166	0.173	0.171		
8.5	0.186	0.173	0.176	0.174		
9.0	0.187	0.174	0.187	0.185		
9.5	0.197	0.183	0.191	0.189		
10.0	0.200	0.187	0.195	0.194		

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO


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

CUTTING PARAMETERS

INFO

3512HL

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	24÷28	20÷25	28÷32	25÷30		
	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		

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

*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

3515HL

4-margin lands, polished flutes

15XD

OSAWA
NORM

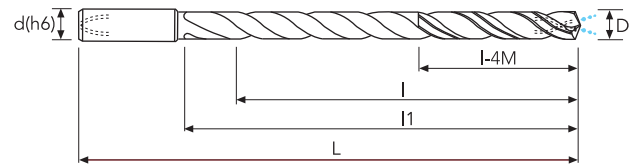
MG
PV250

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

HSS
END-MILLS

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

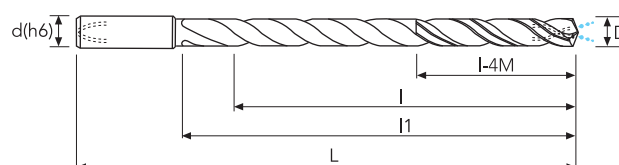
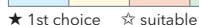
4-margin lands, polished flutes



INFO



- 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

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
Vc (m/min)	65÷85	50÷70	40÷60	35÷55	40÷50	30÷40
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)	40÷50	40÷50	35÷45			
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			

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.

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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.

CUTTING PARAMETERS

INFO

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)	60÷80	55÷75	40÷60	40÷60		
	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		

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						
	Vc (m/min)	115÷135	95÷115	85÷105			
	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			

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.

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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.



INFO

CUTTING PARAMETERS

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)	24÷28	20÷25	28÷32	25÷30		
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.

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*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

20XD

OSAWA
NORM

HL

MG
PV250

135°

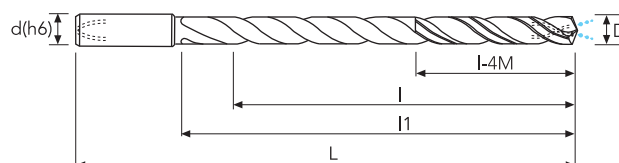
30°

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	l-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	○

* Ø1+Ø3 = 3520 SUH MINI page 152

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

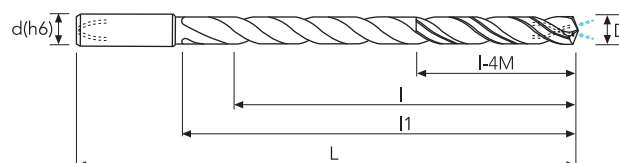
● stock standard ○ non-standard stock ▽ stock exhaustion

4-margin lands, polished flutes



C-SD-1A

★ 1st choice ☆ suitable



● 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 ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	Vc (m/min)	65÷85	50÷70	40÷60	35÷55	40÷50	30÷40
	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

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)	40÷50	40÷50	35÷45			
	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			

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.



CUTTING PARAMETERS

INFO

3520HL

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)	60÷80	55÷75	40÷60	40÷60		
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		

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO


Material Group ISO 513	N1	N2	N3 N4			
Hardness/Rm						
Vc (m/min)	115÷135	95÷115	85÷105			
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			

CARBIDE
END-MILLS

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

HSS
END-MILLS

CARBIDE
BURRS

CUTTING PARAMETERS

INFO

3520HL

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	24÷28	20÷25	28÷32	25÷30		
	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		

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

*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

3525HL

4-margin lands, polished flutes

25XD

OSAWA
NORM

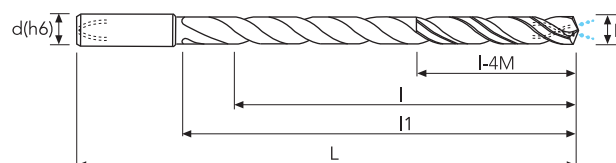
MG
PV250


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	79	83	120	15.5	25 x D	3525HL0310N	○
3.20	0/-0.012	4	81	86	120	16	25 x D	3525HL0320N	○
3.30	0/-0.012	4	84	88	125	16.5	25 x D	3525HL0330N	○
3.40	0/-0.012	4	86	91	125	17	25 x D	3525HL0340N	○
3.50	0/-0.012	4	89	94	130	17.5	25 x D	3525HL0350N	●
3.60	0/-0.012	4	91	96	130	18	25 x D	3525HL0360N	○
3.70	0/-0.012	4	94	99	135	18.5	25 x D	3525HL0370N	○
3.80	0/-0.012	4	96	102	135	19	25 x D	3525HL0380N	○
3.90	0/-0.012	4	99	104	140	19.5	25 x D	3525HL0390N	○
4.00	0/-0.012	4	101	107	140	20	25 x D	3525HL0400N	●
4.10	0/-0.012	5	104	110	145	20.5	25 x D	3525HL0410N	○
4.20	0/-0.012	5	106	112	150	21	25 x D	3525HL0420N	○
4.30	0/-0.012	5	109	115	150	21.5	25 x D	3525HL0430N	○
4.40	0/-0.012	5	111	118	155	22	25 x D	3525HL0440N	○
4.50	0/-0.012	5	114	120	155	22.5	25 x D	3525HL0450N	●
4.60	0/-0.012	5	116	123	160	23	25 x D	3525HL0460N	○
4.70	0/-0.012	5	119	126	165	23.5	25 x D	3525HL0470N	○
4.80	0/-0.012	5	121	128	165	24	25 x D	3525HL0480N	○
4.90	0/-0.012	5	124	131	170	24.5	25 x D	3525HL0490N	○
5.00	0/-0.012	5	126	134	170	25	25 x D	3525HL0500N	●
5.10	0/-0.012	6	129	136	175	25.5	25 x D	3525HL0510N	○
5.20	0/-0.012	6	131	139	180	26	25 x D	3525HL0520N	○
5.30	0/-0.012	6	134	141	180	26.5	25 x D	3525HL0530N	○
5.40	0/-0.012	6	136	144	185	27	25 x D	3525HL0540N	○
5.50	0/-0.012	6	139	147	185	27.5	25 x D	3525HL0550N	●
5.60	0/-0.012	6	141	149	190	28	25 x D	3525HL0560N	○
5.70	0/-0.012	6	144	152	190	28.5	25 x D	3525HL0570N	○
5.80	0/-0.012	6	146	155	195	29	25 x D	3525HL0580N	○
5.90	0/-0.012	6	149	157	195	29.5	25 x D	3525HL0590N	○
6.00	0/-0.012	6	151	160	200	30	25 x D	3525HL0600N	●
6.10	0/-0.015	8	154	163	200	30.5	25 x D	3525HL0610N	○
6.20	0/-0.015	8	156	165	205	31	25 x D	3525HL0620N	○
6.30	0/-0.015	8	159	168	205	31.5	25 x D	3525HL0630N	○
6.40	0/-0.015	8	161	171	210	32	25 x D	3525HL0640N	○
6.50	0/-0.015	8	164	173	210	32.5	25 x D	3525HL0650N	●
6.60	0/-0.015	8	166	176	215	33	25 x D	3525HL0660N	○
6.70	0/-0.015	8	169	179	220	33.5	25 x D	3525HL0670N	○
6.80	0/-0.015	8	171	181	220	34	25 x D	3525HL0680N	○
6.90	0/-0.015	8	174	184	225	34.5	25 x D	3525HL0690N	○

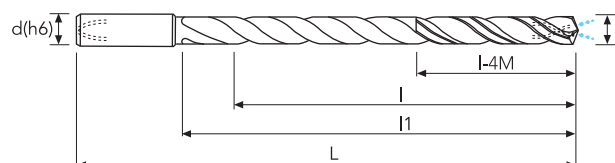
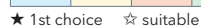
* Ø1+Ø3 = 3525 SUH MINI page 156

● stock standard ○ non-standard stock ▽ stock exhaustion

4-margin lands, polished flutes



INFO



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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
Vc (m/min)	60÷80	45÷65	40÷55	35÷50	35÷45	25÷35
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)	35÷45	35÷45	25÷35			
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

HSS
END-MILLS

*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
BURRS

CUTTING PARAMETERS

INFO

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)	55÷75	45÷65	35÷55	35÷55		
	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		

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						
	Vc (m/min)	105÷125	85÷105	75÷95			
	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			

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

CUTTING PARAMETERS

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)	24÷28	20÷25	28÷32	25÷30		
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

30XD

OSAWA
NORM

HL

MG
PV250

135°

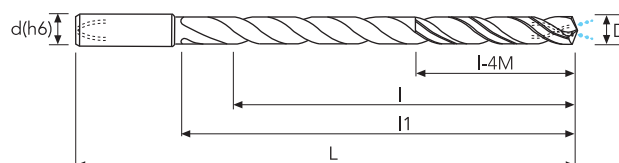
30°

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)	I	L1	L	I-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

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

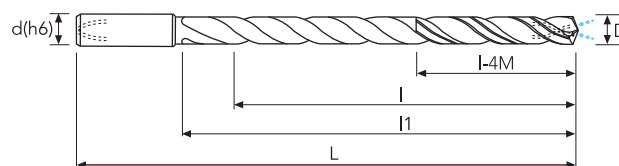
● stock standard ○ non-standard stock ▽ stock exhaustion

4-margin lands, polished flutes



C-3D-1A

★ 1st choice ☆ suitable



CUTTING PARAMETERS

INFO

3530HL

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	Vc (m/min)	60÷80	45÷65	40÷55	35÷50	35÷45	25÷35
	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)	35÷45	35÷45	25÷35			
	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

CUTTING PARAMETERS

3530HL

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)	55÷75	45÷65	35÷55	35÷55		
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		

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO


Material Group ISO 513	N1	N2	N3 N4			
Hardness/Rm						
Vc (m/min)	105÷125	85÷105	75÷95			
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			

CARBIDE
END-MILLS

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

HSS
END-MILLS

CARBIDE
BURRS

CUTTING PARAMETERS

3530HL

	Material Group ISO 513	S1 S2	S3	S4	S5		
	Hardness/Rm	<35 HRC	35÷45 HRC				
	Vc (m/min)	24÷28	20÷25	28÷32	25÷30		
	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

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 chaflanar universal ISO P, M, S.

🇷🇺 Фасочное сверло для универсального применения ISO P, M, S.

CARBIDE BURRS

TYPHOON HSD

STEP DRILL FOR 90° CHAMFERING

INFO

CARBIDE DRILLS

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



- 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

CARBIDE END-MILLS

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

HSS END-MILLS

CARBIDE BURRS



- 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.

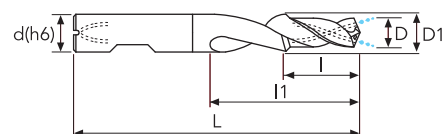
through coolant step drill for 90° chamfering,
weldon shank, universal application



INFO



★ 1st choice ☆ suitable



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

[illegible]CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

372HSD

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			
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²				
Vc (m/min)	80÷120	70÷110	40÷80			
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			

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

372HSD

CARBIDE
END-MILLS

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


Material Group ISO 513	M1	M2	M3			
Hardness/Rm						
Vc (m/min)	40÷80	40÷80	30÷60			
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			

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)	30÷50	30÷50	25÷45			
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
	3	0.030÷0.080	0.030÷0.070	0.030÷0.060			
	4	0.040÷0.100	0.040÷0.100	0.040÷0.080			
	5	0.050÷0.100	0.050÷0.100	0.040÷0.090			
	6	0.050÷0.100	0.050÷0.100	0.050÷0.100			
	7	0.050÷0.110	0.050÷0.110	0.050÷0.110			
	8	0.060÷0.120	0.060÷0.120	0.060÷0.110			
	9	0.060÷0.130	0.060÷0.130	0.060÷0.120			
	10	0.070÷0.140	0.070÷0.140	0.070÷0.120			
	11	0.080÷0.150	0.080÷0.150	0.080÷0.130			
	12	0.080÷0.160	0.080÷0.160	0.080÷0.140			
	13	0.080÷0.170	0.080÷0.170	0.080÷0.150			
	14	0.090÷0.180	0.090÷0.180	0.090÷0.160			
	15	0.090÷0.180	0.090÷0.180	0.090÷0.160			
	16	0.100÷0.180	0.100÷0.180	0.100÷0.160			
	17	0.100÷0.190	0.100÷0.190	0.100÷0.170			
	18	0.100÷0.200	0.100÷0.200	0.100÷0.180			
	19	0.110÷0.210	0.110÷0.210	0.110÷0.190			
	20	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

HSS END-MILLS

CARBIDE BURRS

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. Centratura 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.

C-SD-TA

**OSAWA
NORM**



90°

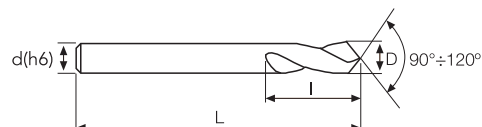


120°

C-SD-TA

P	M	K	N	S	H
★	★	★	★	☆	

★ 1st choice ☆ suitable

[illegible]

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

C-SD-TA

	Material Group ISO 513	P1 P2	P3 P4	P5	P6	P7	P8
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	900÷1200 N/mm ²	1200÷1400 N/mm ²		
	Vc (m/min)	90÷110	70÷90	60÷80	50÷70	50÷70	20÷30
	D (mm)	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)	50÷70	40÷60	30÷40			
	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
CARBIDE
END-MILLS
 G2
 MDTA
 HF-VH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

INFO

CUTTING PARAMETERS

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)	160÷200	140÷180	130÷170	160÷200		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
6	0.175	0.158	0.140	0.158		
7	0.200	0.180	0.160	0.180		
8	0.225	0.203	0.180	0.203		
9	0.250	0.225	0.200	0.225		
10	0.275	0.248	0.220	0.248		
11	0.300	0.270	0.240	0.270		
12	0.325	0.293	0.260	0.293		
13	0.350	0.315	0.280	0.315		
14	0.375	0.338	0.300	0.338		
15	0.400	0.360	0.320	0.360		
16	0.425	0.383	0.340	0.383		

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

Material Group ISO 513	S1 S2	S3	S4	S5		
Hardness/Rm	<35 HRC	35÷45 HRC				
Vc (m/min)	30÷50	20÷40	45÷65	35÷55		
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)		
6	0.063	0.044	0.060	0.050		
7	0.072	0.050	0.068	0.058		
8	0.081	0.057	0.077	0.065		
9	0.090	0.063	0.086	0.072		
10	0.099	0.069	0.094	0.079		
11	0.108	0.076	0.103	0.086		
12	0.117	0.082	0.111	0.094		
13	0.126	0.088	0.120	0.101		
14	0.135	0.095	0.128	0.108		
15	0.144	0.101	0.137	0.115		
16	0.153	0.107	0.145	0.122		

HSS DRILLS



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

STOCK		
●	🇮🇹 stock standard 🇩🇪 Standard Lager	🇫🇷 stock standard 🇪🇸 stock estándar 🇷🇺 складская позиция
○	🇮🇹 non-standard stock 🇩🇪 nicht Standard Lager	🇫🇷 stock non standard 🇪🇸 stock no estándar 🇷🇺 не складская позиция
▽	🇮🇹 stock exhaustion 🇩🇪 Vorratserschöpfung	🇫🇷 épuisement du stock 🇪🇸 agotamiento de stock 🇷🇺 складские остатки

🇮🇹 APPLICATION GUIDELINES 🇩🇪 INDICAZIONI PER L'APPLICAZIONE 🇩🇪 LEITFADEN ZUR ANWENDUNG 🇫🇷 INDICATIONS POUR L'APPLICATION 🇪🇸 INDICACIONES PARA SU APLICACIÓN 🇷🇺 УКАЗАНИЯ ПО ПРИМЕНЕНИЮ		
★	🇮🇹 1st choice 🇩🇪 1. Wahl	🇫🇷 1er choix 🇪🇸 1ª elección 🇷🇺 1-й выбор
☆	🇮🇹 suitable 🇩🇪 geeignet	🇫🇷 adapté 🇪🇸 adecuado 🇷🇺 пригоден

🇮🇹 SHANK 🇩🇪 ATTACCO 🇩🇪 SCHAFT 🇫🇷 QUEUE 🇪🇸 MANGO 🇷🇺 ХВОСТОВИК		
	🇮🇹 cylindrical shank 🇩🇪 zylindrischer Schaft	🇫🇷 queue cylindrique 🇪🇸 mango cilíndrico 🇷🇺 цилиндрическое крепление
	🇮🇹 Morse Taper shank 🇩🇪 MK Schaft	🇫🇷 queue conique 🇪🇸 mango Cono Morse 🇷🇺 конус Морзе

🇮🇹 GEOMETRY 🇩🇪 GEOMETRIA 🇩🇪 GEOMETRIE 🇫🇷 GÉOMÉTRIE 🇪🇸 GEOMETRÍA 🇷🇺 ГЕОМЕТРИЯ		
  	🇮🇹 high performance, selfcentering 🇩🇪 hochleistung, selbstzentrierende	🇫🇷 haute performance, auto centreur 🇪🇸 alto rendimiento, autocentrante 🇷🇺 высокопроизводительные, самоцентрирующиеся
  	🇮🇹 for stainless steel and general application 🇩🇪 für rostfreien Stahl und allgemeine Anwendung	🇫🇷 pour acier inoxydable et applications génériques 🇪🇸 para acero inoxidable y aplicaciones genéricas 🇷🇺 для нержавеющей сталей и общего назначения
  	🇮🇹 HSS general purpose 🇩🇪 HSS allgemeine Anwendung	🇫🇷 HSS applications génériques 🇪🇸 HSS uso genérico 🇷🇺 HSS общего назначения
  	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			
HSS ---	⚙️ high speed steel 🇮🇹 acciaio super rapido 🇩🇪 Hochleistungsschnellschnittstahl	🇫🇷 acier rapide 🇪🇸 acero súper rápido 🇷🇺 быстрорежущая сталь	
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 - 5% ÷ 8% Co	
HSSE ---	HSS/Co + EV		

⚙️ SURFACE TREATMENT 🇮🇹 TRATTAMENTO SUPERFICIALE 🇩🇪 OBERFLÄCHENBEHANDLUNG 🇫🇷 TRAITEMENT DE SURFACE 🇪🇸 TRATAMIENTO SUPERFICIAL 🇷🇺 ОБРАБОТКА ПОВЕРХНОСТИ			
BR ---	⚙️ uncoated 🇮🇹 non rivestito 🇩🇪 unbeschichtet	🇫🇷 non revêtu 🇪🇸 no revestido 🇷🇺 без покрытия	
OX ---	⚙️ vaporization 🇮🇹 vaporizzazione 🇩🇪 Dämpfung	🇫🇷 traitement vapeur 🇪🇸 vaporización 🇷🇺 окисление	
HT ---	⚙️ heat treatment 🇮🇹 trattamento termico 🇩🇪 thermische Behandlung	🇫🇷 traitement thermique 🇪🇸 tratamiento térmico 🇷🇺 термическая обработка	

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

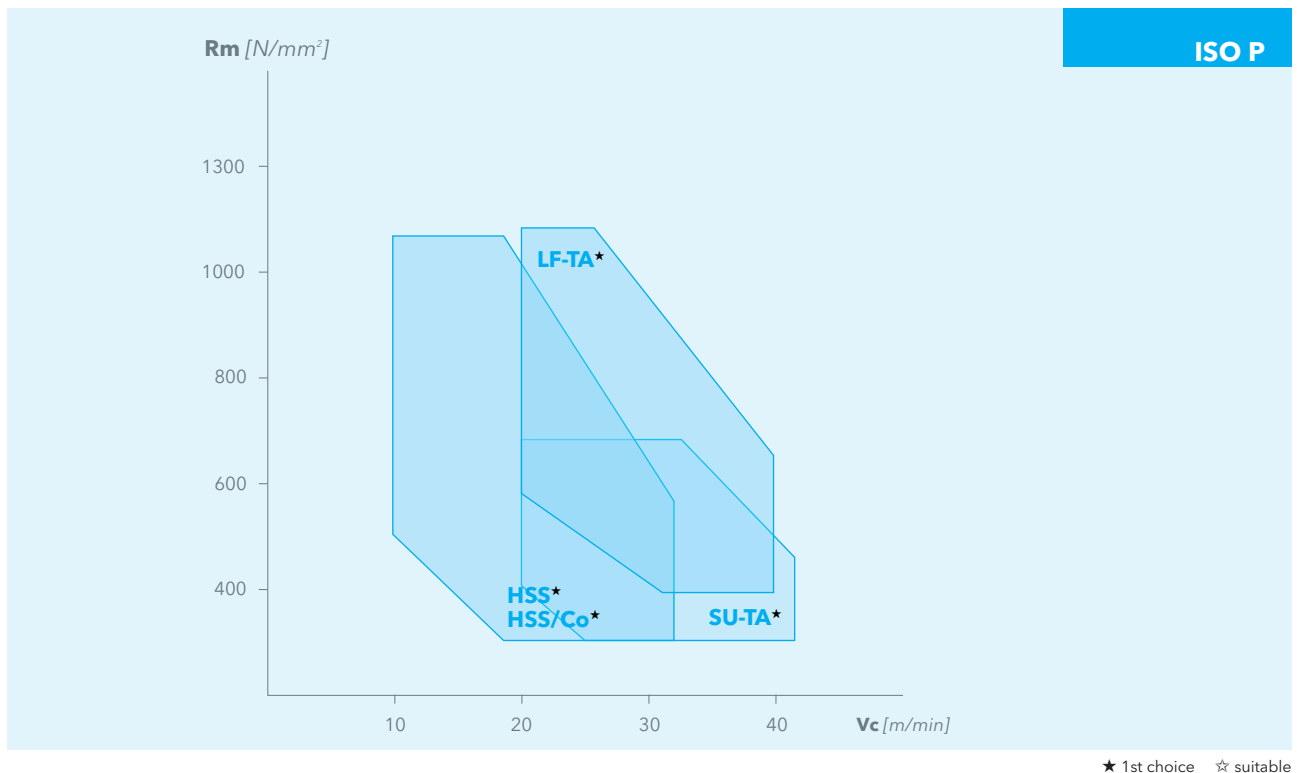
🇬🇧 COATINGS 🇮🇹 RIVESTIMENTI 🇩🇪 BESCHICHTUNGEN 🇫🇷 REVÊTEMENTS 🇪🇸 RECUBRIMIENTOS 🇷🇺 ПОКРЫТИЕ		... TiN	... PV10	... PV15
🇬🇧 hardness (HV) 🇮🇹 durezza (HV) 🇩🇪 Härte (HV)	🇫🇷 dureté (HV) 🇪🇸 dureza (HV) 🇷🇺 твёрдость (HV)	2300	3300	TiAlN + WC/C
🇬🇧 friction coefficient 🇮🇹 coefficiente d'attrito 🇩🇪 Reibungskoeffizient	🇫🇷 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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	138N	228	
	138NTI	228	
	138HB	234	
	138WB	238	
	2386STI	242	
	238NVA	247	
	234NVA	252	
	234LS	256	
	234LSTH	256	
	2691LS	259	
	2691LSTH	259	
	1692LS	261	
	1693LS	263	
	145N	265	
	145NTI	265	
	245N	270	
	241LS	272	
	2701LS	274	
	2702LS	276	

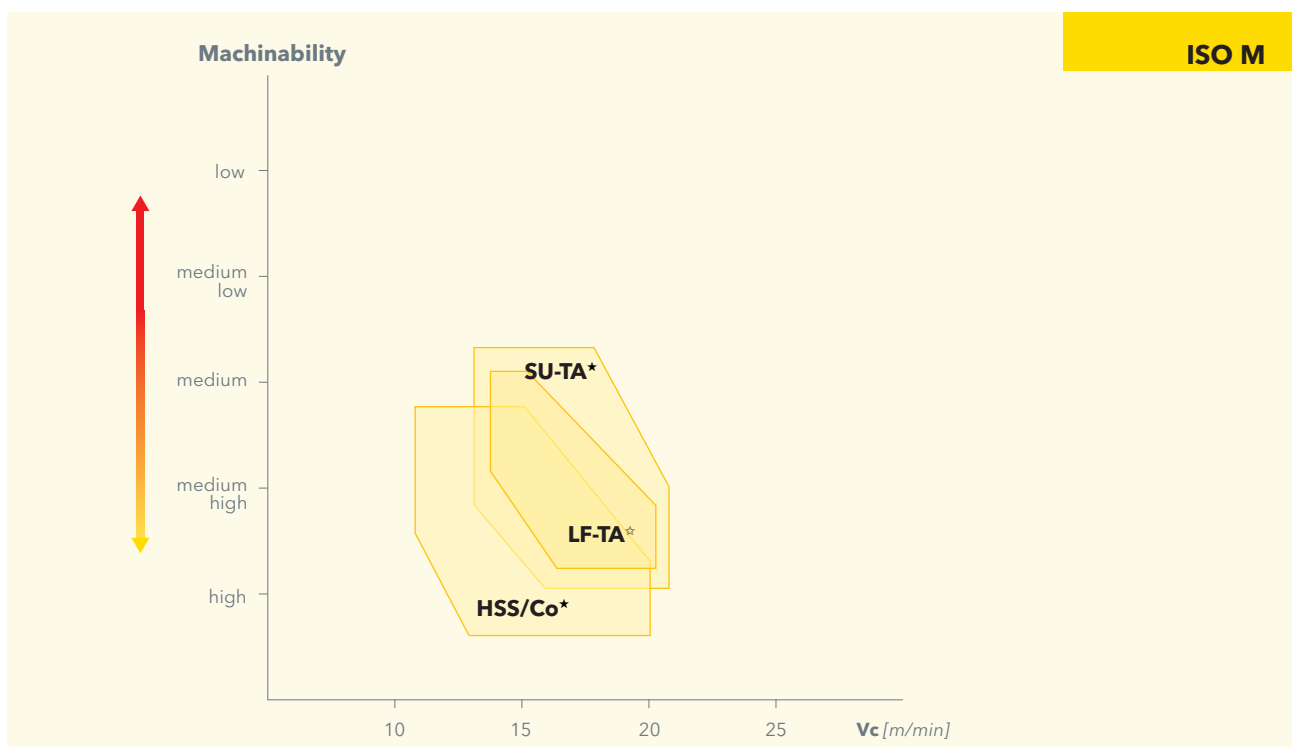
RANGE	DRILLING DEPTH	NORM	TYPE	MATERIAL / COATING	HRC	POINT ANGLE	HELIX ANGLE	CHAMFER	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H
2-20	extra short	DIN1897	LF	HSS/Co PV10		130°	35°-40°		★	☆	★	☆		
2-20	short	DIN338	LF	HSS/Co PV10		130°	35°-40°		★	☆	★	☆		
2-13	extra short	OSAWA	SU	HSSE PV10		120°	38°		★	★		★	☆	
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



STAINLESS STEEL APPLICATION

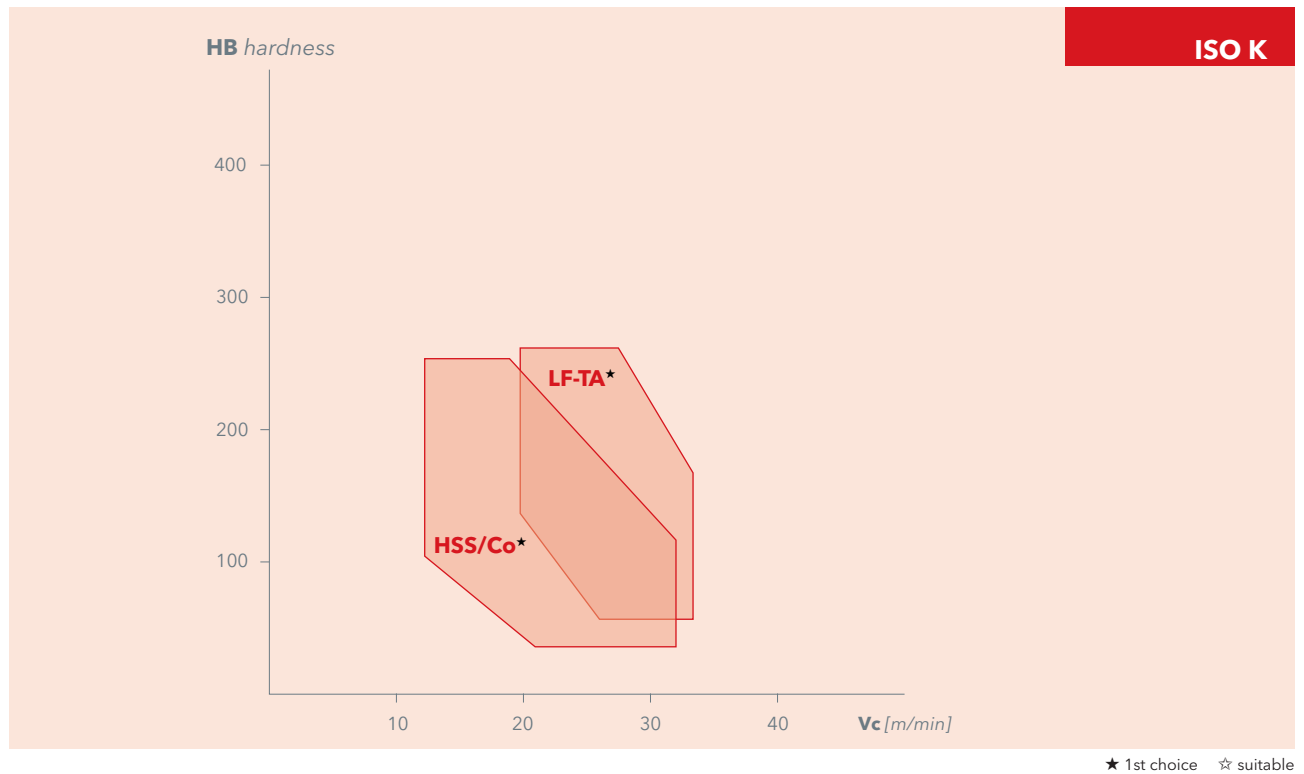


LFTA : high performance (page 194)

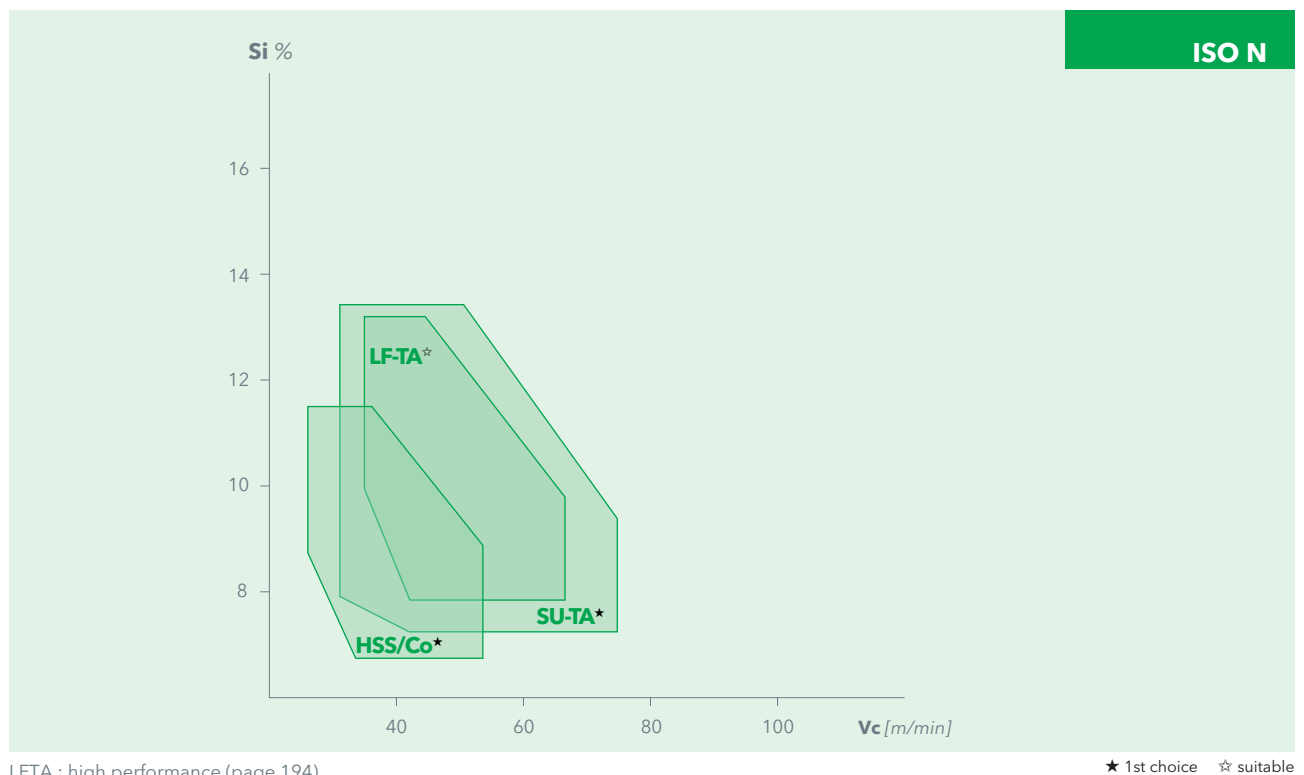
SUTA : high performance (page 204)

HSS-HSS/Co : general purpose (page 214)

CAST IRON APPLICATION



NON-FERROUS MATERIALS APPLICATION

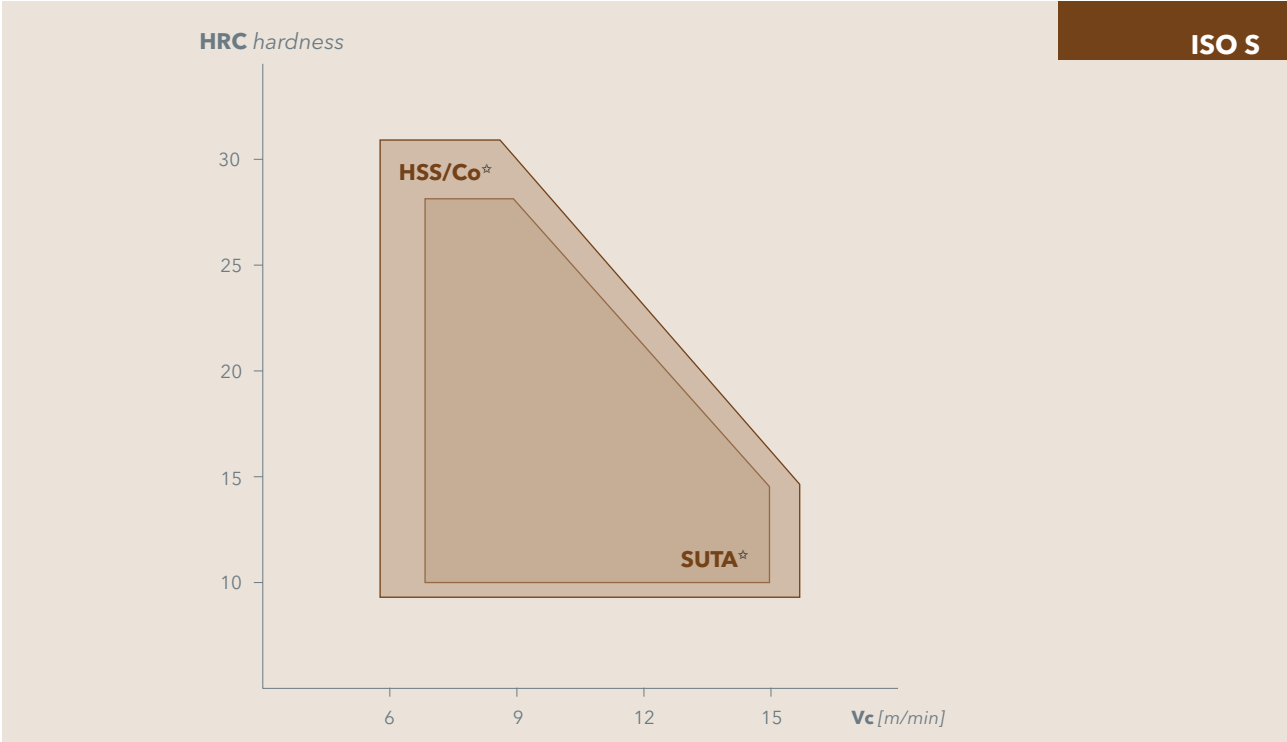


LFTA : high performance (page 194)

SUTA : high performance (page 204)

HSS-HSS/Co : general purpose (page 214)

SUPER ALLOYS APPLICATION



SUTA : high performance (page 204) ★ 1st choice ☆ suitable
HSS-HSS/Co : general purpose (page 214)



INFO

CARBIDE
DRILLS

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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

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.

CARBIDE
END-MILLS

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

HSS
END-MILLS

CARBIDE
BURRS

INFO

218LFTA

self-centering, general purpose, extra-short

DIN
1897HSS/CO
PV10CARBIDE
DRILLSPU-HPU
TA-4HTA

SUH

ALH

HRC

SUH MINI

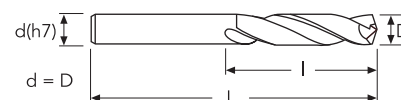
HL

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
DRILLSLFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLS

G2

MDTA

HF VH/UP

MEF

ALU

MEX/MH

UH/MH

HSS
END-MILLSCARBIDE
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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

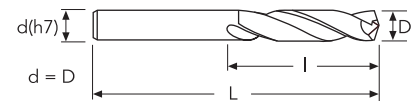
G2
MDTA
HF-VH/UP
MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLS

CARBIDE
BURRS

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	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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

218LFTA

self-centering, general purpose, extra-short

CARBIDE
DRILLSPU-HPU
TA-4HTA

SUH

ALH

HRC

SUH MINI

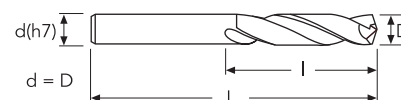
HL

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	●

CARBIDE
END-MILLS

G2

MDTA

HF VH/UP

MEF

ALU

MEX/MH

UH/MH

HSS
END-MILLSCARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

218LFTA

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	N1 N2	N3 N4	
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²			150÷350 HB			
Vc (m/min)	40÷50	30÷40	18÷22	18÷22	30÷40	65÷75	45÷55	
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	

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

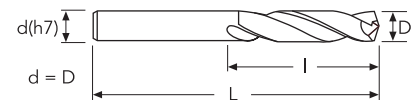
238LFTA

self-centering, general purpose, short

DIN
338HSS/CO
PV10CARBIDE
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	●

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

● stock standard ○ non-standard stock ▽ stock exhaustion

238LFTA

self-centering, general purpose, short

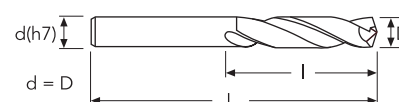


INFO

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-MILLSCARBIDE
BURRS

INFO

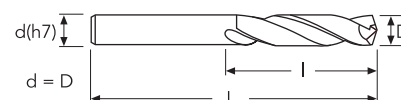
238LFTA

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
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	●

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

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

238LFTA

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	N1 N2	N3 N4	
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²			150÷350 HB			
Vc (m/min)	30÷40	20÷30	14÷18	14÷18	25÷35	50÷60	35÷45	
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	

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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

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.

CARBIDE
END-MILLS

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

HSS
END-MILLS

CARBIDE
BURRS

INFO

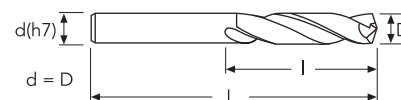
980SUTA

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
 HF VH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

D(h8)	D Tol.	d(h7)	I	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

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

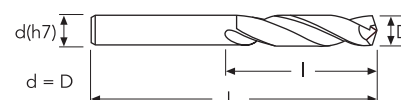
G2
MDTA
HF-VH/UP
MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLS

CARBIDE
BURRS

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	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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

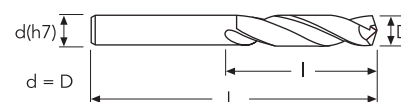
980SUTA

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
 HF VH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

D(h8)	D Tol.	d(h7)	I	L	PACKAGING	EDP No.	Stock
9.80	0/-0.022	9.8	43	93	1	P980SUTA0980	●
9.90	0/-0.022	9.9	43	93	1	P980SUTA0990	●
10.00	0/-0.022	10	43	93	1	P980SUTA1000	●
10.10	0/-0.022	10.1	43	100	1	P980SUTA1010	●
10.20	0/-0.022	10.2	43	100	1	P980SUTA1020	●
10.30	0/-0.022	10.3	43	100	1	P980SUTA1030	●
10.40	0/-0.022	10.4	43	100	1	P980SUTA1040	●
10.50	0/-0.022	10.5	43	100	1	P980SUTA1050	●
10.60	0/-0.022	10.6	43	100	1	P980SUTA1060	●
10.70	0/-0.022	10.7	47	104	1	P980SUTA1070	●
10.80	0/-0.022	10.8	47	104	1	P980SUTA1080	●
10.90	0/-0.022	10.9	47	104	1	P980SUTA1090	●
11.00	0/-0.022	11	47	104	1	P980SUTA1100	●
11.10	0/-0.022	11.1	47	104	1	P980SUTA1110	●
11.20	0/-0.022	11.2	47	104	1	P980SUTA1120	●
11.30	0/-0.022	11.3	47	104	1	P980SUTA1130	●
11.40	0/-0.022	11.4	47	104	1	P980SUTA1140	●
11.50	0/-0.022	11.5	47	104	1	P980SUTA1150	●
11.60	0/-0.022	11.6	47	104	1	P980SUTA1160	●
11.70	0/-0.022	11.7	47	104	1	P980SUTA1170	●
11.80	0/-0.022	11.8	47	104	1	P980SUTA1180	●
11.90	0/-0.022	11.9	51	108	1	P980SUTA1190	●
12.00	0/-0.022	12	51	108	1	P980SUTA1200	●
12.10	0/-0.022	12.1	51	108	1	P980SUTA1210	●
12.20	0/-0.022	12.2	51	108	1	P980SUTA1220	●
12.30	0/-0.022	12.3	51	108	1	P980SUTA1230	●
12.40	0/-0.022	12.4	51	108	1	P980SUTA1240	●
12.50	0/-0.022	12.5	51	108	1	P980SUTA1250	●
12.60	0/-0.022	12.6	51	108	1	P980SUTA1260	●
12.70	0/-0.022	12.7	51	108	1	P980SUTA1270	●
12.80	0/-0.022	12.8	51	108	1	P980SUTA1280	●
12.90	0/-0.022	12.9	51	108	1	P980SUTA1290	●
13.00	0/-0.022	13	51	108	1	P980SUTA1300	●

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

980SUTA

	Material Group ISO 513	P1 P2	P7	M1	M2	N1 N2 N4	N3	S1 S2	S4
	Hardness/Rm	500÷700 N/mm ²	400÷700 N/mm ²					<30 HRC	
	Vc (m/min)	35÷45	18÷22	18÷22	12÷16	60÷80	30÷40	8÷12	12÷16
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	

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

990SUTA

self centering, stainless steel, short

CARBIDE
DRILLSPU-HPU
TA-4HTA

SUH

ALH

HRC

SUH MINI

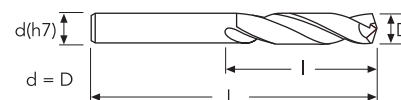
HL

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
DRILLSLFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLSG2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

990SUTA

self centering, stainless steel, short

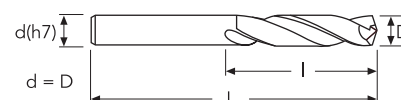


INFO



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
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

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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

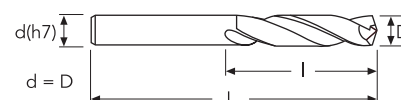
990SUTA

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

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

D(h8)	D Tol.	d(h7)	I	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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

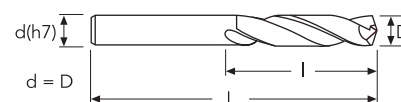
self centering, stainless steel, short



| INFO



★ 1st choice ☆ suitable



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

[illegible]

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

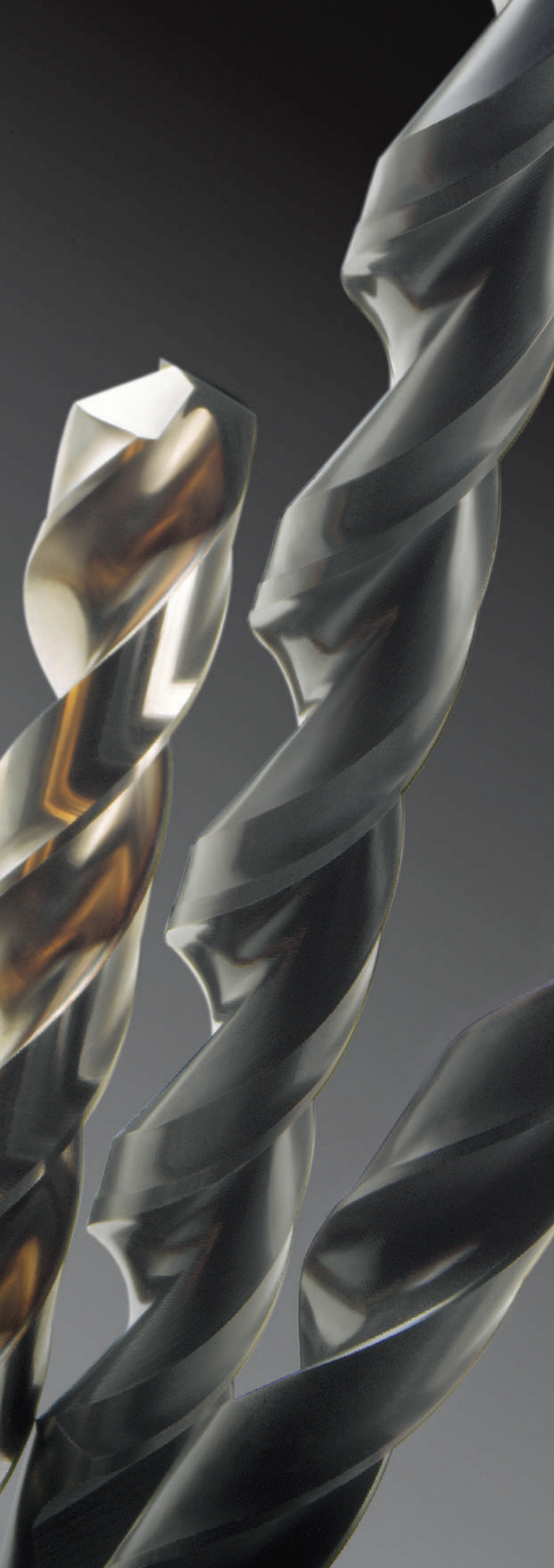
INFO

CUTTING PARAMETERS

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-MILLSCARBIDE
BURRS

Material Group ISO 513	P1 P2	P7	M1	M2	N1 N2 N4	N3	S1 S2	S4
Hardness/Rm	500÷700 N/mm ²	400÷700 N/mm ²					<30 HRC	
Vc (m/min)	35÷45	18÷22	18÷22	12÷16	60÷80	30÷40	8÷12	12÷16
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
2	0.057	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

DIN
1897HSS
OX *

* < Ø2 mm = BR

CARBIDE
DRILLSPU-HPU
TA-4HTA

SUH

ALH

HRC

SUH MINI

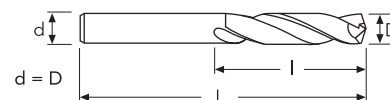
HL

HSD

C-SD-TA

P	M	K	N	S	H
★		☆	☆		

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	I	L	PACKAGING	EDP No.	Stock
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	●

CARBIDE
END-MILLS

G2

MDTA

HF VH/UP

MEF

ALU

MEX/MH

UH/MH

HSS
END-MILLSCARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

118N

N type for general purpose, extra-short

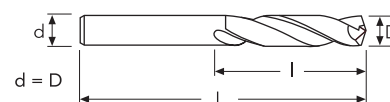


INFO



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-MILLSCARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

118N

N type for general purpose, extra-short

DIN
1897HSS
OXCARBIDE
DRILLSPU-HPU
TA-4HTA

SUH

ALH

HRC

SUH MINI

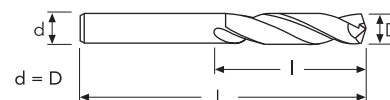
HL

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-MILLSCARBIDE
BURRS

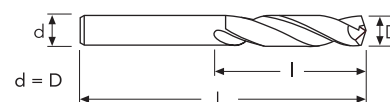
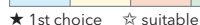
D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
7.50	0/-0.022	7.5	34	74	5	P118N0750	●
7.60	0/-0.022	7.6	37	79	5	P118N0760	●
7.70	0/-0.022	7.7	37	79	5	P118N0770	○
7.75	0/-0.022	7.75	37	79	5	P118N0775	●
7.80	0/-0.022	7.8	37	79	5	P118N0780	●
7.90	0/-0.022	7.9	37	79	5	P118N0790	○
8.00	0/-0.022	8	37	79	5	P118N0800	●
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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

N type for general purpose, extra-short



| INFO



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

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLSCARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS							
INFO	118N						
CARBIDE DRILLS	Material Group ISO 513	P1 P2	P3 P4	K1 K2	N1 N5	N2 N3 N4	
	Hardness/Rm	500÷700 N/mm²	600÷1000 N/mm²	150÷350 HB			
	Vc (m/min)	25÷35	20÷30	25÷35	50÷70	40÷60	
	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	
HSS DRILLS							
LFTA SUTA HSS-HSS/CO							
CARBIDE END-MILLS							
HSS END-MILLS							
CARBIDE BURRS							

218NVA

NVA type for tough materials, extra-short



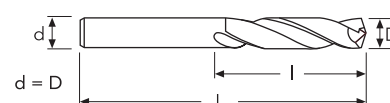
INFO

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

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

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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

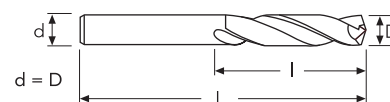
218NVA

NVA type for tough materials, extra-short

DIN
1897HSS/CO
HTCARBIDE
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-MILLSCARBIDE
BURRS

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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

218NVA

NVA type for tough materials, extra-short



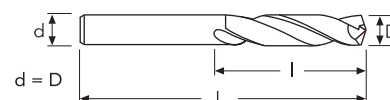
INFO

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	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-MILLSCARBIDE
BURRS

INFO

CUTTING PARAMETERS

218NVA

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

HSS-HSS/CO

Material Group ISO 513	P1 P2	P3 P4	P7	M1 M2	M3	
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²				
Vc (m/min)	25÷35	20÷30	12÷18	12÷18	8÷12	
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

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)	25÷35	20÷30	50÷70	40÷60	8÷12	
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	

CARBIDE
BURRS

1386STI

STI type for general purpose, split point, TiN pointed, short



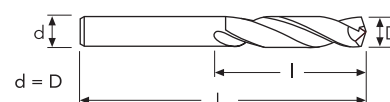
INFO

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	I	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-MILLSCARBIDE
BURRS

INFO

1386STI

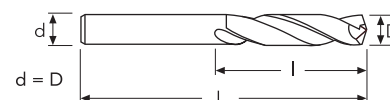
STI type for general purpose, split point, TiN pointed, short

DIN
338HSS
TiNCARBIDE
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-MILLSCARBIDE
BURRS

D(h8)	D Tol.	d	I	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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

1386STI

STI type for general purpose, split point, TiN pointed, short



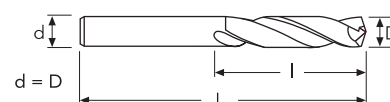
INFO

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	I	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-MILLSCARBIDE
BURRS

STI type for general purpose, split point,
TiN pointed, short

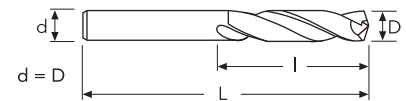


CARBIDE DRILLS

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

P	M	K	N	S	H
★	☆	★	☆	☆	

★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

CARBIDE END-MILLS

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

HSS
END-MILLS

CARBIDE BURRS



1386STIA01A

Set 50 pcs.
1386STI DIN338 HSS TIN POINTED
Ø1 mm÷Ø5.9 mm x 0.1 mm



1386STIA01B

Set 41 pcs.
1386STI DIN338 HSS TIN POINTED
Ø6 mm÷Ø10 mm x 0.1 mm



1386STIA05C

Set 25 pcs.
1386STI DIN338 HSS TIN POINTED
Ø1 mm÷Ø13 mm x 0.5 mm

CUTTING PARAMETERS

INFO

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 ²	600÷1000 N/mm ²			150÷350 HB			<35 HRC
	Vc (m/min)	30÷40	25÷35	15÷25	15÷25	30÷40	60÷80	50÷70	12÷18
	D (mm)	f _n (mm/rev)	f _n (mm/rev)	f _n (mm/rev)	f _n (mm/rev)	f _n (mm/rev)	f _n (mm/rev)	f _n (mm/rev)	f _n (mm/rev)
	1	0.017	0.014	0.012	0.012	0.019	0.024	0.017	0.007
	1.5	0.035	0.030	0.025	0.025	0.039	0.049	0.035	0.014
	2	0.050	0.043	0.035	0.035	0.055	0.070	0.050	0.020
	2.5	0.075	0.064	0.053	0.053	0.083	0.105	0.075	0.030
	3	0.090	0.077	0.063	0.063	0.099	0.126	0.090	0.036
	3.5	0.105	0.089	0.074	0.074	0.116	0.147	0.105	0.042
	4	0.110	0.094	0.077	0.077	0.121	0.154	0.110	0.044
	5	0.125	0.106	0.088	0.088	0.138	0.175	0.125	0.050
	6	0.160	0.136	0.112	0.112	0.176	0.224	0.160	0.064
	7	0.175	0.149	0.123	0.123	0.193	0.245	0.175	0.070
8	0.200	0.170	0.140	0.140	0.220	0.280	0.200	0.080	
9	0.210	0.179	0.147	0.147	0.231	0.294	0.210	0.084	
10	0.220	0.187	0.154	0.154	0.242	0.308	0.220	0.088	
11	0.235	0.200	0.165	0.165	0.259	0.329	0.235	0.094	
12	0.250	0.213	0.175	0.175	0.275	0.350	0.250	0.100	
13	0.265	0.225	0.186	0.186	0.292	0.371	0.265	0.106	

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

138N-138NTI

N type for general purpose, short (138N),
N type for general purpose, TiN coated, short (138NTI)



138N 138NTI

* < Ø2 mm = BR



138N



138NTI

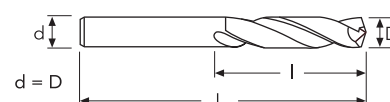
138NTI will be gradually replaced by 1386STI (page 233)

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



D(h8)	D Tol.	d	I	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	▽

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

138N-138NTI

N type for general purpose, short (138N),
N type for general purpose, TiN coated, short (138NTI)



138N

138NTI

INFO



138N

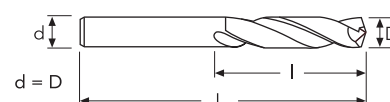


138NTI

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-MILLSCARBIDE
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)



138N

138NTI



138N



138NTI

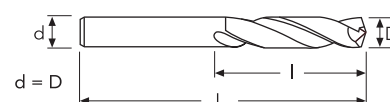
138NTI will be gradually replaced by 1386STI (page 233)

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

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

D(h8)	D Tol.	d	I	L	PACKAGING	138N		138NTI	
						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	▽

● 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)



138N 138NTI

INFO



138N

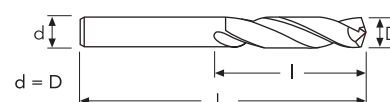


138NTI

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	l	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-MILLSCARBIDE
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)



138N

138NTI



138N



138NTI

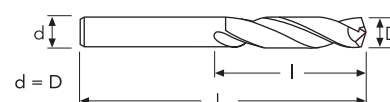
138NTI will be gradually replaced by 1386STI (page 239)

CARBIDE DRILLS

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

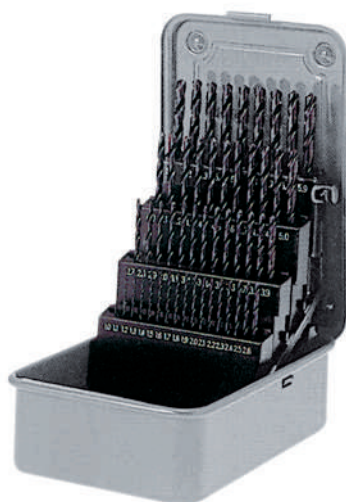
P	M	K	N	S	H
★		☆	☆		

★ 1st choice ☆ suitable



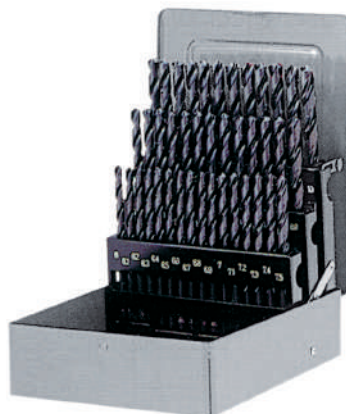
D(h8)	D Tol.	d	I	L	PACKAGING	138N		138NTI	
						EDP No.	Stock	EDP No.	Stock
14.00	0/-0.027	14	108	160	1	P138N1400	●	P138NTI1400	▽
14.25	0/-0.027	14.25	114	169	1	P138N1425	●		
14.50	0/-0.027	14.5	114	169	1	P138N1450	●	P138NTI1450	▽
14.75	0/-0.027	14.75	114	169	1	P138N1475	●		
15.00	0/-0.027	15	114	169	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



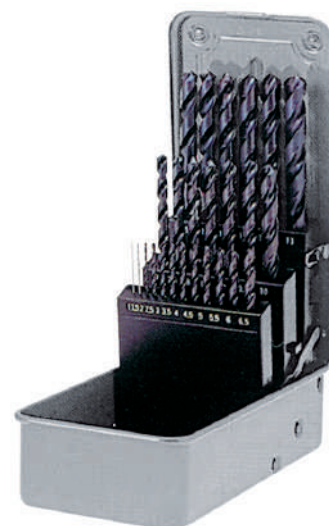
138NA01A

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

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

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 ²	600÷1000 N/mm ²	150÷350 HB			
Vc (m/min)	25÷35	20÷30	25÷35	50÷70	40÷60	
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 ²	600÷1000 N/mm ²	150÷350 HB			
Vc (m/min)	30÷40	25÷35	30÷40	60÷80	50÷70	
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-MILLSCARBIDE
BURRS

INFO

138HB

HB type for brass, short

CARBIDE
DRILLSPU-HPU
TA-4HTA

SUH

ALH

HRC

SUH MINI

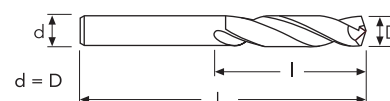
HL

HSD

C-SD-TA

P	M	K	N	S	H
			★		

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	I	L	PACKAGING	EDP No.	Stock
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	○

CARBIDE
END-MILLS

G2

MDTA

HF VH/UP

MEF

ALU

MEX/MH

UH/MH

HSS
END-MILLSCARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

138HB

HB type for brass, short



INFO

CARBIDE
DRILLS

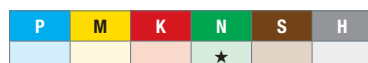
PU-HPU
TA-4HTA
SUH
ALH
HRC
SUH MINI
HL
HSD
C-SD-TA

HSS
DRILLS

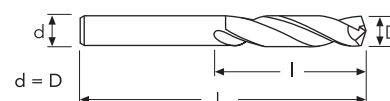
LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

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

HSS
END-MILLSCARBIDE
BURRS

★ 1st choice ☆ suitable



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	○

HB type for brass, short

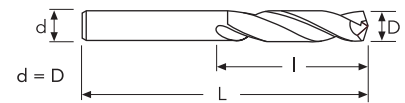


CARBIDE DRILLS

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



★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

138HB

Material Group ISO 513	N4						
Hardness/Rm							
Vc (m/min)	40÷60						
D (mm)	fn (mm/rev)						
1.5	0.065						
2	0.080						
2.5	0.090						
3	0.100						
3.5	0.110						
4	0.120						
4.5	0.130						
5	0.140						
6	0.160						
7	0.180						
8	0.200						
9	0.220						
10	0.250						

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

138WB

WB type for aluminium, short

DIN
338HSS
BRCARBIDE
DRILLSPU-HPU
TA-4HTA

SUH

ALH

HRC

SUH MINI

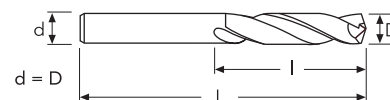
HL

HSD

C-SD-TA

P	M	K	N	S	H
			★		

★ 1st choice ☆ suitable



D(h8)	D Tol.	d	l	L	PACKAGING	EDP No.	Stock
1.50	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

HF VH/UP

MEF

ALU

MEX/MH

UH/MH

HSS
END-MILLSCARBIDE
BURRS

138WB

WB type for aluminium, short



INFO

CARBIDE
DRILLS

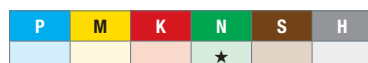
PU-HPU
TA-4HTA
SUH
ALH
HRC
SUH MINI
HL
HSD
C-SD-TA

HSS
DRILLS

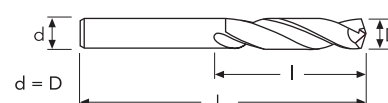
LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

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

HSS
END-MILLSCARBIDE
BURRS

★ 1st choice ☆ suitable



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	○

WB type for aluminium, short

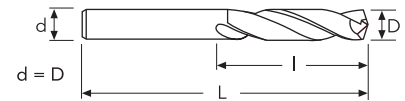


CARBIDE DRILLS

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



★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

138WB

Material Group ISO 513	N1	N2	N3			
Hardness/Rm						
Vc (m/min)	40÷60	30÷50	25÷45			
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			

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

2386STI

STI type for tough materials, split point, TiN pointed, short

DIN
338

SPLIT POINT

HSS/Co
TIN

135°

33°

CARBIDE
DRILLSPU-HPU
TA-4HTA

SUH

ALH

HRC

SUH MINI

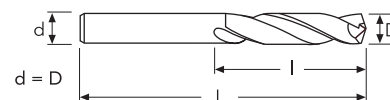
HL

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-MILLSCARBIDE
BURRS

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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

2386STI

STI type for tough materials, split point, TiN pointed, short

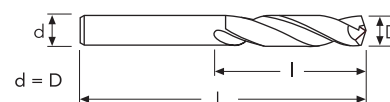


INFO

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	I	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-MILLSCARBIDE
BURRS

INFO

2386STI

STI type for tough materials, split point, TiN pointed, short

DIN
338HSS/Co
TINCARBIDE
DRILLSPU-HPU
TA-4HTA

SUH

ALH

HRC

SUH MINI

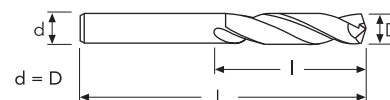
HL

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	●

CARBIDE
END-MILLS

G2

MDTA

HF VH/UP

MEF

ALU

MEX/MH

UH/MH

HSS
END-MILLSCARBIDE
BURRS

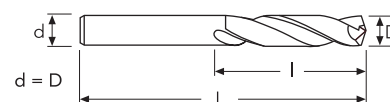
STI type for tough materials, split point, TiN pointed, short



INFO



★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion



2386STIA01A

Set 50pcs.

2386STI DIN338 HSS/Co TIN POINTED
Ø1 mm÷Ø5.9 mm x 0.1 mm



2386STIA01B

Set 41 pcs.

2386STI DIN338 HSS/Co TIN POINTED
Ø6 mm÷Ø10 mm x 0.1 mm



2386STIA05C

Set 25pcs.

2386STI DIN338 HSS/Co TIN POINTED
Ø1 mm÷Ø13 mm x 0.5 mm

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

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²				
Vc (m/min)	30÷40	25÷35	15÷25	15÷25	12÷18	
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)	30÷40	25÷35	60÷80	50÷70	12÷18	
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
 HF VH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

238NVA

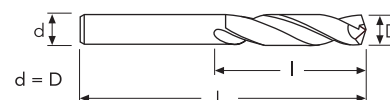
NVA type for tough materials, short



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

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(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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

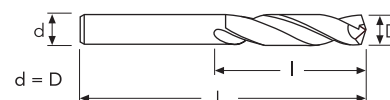
238NVA

NVA type for tough materials, short

DIN
338HSS/CO
HTCARBIDE
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-MILLSCARBIDE
BURRS

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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

238NVA

NVA type for tough materials, short

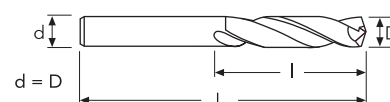


INFO



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-MILLSCARBIDE
BURRS

238NVA

DIN 338



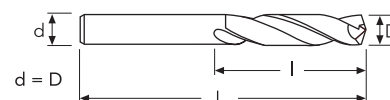
HSS/CO
HT



C-SD-TA

P	M	K	N	S	H
★	★	☆	☆	☆	

★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion



238NVAA01A

Set 50pcs.
238NVA DIN338 HSS/Co
Ø1 mm÷Ø5.9 mm x 0.1 mm



238NVA01B

Set 41pcs.
238NVA DIN338 HSS/Co
Ø6 mm÷Ø10 mm x 0.1 mm



238NVAA05C

Set 25pcs.
238NVA DIN338 HSS/Co
Ø1 mm÷Ø13 mm x 0.5 mm

CUTTING PARAMETERS

INFO

238NVA

Material Group ISO 513	P1 P2	P3 P4	P7	M1	M2 M3	
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²				
Vc (m/min)	25÷35	20÷30	12÷18	12÷18	8÷12	
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	

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)	25÷35	20÷30	50÷70	40÷60	8÷12	
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-MILLSCARBIDE
BURRS

INFO

234NVA

NVA type for tough materials, long

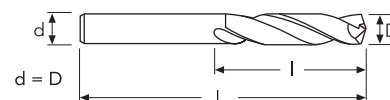


* < Ø2 mm = HSS BR

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	●

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

● stock standard ○ non-standard stock ▽ stock exhaustion

234NVA

NVA type for tough materials, long



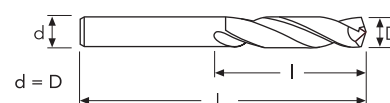
INFO

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

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

D(h8)	D Tol.	d	I	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	●

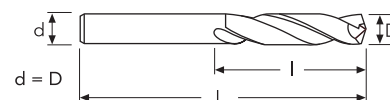
● stock standard ○ non-standard stock ▽ stock exhaustion

NVA type for tough materials, long



C-SD-TA

★ 1st choice ☆ suitable



CARBIDE BURRS

CUTTING PARAMETERS

INFO

234NVA

Material Group ISO 513	P1 P2	P3 P4	P7	M1	M2 M3	
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²				
Vc (m/min)	20÷30	15÷25	12÷16	12÷16	8÷12	
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	

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

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)	20÷30	20÷30	40÷60	30÷50	8÷12	
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

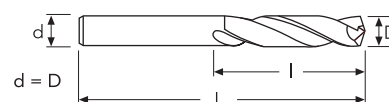
LS type for deep holes, long (234LS),

LS type for deep holes, PV15 coated, long (234LSTH)

**234LS 234LSTH****234LS****234LSTH**CARBIDE
DRILLSPU-HPU
TA-4HTA
SUH
ALH
HRC
SUH MINI
HL
HSD
C-SD-TA

P	M	K	N	S	H
★	☆	★			

★ 1st choice ☆ suitable



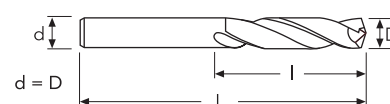
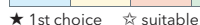
						234LS		234LSTH	
D(h8)	D Tol.	d	I	L	PACKAGING	EDP No.	Stock	EDP No.	Stock
2.00	0/-0.014	2	56	85	10	P234LS0200	●	P234LSTH0200	●
2.10	0/-0.014	2.1	56	85	10	P234LS0210	●	P234LSTH0210	●
2.20	0/-0.014	2.2	59	90	10	P234LS0220	●	P234LSTH0220	●
2.30	0/-0.014	2.3	59	90	10	P234LS0230	●	P234LSTH0230	●
2.40	0/-0.014	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
DRILLSLFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLSG2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

LS type for deep holes, long (234LS),
LS type for deep holes, PV15 coated, long (234LSTH)



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

INFO

CUTTING PARAMETERS

234LS

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²			150÷350 HB	
Vc (m/min)	20÷30	15÷25	10÷14	10÷14	20÷30	
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	

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

234LSTH

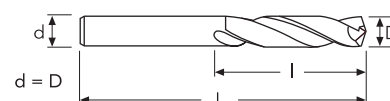
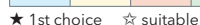
Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²			150÷350 HB	
Vc (m/min)	25÷35	20÷30	16÷20	16÷20	25÷35	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
2	0.040	0.034	0.028	0.028	0.044	
2.5	0.050	0.043	0.035	0.035	0.055	
3	0.060	0.051	0.042	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
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
 HF VH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

LS type for deep holes. extra-long/1 (2691LS);
LS type for deep holes. PV15 coated. extra-long/1 (2691LSTH)



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

2691LS

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²			150÷350 HB	
Vc (m/min)	20÷24	16÷20	8÷12	8÷12	20÷24	
D (mm)	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

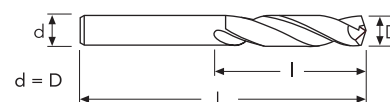
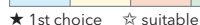
Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²			150÷350 HB	
Vc (m/min)	24÷28	20÷24	10÷14	10÷14	24÷28	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
2	0.032	0.027	0.022	0.022	0.035	
2.5	0.040	0.034	0.028	0.028	0.044	
3	0.048	0.041	0.034	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-MILLSCARBIDE
BURRS

LS type for deep holes. extra-long/2



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

1692LS

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

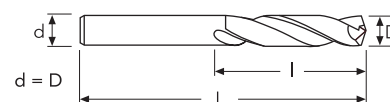
CARBIDE
BURRS

	Material Group ISO 513	P1 P2	P3 P4	K1 K2			
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	150÷350 HB				
Vc (m/min)	20÷24	16÷20	20÷24				
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)				
3.5	0.045	0.038	0.050				
4	0.053	0.045	0.058				
5	0.060	0.051	0.066				
6	0.068	0.057	0.074				
7	0.075	0.064	0.083				
8	0.083	0.070	0.091				
9	0.090	0.077	0.099				
10	0.098	0.083	0.107				
11	0.105	0.089	0.116				
12	0.113	0.096	0.124				
13	0.120	0.102	0.132				

LS type for deep holes. extra-long/3



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS							
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 ²	600÷1000 N/mm ²	150÷350 HB			
	Vc (m/min)	15÷25	10÷20	15÷25			
	D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)			
	3.5	0.045	0.038	0.050			
	4	0.053	0.045	0.058			
	5	0.060	0.051	0.066			
	6	0.068	0.057	0.074			
	7	0.075	0.064	0.083			
	8	0.083	0.070	0.091			
	9	0.090	0.077	0.099			
	10	0.098	0.083	0.107			
	11	0.105	0.089	0.116			
	12	0.113	0.096	0.124			
	13	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)



145N

145NTI

INFO



145N



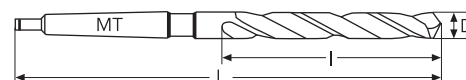
145NTI

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)



145N

145NTI



145N



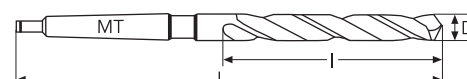
145NTI

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)



145N

145NTI

INFO



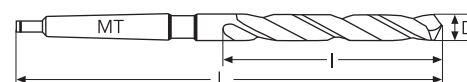
145N



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
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	●		

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 ²	600÷1000 N/mm ²	150÷350 HB			
Vc (m/min)	25÷35	20÷30	25÷35	50÷70	40÷60	
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 ²	600÷1000 N/mm ²	150÷350 HB			
Vc (m/min)	30÷40	25÷35	30÷40	60÷80	50÷70	
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-MILLSCARBIDE
BURRS

N type for tough materials. MT shank. short



CARBIDE DRILLS

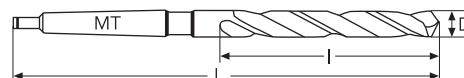
PU-HPU
TA-4HTA

ALH

HSD
GSD TA

P	M	K	N	S	H
★	★	☆	☆	☆	

★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

245N

Material Group ISO 513	P1 P2	P3 P4	P7	M1	M2 M3	
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²				
Vc (m/min)	25÷35	20÷30	12÷18	12÷18	8÷12	
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	

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)	25÷35	20÷30	50÷70	40÷60	8÷12	
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-MILLSCARBIDE
BURRS

LS type for deep holes. MT shank. long



CARBIDE DRILLS

PU-HPU
TA-4HTA

ALH

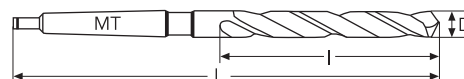
MINI

AL
USD

C-SD-TA

P	M	K	N	S	H
★	☆	★			

★ 1st choice ☆ suitable

[illegible]

CARBIDE END-MILLS

MDTA

MEE

ALL

ALU
MEY/MUHSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

241LS

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²			150÷350 HB	
Vc (m/min)	15÷25	10÷20	10÷14	10÷14	20÷30	
D (mm)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	fn (mm/rev)	
13	0.160	0.136	0.112	0.112	0.176	
14	0.170	0.145	0.119	0.119	0.187	
15	0.180	0.153	0.126	0.126	0.198	
16	0.200	0.170	0.140	0.140	0.220	
17	0.190	0.162	0.133	0.133	0.209	
18	0.205	0.174	0.144	0.144	0.226	
19	0.220	0.187	0.154	0.154	0.242	
20	0.235	0.200	0.165	0.165	0.259	
21	0.250	0.213	0.175	0.175	0.275	
22	0.265	0.225	0.186	0.186	0.292	
23	0.280	0.238	0.196	0.196	0.308	
24	0.295	0.251	0.207	0.207	0.325	
25	0.310	0.264	0.217	0.217	0.341	
26	0.325	0.276	0.228	0.228	0.358	
27	0.340	0.289	0.238	0.238	0.374	
28	0.355	0.302	0.249	0.249	0.391	
29	0.370	0.315	0.259	0.259	0.407	
30	0.385	0.327	0.270	0.270	0.424	

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

2701LS

**DIN
1870/1**



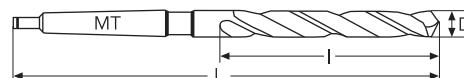
HSS/CO
OX



C-SD-TA

P	M	K	N	S	H
★	☆	★			

★ 1st choice ☆ suitable



HSS DRILLS

LFTA

SUTA

HSS-HSS/CO

CARBIDE END-MILLS

MDTA

MEE

ALL

ALU
MEY/MU

HSS

END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

2701LS

INFO

	Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
	Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²			150÷350 HB	
	Vc (m/min)	20÷24	16÷20	8÷12	8÷12	20÷24	
D (mm)	fn (mm/rev)	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		

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

2702LS

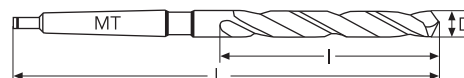
DIN 1870/2

HSS/CO
0Y

C-SD-TA

P	M	K	N	S	H
★	☆	★			

★ 1st choice ☆ suitable



CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

2702LS

Material Group ISO 513	P1 P2	P3 P4	P7	M1	K1 K2	
Hardness/Rm	500÷700 N/mm ²	600÷1000 N/mm ²	<700 N/mm ²	<750 N/mm ²	150÷350 HB	
Vc (m/min)	20÷24	16÷20	8÷12	8÷12	20÷24	
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	

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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Legenda
 Verzeichnis
 Légende
 Leyenda
 Условные обозначения

STOCK		
●	stock standard stock standard Standard Lager	stock standard stock estándar складская позиция
○	non-standard stock stock non standard nicht Standard Lager	stock non standard stock no estándar не складская позиция
▽	stock exhaustion esaurimento stock Vorraterschöpfung	épuisement du stock agotamiento de stock складские остатки

APPLICATION GUIDELINES INDICAZIONI PER L'APPLICAZIONE LEITFADEN ZUR ANWENDUNG INDICATIONS POUR L'APPLICATION INDICACIONES PARA SU APLICACIÓN УКАЗАНИЯ ПО ПРИМЕНЕНИЮ		
★	1st choice 1a scelta 1. Wahl	1er choix 1ª elección 1-й выбор
☆	suitable adatto geeignet	adapté adecuado пригоден

SHANK ATTACCO SCHAFT QUEUE MANGO ХВОСТОВИК		
	cylindrical shank attacco cilindrico zylindrischer Schaft	queue cylindrique mango cilíndrico цилиндрическое крепление
	Weldon	

MILLING STRATEGY STRATEGIA DI FRESATURA FRÄSSSTRATEGIE STRATÉGIES DE FRAISAGE ESTRATEGIA DE FRESADO СТРАТЕГИЯ ФРЕЗЕРОВАНИЯ		
	slotting fresatura di cave Nutfräsen	rainurage ranurado фрезерование канавок
 	side milling contornatura Konturfräsen	contournage perfiladura фрезерование по контуру
	3D machining fresatura 3D 3D-Bearbeitung	fraisage 3D fresado 3D 3D фрезерование
	square rib nervatura piana Flachrippen	rainurage nervio plano прямоугольное оребрение
	copying copiatura Kopieren	copiage copia копирование
	round rib nervatura raggiata Rundrippen	rainurage rayonné nervio radiado радиальное оребрение

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

🇮🇹 MILLING STRATEGY 🇮🇹 STRATEGIA DI FRESATURA 🇩🇪 FRÄSSTRATEGIE 🇫🇷 STRATÉGIES DE FRAISAGE 🇪🇸 ESTRATEGIA DE FRESADO 🇷🇺 СТРАТЕГИЯ ФРЕЗЕРОВАНИЯ		
	🇮🇹 helical 🇮🇹 interpolazione elicoidale 🇩🇪 Helixinterpolation	🇫🇷 interpolation hélicoïdale 🇪🇸 interpolación helicoidal 🇷🇺 винтовая интерполяция
	🇮🇹 ramping 🇮🇹 entrata in rampa 🇩🇪 Rampen	🇫🇷 entrée en ramping 🇪🇸 entrada en rampa 🇷🇺 фрезерование под углом
	🇮🇹 vertical 🇮🇹 fresatura assiale 🇩🇪 Vertikalfräsen	🇫🇷 fraisage axial 🇪🇸 fresado axial 🇷🇺 осевое фрезерование
	🇮🇹 drilling 🇮🇹 foratura 🇩🇪 Bohren	🇫🇷 perçage 🇪🇸 taladro 🇷🇺 сверление
	🇮🇹 trochoidal 🇮🇹 fresatura trocoidale 🇩🇪 trochoidales Fräsen	🇫🇷 fraisage trochoïdal 🇪🇸 fresado trocoidal 🇷🇺 трохоидальное фрезерование

🇮🇹 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
	🇮🇹 < 40 HRC variable helix and unequal pitch 🇮🇹 < 40 HRC elica variabile e passo differenziato 🇩🇪 < 40 HRC ungleicher Teilung und Winkel	🇫🇷 < 40 HRC hélice et pas différencié 🇪🇸 < 40 HRC hélice variable y paso diferenciado 🇷🇺 < 40 HRC переменный завиток и дифференциальная кромка
	🇮🇹 30÷55 HRC unequal pitch 🇮🇹 30÷55 HRC passo differenziato 🇩🇪 30÷55 HRC ungleicher Teilung	🇫🇷 30÷55 HRC pas différencié 🇪🇸 30÷55 HRC paso diferenciado 🇷🇺 30÷55 HRC неодинаковый шаг режущих кромок
	🇮🇹 for stainless steel 🇮🇹 per acciaio inossidabile 🇩🇪 für rostfreien Stahl	🇫🇷 pour acier inoxydable 🇪🇸 para acero inoxidable 🇷🇺 для нержавеющей сталей
	🇮🇹 for aluminium 🇮🇹 per alluminio 🇩🇪 für Aluminium	🇫🇷 pour aluminium 🇪🇸 para aluminio 🇷🇺 для алюминия
	🇮🇹 unequal pitch (UP) for Aluminium 🇮🇹 passo differenziato (UP) per alluminio 🇩🇪 ungleiche Teilung (UP) für Aluminium	🇫🇷 pas différencié (UP) pour aluminium 🇪🇸 paso diferenciado (UP) para aluminio 🇷🇺 неравномерный шаг (UP) для алюминия
	🇮🇹 30÷55 HRC general purpose and hardened steel 🇮🇹 30÷55 HRC uso generico e acciaio temprato 🇩🇪 30÷55 HRC allgemeine Anwendung und gehärtete Stähle	🇫🇷 30÷55 HRC utilisation générale et aciers trempés 🇪🇸 30÷55 HRC mecanizado genérico y acero templado 🇷🇺 30÷55 HRC общее назначение и для закалённых сталей
	🇮🇹 30÷70 HRC general purpose and hardened steel 🇮🇹 30÷70 HRC uso generico e acciaio temprato 🇩🇪 30÷70 HRC allgemeine Anwendung und gehärtete Stähle	🇫🇷 30÷70 HRC utilisation générale et aciers trempés 🇪🇸 30÷70 HRC mecanizado genérico y acero templado 🇷🇺 30÷70 HRC общее назначение и для закалённых сталей
	🇮🇹 < 70 HRC for hardened steel 🇮🇹 < 70 HRC per acciai temprati 🇩🇪 < 70 HRC für Hartstahl	🇫🇷 < 70 HRC pour acier trempé 🇪🇸 < 70 HRC para aceros templados 🇷🇺 < 70 HRC для закалённых сталей

🇮🇹 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°	🇪🇸 chaflán a 45°	🇷🇺 фаска 45°
 C+R	✚ 45° chamfer + radius	🇮🇹 smusso a 45° + raggio	🇩🇪 45° abgeschrägt + Radius	🇫🇷 biseau à 45° + rayon	🇪🇸 chaflán a 45° + radio	🇷🇺 фаска 45° + радиус
 RADIUS	✚ corner radius	🇮🇹 torica	🇩🇪 Eckradius	🇫🇷 torique	🇪🇸 tórica	🇷🇺 с радиусом при вершине
 BALL NOSE	✚ ball nose	🇮🇹 raggata	🇩🇪 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 TAGLIENTI	🇩🇪 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 ROMPITRUCIOLO		SPÄNEBRECHER TYP	
TYPE DE BRISE-COPEAUX		TIPO DE ROMPEVIRUTAS		ТИП СТРУЖКОЛОМА			
	roughing coarse pitch		ébauche pas gros				
	sgrossare passo grosso		desbaste paso grueso				
	Schruppfräser Regelgewinde		черновая с крупным шагом				
	roughing fine pitch		ébauche pas fin				
	sgrossare passo fine		desbaste paso fino				
	Schruppfräser Feingewinde		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  TRAITEMENT DE SURFACE  TRATAMIENTO SUPERFICIAL  ОБРАБОТКА ПОВЕРХНОСТИ			
... BR	 uncoated  non rivestito  unbeschichtet	 non revêtu  no revestido  без покрытия	
... POLISHED	 polished  lappato  geläpft	 poli  pulido  полированный	

🇬🇧 COATINGS 🇮🇹 RIVESTIMENTI 🇩🇪 BESCHICHTUNGEN 🇫🇷 REVÊTEMENTS 🇪🇸 RECUBRIMIENTOS 🇷🇺 ПОКРЫТИЕ							
		*** PV200	*** PV300	--- ENDLESS	--- ENDLESS ORANGE	--- MH COAT	--- UH RED
🇬🇧 hardness (HV) 🇮🇹 durezza (HV) 🇩🇪 Härte (HV)	🇫🇷 dureté (HV) 🇪🇸 dureza (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)	🇫🇷 épaisseur (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°

	ITEM No.	PAGE	
G2 general purpose, square	GB205	298	
	G2CS2	300	
	G2WS2	302	
	G2210	304	
	G2211	304	
	G2212	304	
	GB305	307	
	G2CSH3	309	
	G2WSH3	311	
	G2310	313	
	G2311	313	
	G2312	313	
	GB405	315	
	G2CS4	317	
	G2WS4	319	
	G2410	321	
	G2411	321	
	G2412	321	
	G2413	321	
	G2CSHM	323	
G2 general purpose, roughing	G2CSFR	325	
	G2WSFR	327	
G2 general purpose, corner radius	G2CS2R	329	
	G2CS4R	331	
	G2CL4R	333	
G2 general purpose, ball nose	GB255	335	
	G2CSB2	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



	ITEM No.	PAGE	
G2 general purpose, ball nose	G2250	339	
	G2251	339	
	G2CSB4	341	
MDTA general purpose, square	MDTACS2	344	
	MDTA210	346	
	MDCL2	348	
	MDTACS3	350	
	MDTAWSH3	352	
	MDTACS4	354	
	MDTA410	356	
	MDCL4	358	
MDTA general purpose, roughing	MDTAUPR	360	
MDTA general purpose, ball nose	MDTACSB2	362	
	MDTA250	364	
HF UNI < 40 HRC, 45° chamfer	HF840	370	
	HF440	374	
	HF441	379	
HF UNI < 40 HRC, roughing	HF844	385	
	HF444	389	
	HF445	393	
HF UNI < 40 HRC, corner radius	HF342	398	
	HF842	401	
	HF442	405	
	HF443	410	
	HF542	415	
	HF942	418	
	HF943	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	HF642	426	
	HF643	429	
	HF742	432	
	HF743	435	
HF UNI SC < 40 HRC, 45° chamfer + corner radius	HF871	438	
HF HARD 30÷55 HRC, 45° chamfer	HF850	443	
	HF450	447	
	HF451	451	
HF HARD 30÷55 HRC, corner radius	HF852	455	
	HF452	459	
MEF stainless steel and super alloys, square	MEFCS2	464	
	MEFCSH3	466	
	MEFCS4	468	
	MEF600	470	
MEF stainless steel and super alloys, roughing	MEF901	472	
	MEF902	474	
ALU unequal pitch, square	HFAL4	478	
ALU unequal pitch, corner radius	HFAL3	481	
	HFA53	484	
ALU square	MDCSA1	487	
	MDCSA2	489	
	MDCSA3	492	
	MDA310	494	
	MDA311	494	
	MDA312	494	
	MDCSAM	497	
ALU corner radius	MCA212R	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	MDCAB2	501	
MEX 30÷55 HRC, square	MEXM2	504	
	MEXM2SC	506	
	MEXLN2	508	
	MEXCS2	513	
	MEXCL2	515	
MEX 30÷55 HRC, square	MEX400	517	
	MEXCL4	519	
	MEXCSHM	521	
	MEXCLHM	523	
MEX 30÷55 HRC, roughing	MEXCSFR	525	
MEX 30÷55 HRC, corner radius	MEXLN2R	527	
	MEXLS2R	533	
	MEXCS4R	535	
	MEX410R	538	
	MEXLS4R	540	
	MEX610R	542	
	MEX611R	544	
MEX 30÷55 HRC and MH 30÷70 HRC, ball nose	MHMB204	546	
	MHMB206	548	
	MHLNB2	550	
	MHCRB2	555	
	MEXCSB2	557	
	MEXCLSB2	559	
	MEX253	561	
UH < 70 HRC, square	UHM204	564	
	UHLN2	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

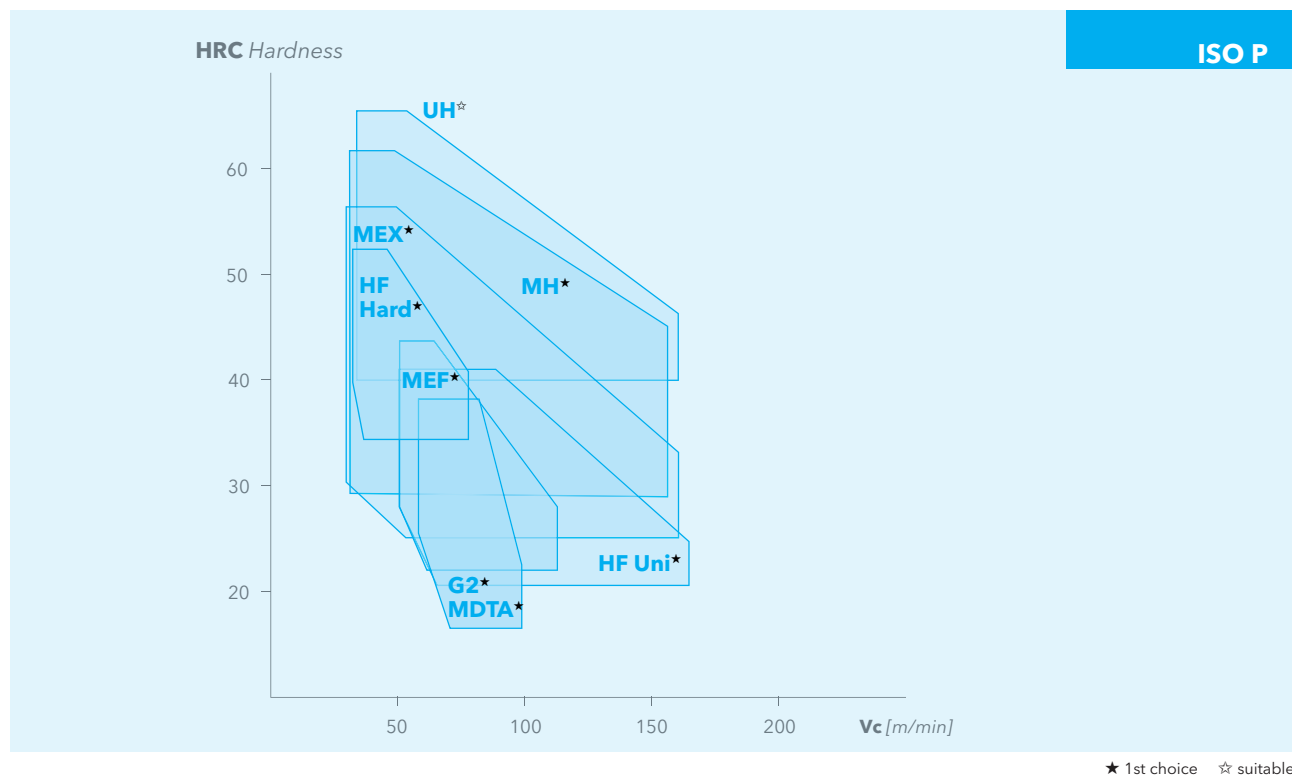


	ITEM No.	PAGE	
UH < 70 HRC, square	UH600	571	
	UH612	573	
UH < 70 HRC, corner radius	UHM206	575	 
	UH211	577	 
	UH212	579	 
	UHCS2	584	
	UHF4LN	586	 
	UHF-RT	590	
	UHF4	592	
	UHCS4	594	
	UH410	596	
	UH411	599	
	UH412	601	
	UH413	603	
	UH610R	605	
	UH611R	607	
UH < 70 HRC and MH 30÷70 HRC, ball nose	MHMB204	609	 
	MHMB206	611	 
	MHLNB2	613	 
	MHCRB2	618	 
	UHCSB2	620	
	UH250	622	
	UH253	624	

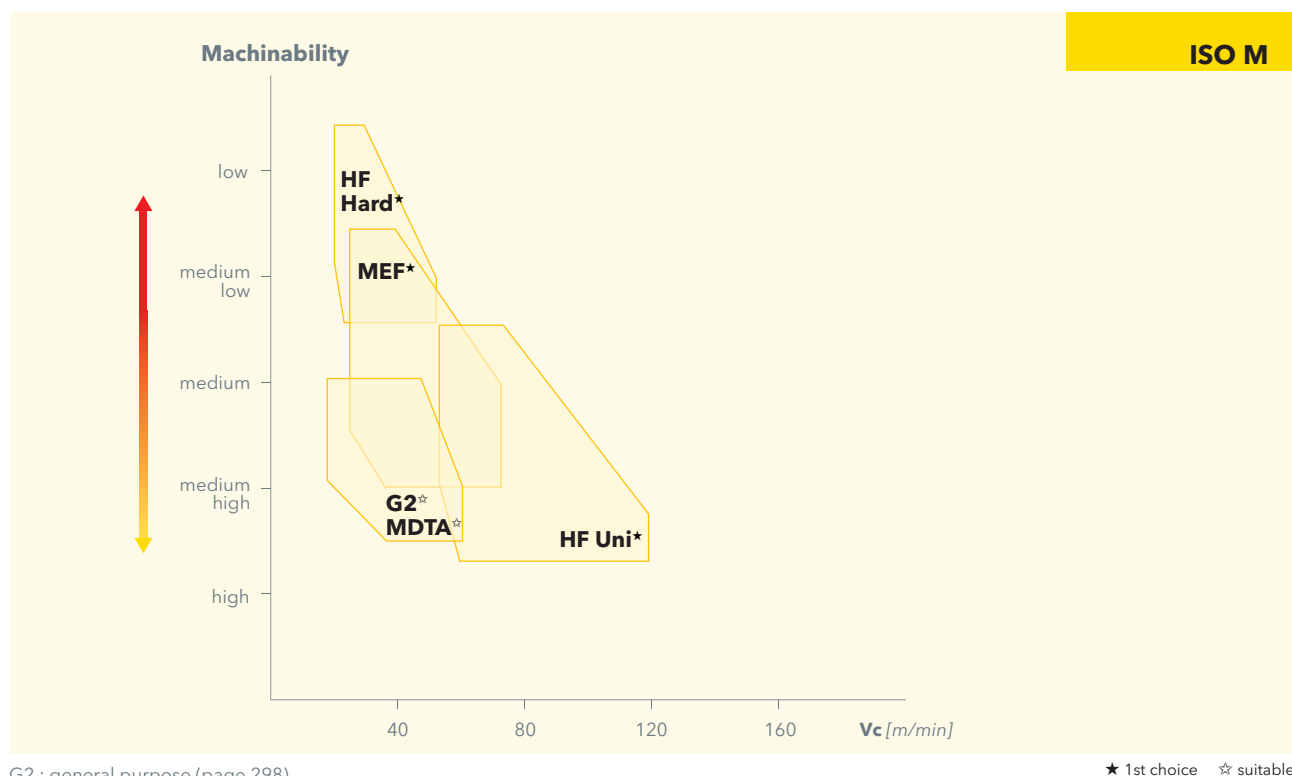
RANGE	NORM	TYPE	MATERIAL / COATING	HRC	HELIX ANGLE	GEOMETRY	Z	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H
3-20	OSAWA	UH	NMG UH RED	<70	50°	SQUARE	6-8	☆		☆			★
3-20	OSAWA	UH	NMG UH RED	<70	50°	SQUARE	6-8	☆		☆			★
0.3-2	OSAWA	UH	NMG UH RED	<70	40°	CORNER RADIUS	2	☆		☆			★
1-6	OSAWA	UH	NMG UH RED	<70	40°	CORNER 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



STAINLESS STEEL APPLICATION



G2 : general purpose (page 298)

MDTA : general purpose (page 344)

HF UNI : universal purpose (page 370)

HF HARD : special purpose (page 443)

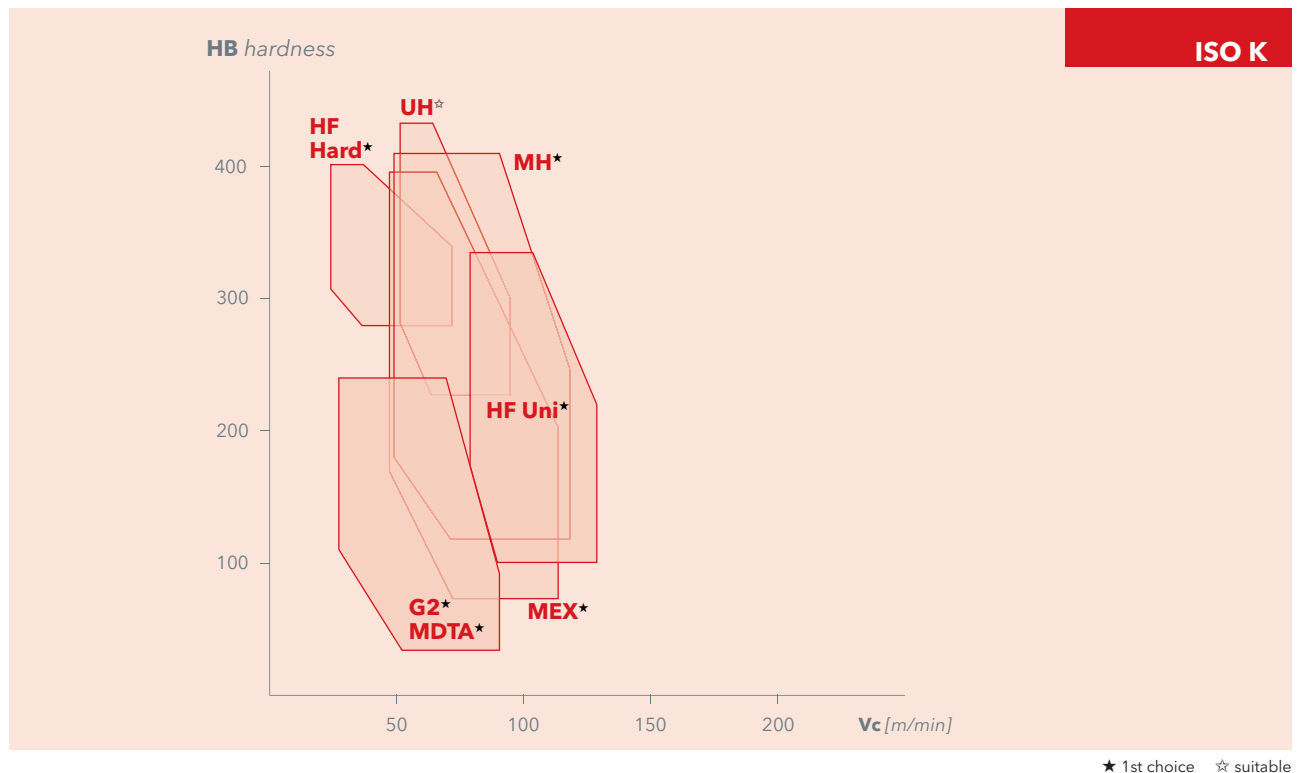
MEH : special purpose (page 464)

MEX : special purpose (page 504)

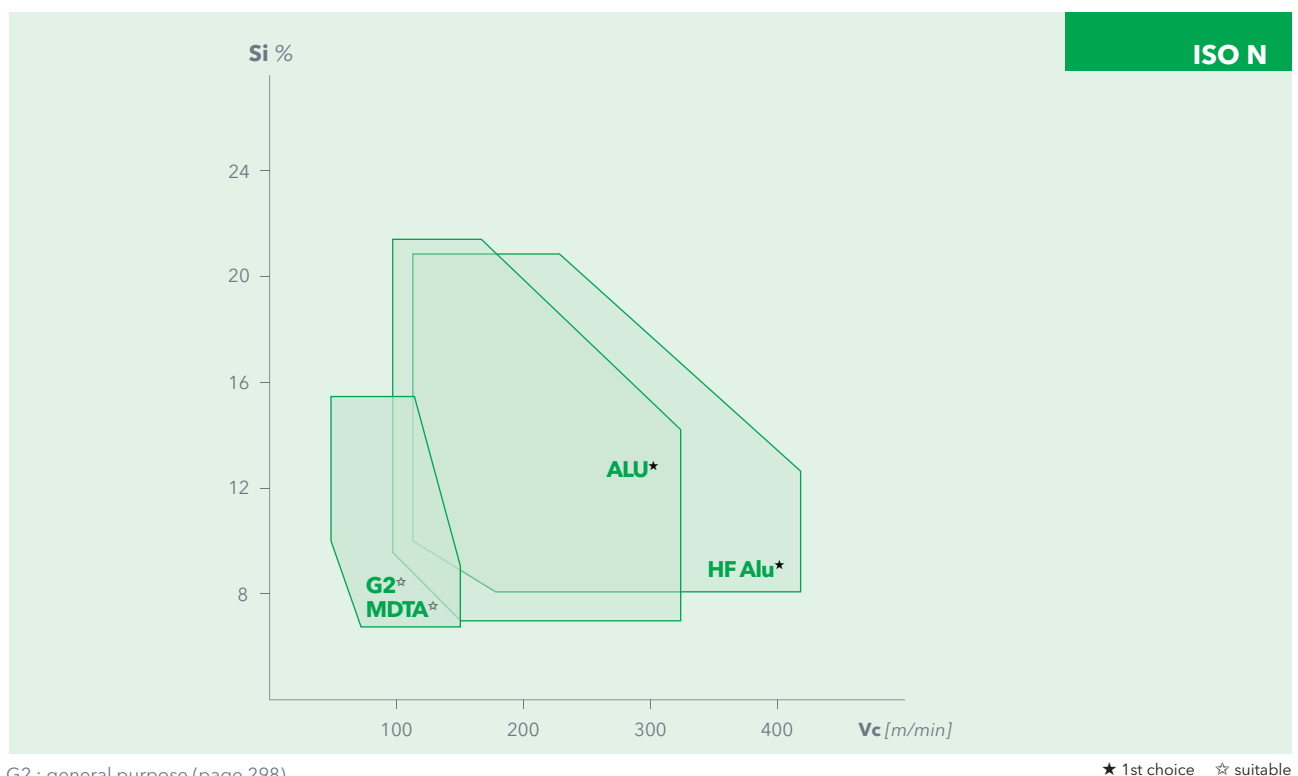
MH : special purpose (page 546/609)

UH : special purpose (page 564)

CAST IRON APPLICATION



NON-FERROUS MATERIALS APPLICATION



G2 : general purpose (page 298)

MDTA : general purpose (page 344)

HF UNI : universal purpose (page 370)

HF HARD : special purpose (page 443)

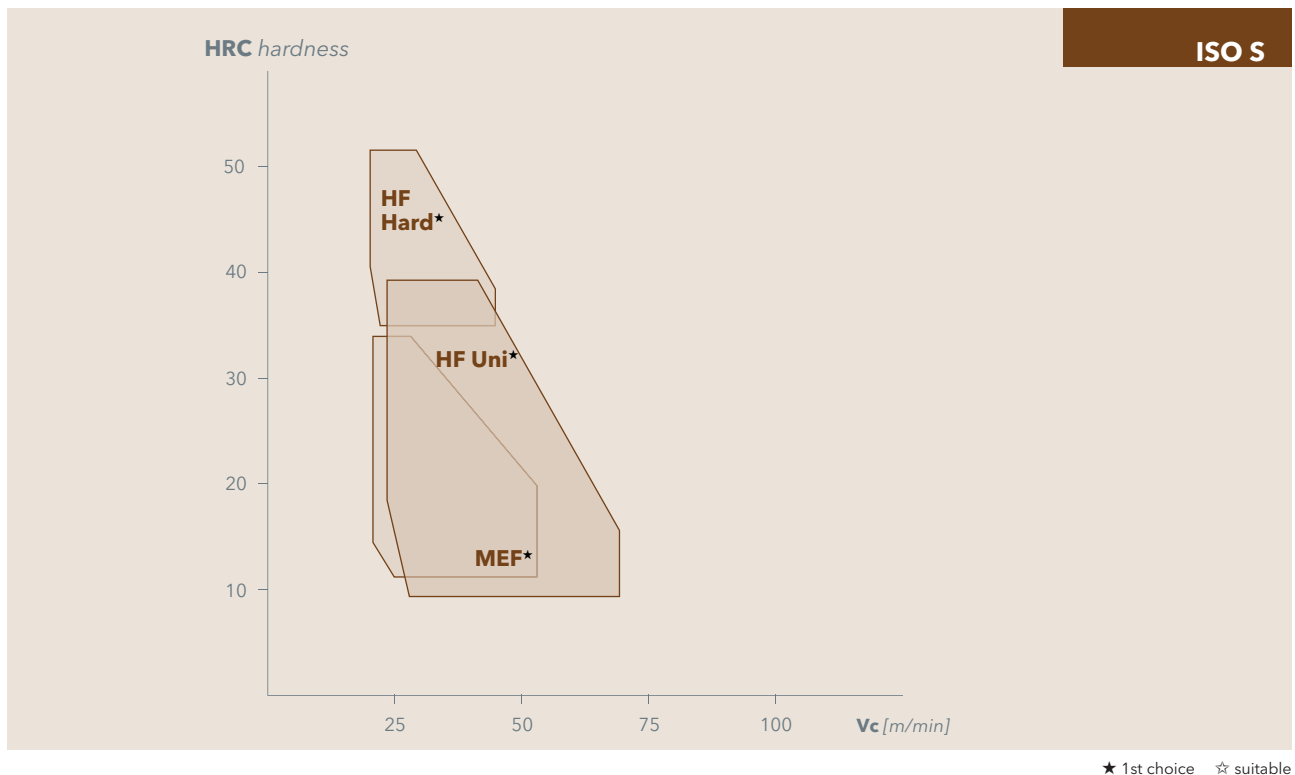
ALU : special purpose (page 478)

MEX : special purpose (page 504)

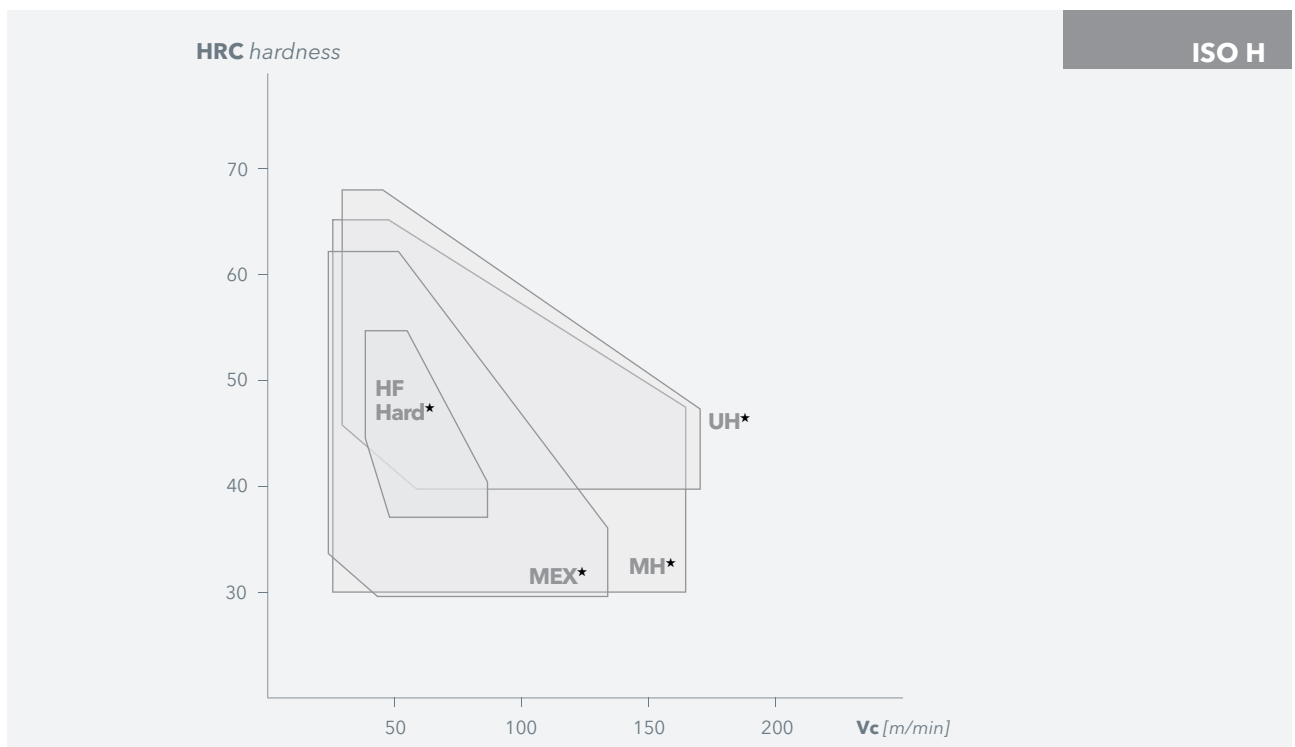
MH : special purpose (page 546/609)

UH : special purpose (page 564)

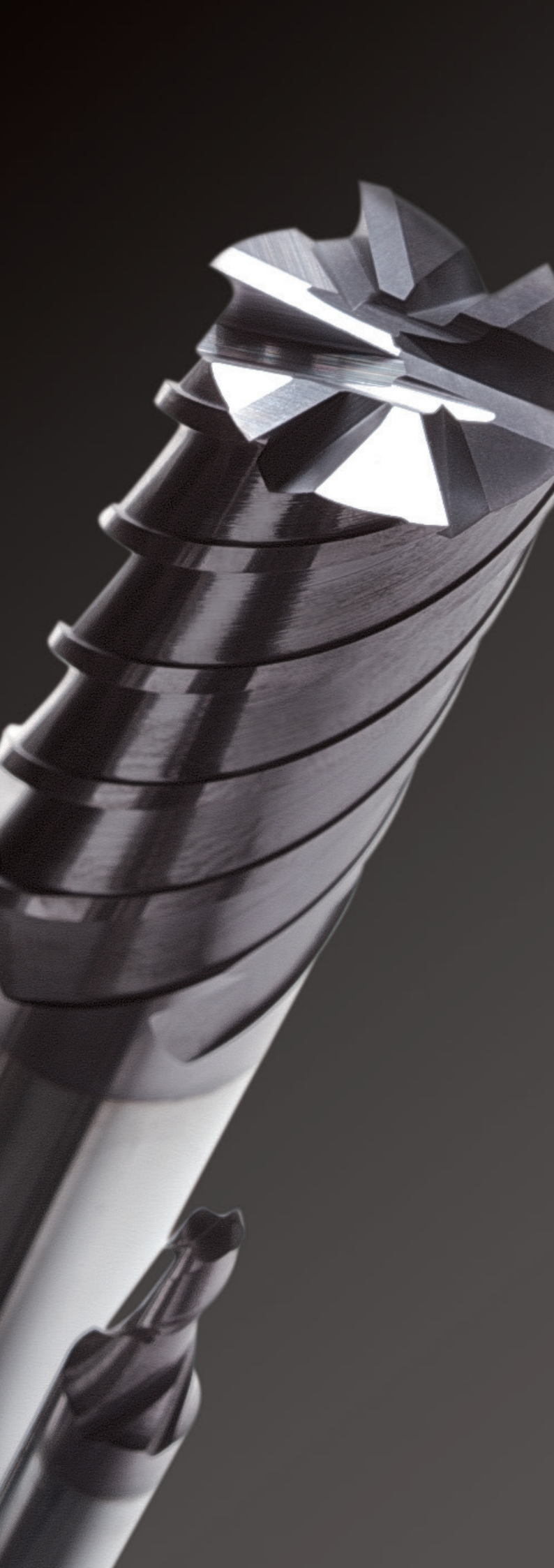
SUPER ALLOYS APPLICATION



HARDENED STEEL APPLICATION



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)



**NEW ITEMS AVAILABLE.
PLEASE REFER TO OSW23 UPDATE - SEPTEMBER.**

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 leistungstärkere 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**

cylindrical shank, 2 flutes



N

MG
BR

**<45
HRC**



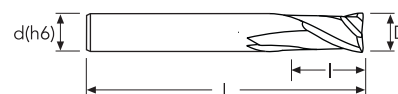
SQUARE



C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable



CARBIDE D-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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	0.5D x D	0.5D x D	0.3D x D	0.5D x D
	Vc (m/min)	50÷60	30÷50	20÷40	70÷90
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.004	0.003	0.003	0.005
	2	0.007	0.006	0.005	0.009
	3	0.010	0.009	0.008	0.013
	4	0.014	0.012	0.011	0.018
	5	0.018	0.015	0.014	0.023
	6	0.023	0.020	0.017	0.030
	8	0.030	0.026	0.023	0.039
	10	0.038	0.032	0.029	0.049
	12	0.045	0.038	0.034	0.059

< 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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.2D	1.5D x 0.3D
	Vc (m/min)	50÷60	30÷50	20÷40	70÷90
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.004	0.004	0.003	0.006
	2	0.009	0.007	0.007	0.011
	3	0.013	0.011	0.009	0.016
	4	0.018	0.015	0.013	0.023
	5	0.023	0.019	0.017	0.029
	6	0.029	0.024	0.022	0.037
	8	0.038	0.032	0.028	0.049
	10	0.048	0.040	0.036	0.062
	12	0.056	0.048	0.042	0.073

< 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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	D x D	D x D	D x D	D x D
	Vc (m/min)	40÷50	30÷40	20÷30	60÷80
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.002	0.002	0.002	0.003
	2	0.004	0.004	0.003	0.006
	3	0.006	0.005	0.005	0.008
	4	0.009	0.007	0.007	0.011
	5	0.011	0.010	0.008	0.015
	6	0.014	0.012	0.011	0.019
	8	0.019	0.016	0.014	0.024
	10	0.024	0.020	0.018	0.031
	12	0.028	0.024	0.021	0.037

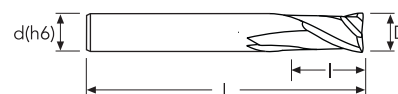
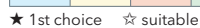
< D3 mm: ap = 0.5D

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

cylindrical shank, 2 flutes



CSD TA



CARBIDE BURRS

CUTTING PARAMETERS

INFO

G2CS2

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
	Vc (m/min)	80÷100	50÷70	30÷50	100÷120
	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 ²	600÷1000 N/mm ²	≤35 HRC	
	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)	80÷100	50÷70	30÷50	100÷120
	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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	D x D	D x D	D x D	D x D
	Vc (m/min)	70÷90	40÷60	25÷35	80÷100
	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

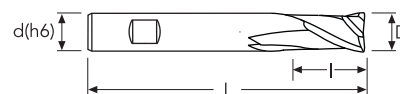
< D3 mm: ap = 0.5D

HSS
END-MILLSCARBIDE
BURRS

weldon shank, 2 flutes



DRILLING



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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
	Vc (m/min)	80÷100	50÷70	30÷50	100÷120
	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
DRILLSPU-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 ²	600÷1000 N/mm ²	≤35 HRC	
	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)	80÷100	50÷70	30÷50	100÷120
	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
DRILLSLFTA
SUTA
HSS-HSS/COCARBIDE
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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	D x D	D x D	D x D	D x D
	Vc (m/min)	70÷90	40÷60	25÷35	80÷100
	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-MILLSCARBIDE
BURRS

cylindrical shank, 2 flutes, long

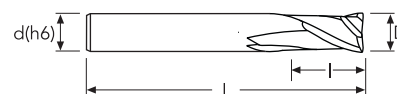


G2210



G2211-G2212

★ 1st choice ☆ suitable



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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
	Vc (m/min)	70÷90	45÷65	30÷50	80÷120
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	2	0.007	0.006	0.005	0.009
	3	0.010	0.009	0.008	0.013
	4	0.014	0.012	0.011	0.018
	5	0.018	0.015	0.014	0.023
	6	0.023	0.019	0.017	0.029
	8	0.030	0.026	0.023	0.039
	10	0.035	0.030	0.026	0.046
	12	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 ²	600÷1000 N/mm ²	≤35 HRC	
	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)	70÷90	45÷65	30÷50	80÷120
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	2	0.008	0.007	0.006	0.011
	3	0.012	0.010	0.009	0.016
	4	0.017	0.014	0.013	0.022
	5	0.022	0.018	0.016	0.028
	6	0.027	0.023	0.020	0.035
	8	0.036	0.031	0.027	0.047
	10	0.042	0.036	0.032	0.055
	12	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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	D x D	D x D	D x D	D x D
	Vc (m/min)	60÷80	40÷60	25÷35	70÷100
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	2	0.004	0.004	0.003	0.005
	3	0.006	0.005	0.005	0.008
	4	0.008	0.007	0.006	0.011
	5	0.011	0.009	0.008	0.014
	6	0.014	0.011	0.010	0.018
	8	0.018	0.015	0.014	0.023
	10	0.021	0.018	0.016	0.027
	12	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-MILLSCARBIDE
BURRS

INFO

CUTTING PARAMETERS

G2212



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	0.3D x D	0.3D x D	0.3D x D	0.3D x D
Vc (m/min)	55÷75	40÷60	20÷40	70÷90
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
8	0.026	0.022	0.020	0.034
10	0.032	0.027	0.024	0.042
12	0.036	0.031	0.027	0.047
14	0.042	0.036	0.032	0.055
16	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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D
Vc (m/min)	55÷75	40÷60	20÷40	70÷90
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
8	0.031	0.027	0.023	0.041
10	0.038	0.033	0.029	0.050
12	0.043	0.037	0.032	0.056
14	0.050	0.043	0.038	0.066
16	0.058	0.049	0.043	0.075



Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	D x D	D x D	D x D	D x D
Vc (m/min)	50÷70	35÷55	20÷30	60÷80
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
8	0.016	0.013	0.012	0.020
10	0.019	0.016	0.014	0.025
12	0.022	0.018	0.016	0.028
14	0.025	0.021	0.019	0.033
16	0.029	0.024	0.022	0.037

CARBIDE
DRILLSPU-HPU
TA-4HTA
SUH
ALH
HRC
SUH MINI
HL
HSD
C-SD-TAHSS
DRILLSLFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLS

G2

MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

cylindrical shank, 3 flutes



N

MG
BR

**<45
HRC**

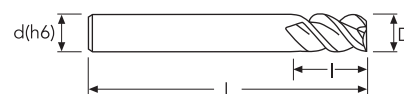


73

INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE
BURRS

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

GB305

CARBIDE
DRILLS
 PU-HPU
 TA-4HTA
 SUH
 ALH
 HRC
 SUH MINI
 HL
 HSD
 C-S-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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
Vc (m/min)	50÷60	30÷50	20÷40	70÷90
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	0.004	0.008
3	0.009	0.007	0.006	0.011
4	0.012	0.010	0.009	0.016
5	0.015	0.013	0.012	0.020
6	0.020	0.017	0.015	0.026
8	0.026	0.022	0.019	0.033
10	0.032	0.028	0.024	0.042
12	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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D
Vc (m/min)	50÷70	40÷60	20÷40	80÷100
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.004	0.003	0.003	0.005
2	0.007	0.006	0.005	0.009
3	0.010	0.009	0.008	0.013
4	0.014	0.012	0.011	0.019
5	0.018	0.016	0.014	0.024
6	0.024	0.020	0.018	0.031
8	0.031	0.026	0.023	0.040
10	0.039	0.033	0.029	0.051
12	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-MILLSCARBIDE
BURRS

cylindrical shank, 3 flutes



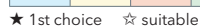
N

MG
PV20

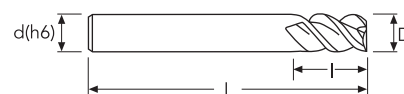
**<45
HRC**



INFO



SIDE MILLING



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

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
Vc (m/min)	80÷100	50÷70	30÷50	80÷120
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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D
Vc (m/min)	90÷110	60÷80	40÷60	110÷130
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-MILLSCARBIDE
BURRS

weldon shank, 3 flutes



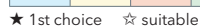
N

MG
PV20

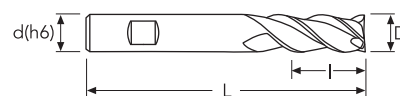
**<45
HRC**



INFO



L
SIDE MILLING



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

LFTA
SUTA
HSS-HSS/CO

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

G2WSH3

CARBIDE
DRILLSPU-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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
Vc (m/min)	80÷100	50÷70	30÷50	80÷120
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
DRILLSLFTA
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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D
Vc (m/min)	90÷110	60÷80	40÷60	110÷130
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

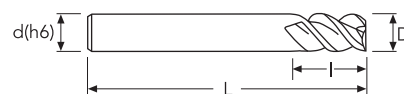
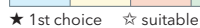
< D3 mm: ae = 0.1D

CARBIDE
END-MILLS

G2

MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

cylindrical shank, 3 flutes, long

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
Vc (m/min)	60÷80	35÷55	25÷35	80÷100
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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D
Vc (m/min)	70÷90	45÷65	30÷50	80÷120
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

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D
Vc (m/min)	55÷75	40÷60	20÷40	70÷90
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-MILLSCARBIDE
BURRS

cylindrical shank, 4 flutes



N

MG
BR

**<45
HRC**



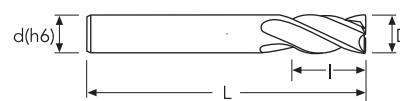
SQUARE



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	1.5D x 0.2D	1.5D x 0.2D	1.5D x 0.2D	1.5D x 0.2D
Vc (m/min)	50÷70	40÷50	20÷40	80÷100
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	0.006	0.005	0.008
3	0.010	0.008	0.007	0.013
4	0.013	0.011	0.010	0.017
5	0.016	0.014	0.012	0.021
6	0.020	0.017	0.015	0.026
8	0.026	0.022	0.019	0.034
10	0.031	0.026	0.023	0.040
12	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-MILLSCARBIDE
BURRS

G2CS4

cylindrical shank, 4 flutes

OSAWA
NORM

N

MG
PV200<45
HRC

30°

SQUARE

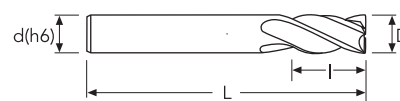
Z4

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)	I	I1	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-MILLSCARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	1.5D x 0.2D	1.5D x 0.2D	1.5D x 0.2D	1.5D x 0.2D
Vc (m/min)	80÷100	50÷70	30÷50	100÷120
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.004	0.003	0.003	0.005
2	0.007	0.006	0.005	0.009
3	0.010	0.009	0.008	0.013
4	0.013	0.011	0.010	0.017
5	0.016	0.014	0.012	0.021
6	0.019	0.016	0.014	0.025
8	0.025	0.021	0.019	0.033
10	0.032	0.027	0.024	0.042
12	0.040	0.034	0.030	0.052
14	0.047	0.040	0.035	0.061
16	0.054	0.046	0.041	0.070
18	0.060	0.051	0.045	0.078
20	0.065	0.055	0.049	0.085
22	0.073	0.062	0.055	0.095
25	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-MILLSCARBIDE
BURRS

weldon shank, 4 flutes



N

MG
PV20

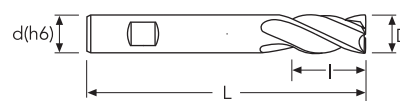
**<45
HRC**



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	1.5D x 0.2D	1.5D x 0.2D	1.5D x 0.2D	1.5D x 0.2D
	Vc (m/min)	80÷100	50÷70	30÷50	100÷120
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.010	0.009	0.008	0.013
	4	0.013	0.011	0.010	0.017
	5	0.016	0.014	0.012	0.021
	6	0.019	0.016	0.014	0.025
	8	0.025	0.021	0.019	0.033
	10	0.032	0.027	0.024	0.042
	12	0.040	0.034	0.030	0.052
	14	0.047	0.040	0.035	0.061
	16	0.054	0.046	0.041	0.070
	18	0.060	0.051	0.045	0.078
	20	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

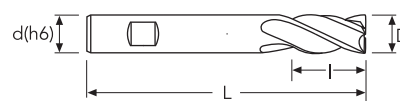
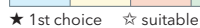
CARBIDE
END-MILLS

G2

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

HSS
END-MILLSCARBIDE
BURRS

cylindrical shank, 4 flutes, long



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

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
	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)	70÷90	45÷65	30÷50	80÷120
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	2	0.006	0.005	0.005	0.008
	3	0.009	0.008	0.007	0.012
	4	0.012	0.010	0.009	0.015
	5	0.014	0.012	0.011	0.019
	6	0.017	0.015	0.013	0.022
	8	0.023	0.019	0.017	0.029
	10	0.029	0.024	0.022	0.037
	12	0.036	0.031	0.027	0.047

< 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 ²	600÷1000 N/mm ²	≤35 HRC	
	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)	55÷75	40÷60	20÷40	70÷90
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	8	0.020	0.017	0.015	0.026
	10	0.026	0.022	0.019	0.033
	12	0.032	0.027	0.024	0.042
	14	0.038	0.032	0.028	0.049
	16	0.043	0.037	0.032	0.056
	20	0.065	0.055	0.049	0.085

CARBIDE
DRILLSPU-HPU
TA-4HTA
SUH
ALH
HRC
SUH MINI
HL
HSD
C-SD-TAHSS
DRILLSLFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLS

G2

MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

cylindrical shank, multi flute



N

MG
PV20

**<45
HRC**



SQUARE

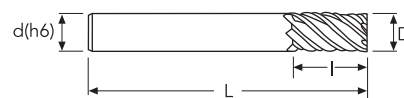


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INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE
BURRS

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

G2CSHM

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	
	Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	1.5D x 0.1D	1.5D x 0.1D	1.5D x 0.1D	
	Vc (m/min)	100÷120	70÷90	50÷70	
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
	6	0.016	0.014	0.012	
	8	0.020	0.017	0.015	
	10	0.025	0.021	0.019	
	12	0.030	0.026	0.023	
	14	0.035	0.030	0.026	
	16	0.040	0.034	0.030	
	20	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

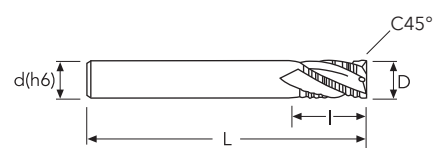
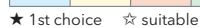
MDTA
 HF VH/UP
 MEF
 ALU
 MEX/MH
 UH/MH

HSS
END-MILLSCARBIDE
BURRS

cylindrical shank, roughing HR



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D	
Vc (m/min)	70÷90	50÷70	30÷50	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
6	0.030	0.026	0.023	
8	0.045	0.038	0.034	
10	0.060	0.051	0.045	
12	0.072	0.061	0.054	
14	0.085	0.072	0.064	
16	0.096	0.082	0.072	
20	0.120	0.102	0.090	

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

G2

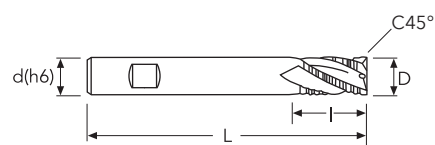
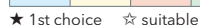
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLSCARBIDE
BURRS

weldon shank, roughing HR



| INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

[illegible]

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D	
Vc (m/min)	70÷90	50÷70	30÷50	
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
6	0.030	0.026	0.023	
8	0.045	0.038	0.034	
10	0.060	0.051	0.045	
12	0.072	0.061	0.054	
14	0.085	0.072	0.064	
16	0.096	0.082	0.072	
20	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-MILLSCARBIDE
BURRS

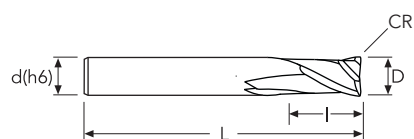
cylindrical shank, 2 flutes, corner radius



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
Vc (m/min)	80÷100	50÷70	30÷50	100÷120
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 ²	600÷1000 N/mm ²	≤35 HRC	
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)	80÷100	50÷70	30÷50	100÷120
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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	D x D	D x D	D x D	D x D
Vc (m/min)	70÷90	40÷60	25÷35	80÷100
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°

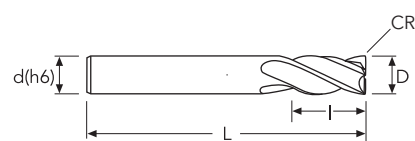
RADIUS

Z4

INFO

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
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

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	●

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	1.5D x 0.2D	1.5D x 0.2D	1.5D x 0.2D	1.5D x 0.2D
Vc (m/min)	80÷100	50÷70	30÷50	100÷120
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.004	0.003	0.003	0.005
2	0.007	0.006	0.005	0.009
3	0.010	0.009	0.008	0.013
4	0.013	0.011	0.010	0.017
5	0.016	0.014	0.012	0.021
6	0.019	0.016	0.014	0.025
8	0.025	0.021	0.019	0.033
10	0.032	0.027	0.024	0.042
12	0.040	0.034	0.030	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-MILLSCARBIDE
BURRS

cylindrical shank, 4 flutes, long, corner radius



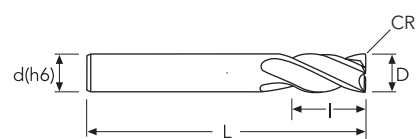
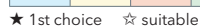
N

MG
PV20

**<45
HRC**



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae	1.5D x 0.2D	1.5D x 0.2D	1.5D x 0.2D	1.5D x 0.2D
Vc (m/min)	55÷75	40÷60	20÷40	70÷90
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.004	0.003	0.003	0.004
2	0.006	0.005	0.005	0.007
3	0.009	0.008	0.007	0.010
4	0.012	0.010	0.009	0.013
5	0.015	0.013	0.011	0.017
6	0.017	0.014	0.013	0.019
8	0.023	0.020	0.017	0.030
10	0.029	0.025	0.022	0.038
12	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-MILLSCARBIDE
BURRS

cylindrical shank, 2 flutes ball nose



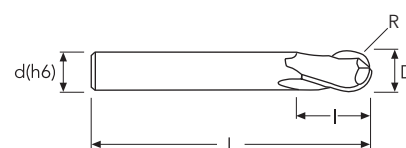
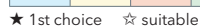
N

MG
BR

**<45
HRC**



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae		0.1D x 0.1D	0.1D x 0.1D	0.1D x 0.1D	0.1D x 0.1D
Vc (m/min)		50÷70	35÷55	20÷40	80÷120
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.60	0.030	0.023	0.021	0.036
2	1.20	0.040	0.030	0.028	0.048
3	1.80	0.050	0.038	0.035	0.060
4	2.40	0.060	0.045	0.042	0.072
5	3.00	0.070	0.053	0.049	0.084
6	3.60	0.080	0.060	0.056	0.096
8	4.80	0.090	0.068	0.063	0.108
10	6.00	0.105	0.079	0.074	0.126
12	7.20	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-MILLSCARBIDE
BURRS

cylindrical shank, 2 flutes ball nose



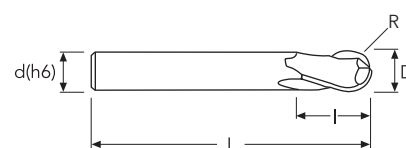
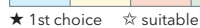
N

MG
PV20

**<45
HRC**



INFO



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

CUTTING PARAMETERS

G2CSB2

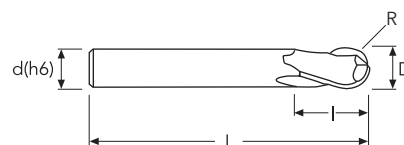
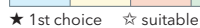
Material Group ISO 513		P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm		≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae		0.1D x 0.1D	0.1D x 0.1D	0.1D x 0.1D	0.1D x 0.1D
Vc (m/min)		80÷100	60÷80	40÷60	110÷130
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.60	0.030	0.023	0.021	0.036
2	1.20	0.040	0.030	0.028	0.048
3	1.80	0.050	0.038	0.035	0.060
4	2.40	0.060	0.045	0.042	0.072
5	3.00	0.070	0.053	0.049	0.084
6	3.60	0.080	0.060	0.056	0.096
8	4.80	0.090	0.068	0.063	0.108
10	6.00	0.105	0.079	0.074	0.126
12	7.20	0.120	0.090	0.084	0.144
16	9.60	0.150	0.113	0.105	0.180
20	12.00	0.180	0.135	0.126	0.216

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

cylindrical shank, 2 flutes ball nose, long

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

G2250

CARBIDE
DRILLS

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

COPYING

Material Group ISO 513		P1P2K1	P3P4P7M1K2	P5M2K3	N1N2N3N4
Hardness/Rm		≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae		0.1D x 0.1D	0.1D x 0.1D	0.1D x 0.1D	0.1D x 0.1D
Vc (m/min)		70÷90	50÷70	40÷50	100÷120
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.60	0.027	0.020	0.019	0.032
2	1.20	0.036	0.027	0.025	0.043
3	1.80	0.045	0.034	0.032	0.054
4	2.40	0.054	0.041	0.038	0.065
5	3.00	0.063	0.047	0.044	0.076
6	3.60	0.072	0.054	0.050	0.086
8	4.80	0.081	0.061	0.057	0.097
10	6.00	0.095	0.071	0.066	0.113
12	7.20	0.108	0.081	0.076	0.130

G2251

COPYING	Material Group ISO 513		P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm		≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae		0.1D x 0.1D	0.1D x 0.1D	0.1D x 0.1D	0.1D x 0.1D
	Vc (m/min)		60÷80	40÷60	35÷45	90÷110
	D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	3.60	0.058	0.044	0.041	0.070
	8	4.80	0.066	0.049	0.046	0.079
	10	6.00	0.077	0.057	0.054	0.092
	12	7.20	0.087	0.066	0.061	0.105
	16	9.60	0.122	0.092	0.085	0.146
20	12.00	0.146	0.110	0.102	0.175	

CARBIDE
END-MILLS

G2

 MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MH
HSS
END-MILLSCARBIDE
BURRS

cylindrical shank, 4 flutes ball nose



N

MG
PV20

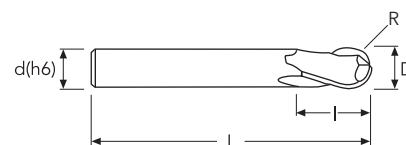
**<45
HRC**



INFO



★ 1st choice ☆ suitable



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

[illegible]

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae		0.1D x 0.3D	0.1D x 0.3D	0.1D x 0.3D	0.1D x 0.3D
Vc (m/min)		80÷100	60÷80	40÷60	110÷130
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.60	0.030	0.023	0.021	0.036
2	1.20	0.040	0.030	0.028	0.048
3	1.80	0.050	0.038	0.035	0.060
4	2.40	0.060	0.045	0.042	0.072
5	3.00	0.070	0.053	0.049	0.084
6	3.60	0.080	0.060	0.056	0.096
8	4.80	0.090	0.068	0.063	0.108
10	6.00	0.105	0.079	0.074	0.126
12	7.20	0.120	0.090	0.084	0.144
16	9.60	0.150	0.113	0.105	0.180
20	12.00	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-MILLSCARBIDE
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

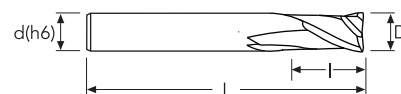
cylindrical shank, 2 flutes



C-SD-TA



★ 1st choice ☆ suitable

[illegible]

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
	Vc (m/min)	80÷100	50÷70	30÷50	100÷120
	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 ²	600÷1000 N/mm ²	≤35 HRC	
	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)	80÷100	50÷70	30÷50	100÷120
	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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	D x D	D x D	D x D	D x D
	Vc (m/min)	70÷90	40÷60	25÷35	80÷100
	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-MILLSCARBIDE
BURRS

MDTA210

**OSAWA
NORM**

N

MG
PV20

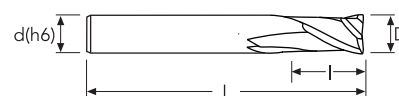
**<45
HRC**



C-SD-TA

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable

[illegible]

UH/MH

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
	Vc (m/min)	70÷90	45÷65	30÷40	70÷80
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.010	0.009	0.008	0.013
	4	0.014	0.012	0.011	0.018
	5	0.018	0.015	0.014	0.023
	6	0.023	0.019	0.017	0.029
	8	0.030	0.026	0.023	0.039
	10	0.035	0.030	0.026	0.046
	12	0.041	0.035	0.031	0.053

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 ²	600÷1000 N/mm ²	≤35 HRC	
	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)	70÷90	45÷65	30÷50	80÷120
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0,012	0,010	0,009	0,016
	4	0,017	0,014	0,013	0,022
	5	0,022	0,018	0,016	0,028
	6	0,027	0,023	0,020	0,035
	8	0,036	0,031	0,027	0,047
	10	0,042	0,036	0,032	0,055
	12	0,049	0,042	0,037	0,064

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 ²	600÷1000 N/mm ²	≤35 HRC	
	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)	60÷80	40÷60	25÷35	70÷100
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.006	0.005	0.005	0.008
	4	0.008	0.007	0.006	0.011
	5	0.011	0.009	0.008	0.014
	6	0.014	0.011	0.010	0.018
	8	0.018	0.015	0.014	0.023
	10	0.021	0.018	0.016	0.027
	12	0.025	0.021	0.018	0.032

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

MDCL2

OSAWA NORM	N	MG BR	<45 HRC	 30°	 SQUARE	 Z2

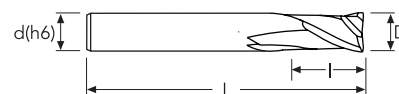
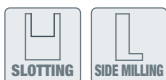


MDCL2 will be gradually replaced by GBL2 (see OSW23 UPDATE - september)

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



★ 1st choice ☆ suitable

[illegible]

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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	0.3D x D	0.3D x D	0.3D x D	0.3D x D
	Vc (m/min)	40÷50	25÷35	20÷30	60÷80
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.010	0.008	0.007	0.011
	4	0.013	0.011	0.010	0.014
	5	0.016	0.014	0.012	0.018
	6	0.020	0.017	0.015	0.022
	8	0.026	0.022	0.019	0.033
	10	0.030	0.026	0.023	0.040
	12	0.036	0.031	0.027	0.047

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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D
	Vc (m/min)	45÷55	30÷40	25÷35	70÷90
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.012	0.010	0.009	0.013
	4	0.015	0.013	0.012	0.017
	5	0.019	0.016	0.014	0.021
	6	0.024	0.020	0.018	0.027
	8	0.031	0.026	0.023	0.040
	10	0.036	0.031	0.027	0.047
	12	0.043	0.037	0.032	0.056

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

cylindrical shank, 3 flutes



C-SD-TA

★ 1st choice ☆ suitable



● 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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
	Vc (m/min)	80÷100	50÷70	30÷50	100÷120
	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

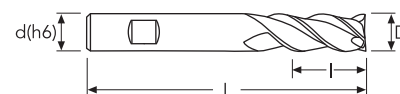
< D3 mm: ap = 0.2D

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
	Vc (m/min)	80÷100	50÷70	30÷50	100÷120
	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
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

weldon shank, 3 flutes



● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

MDTAWSH3

	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
	Vc (m/min)	80÷100	50÷70	30÷50	80÷120
	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

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

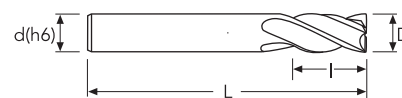
	Material Group ISO 513	P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
	Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D
	Vc (m/min)	90÷110	60÷80	40÷60	110÷130
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.011	0.010	0.008	0.015
	4	0.015	0.013	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

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

cylindrical shank, 4 flutes



SIDE MILLING



CARBIDE BURRS

CUTTING PARAMETERS

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	1.5D x 0.2D	1.5D x 0.2D	1.5D x 0.2D	0.5D x D
	Vc (m/min)	80÷100	50÷70	30÷50	100÷120
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.004	0.003	0.003	0.005
	2	0.007	0.006	0.005	0.009
	3	0.010	0.009	0.008	0.013
	4	0.013	0.011	0.010	0.017
	5	0.016	0.014	0.012	0.021
	6	0.019	0.016	0.014	0.025
	8	0.025	0.021	0.019	0.033
	10	0.032	0.027	0.024	0.042
	12	0.040	0.034	0.030	0.052
	14	0.047	0.040	0.035	0.061
	16	0.054	0.046	0.041	0.070
	18	0.060	0.051	0.045	0.078
	20	0.065	0.055	0.049	0.085
	22	0.073	0.062	0.055	0.095
	25	0.083	0.071	0.062	0.108

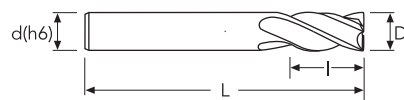
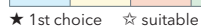
< D3 mm: ae = 0.1D

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-MILLSCARBIDE
BURRS

cylindrical shank, 4 flutes, long



CSD TA

UH/MH

● stock standard ○ non-standard stock ▽ stock exhaustion

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 ²	600÷1000 N/mm ²	≤35 HRC	
	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)	70÷90	45÷65	30÷50	80÷120
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	2	0.006	0.005	0.005	0.008
	3	0.009	0.008	0.007	0.012
	4	0.012	0.010	0.009	0.015
	5	0.014	0.012	0.011	0.019
	6	0.017	0.015	0.013	0.022
	8	0.023	0.019	0.017	0.029
	10	0.029	0.024	0.022	0.037
	12	0.036	0.031	0.027	0.047
	14	0.042	0.036	0.032	0.065
	16	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

MDCL4

**OSAWA
NORM**

N

MG
BR

**<45
HRC**



CARBIDE DRILLS

PU-HPU
TA-4HTA

ALH

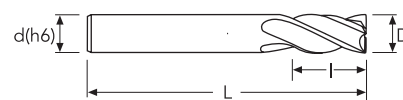
MINI

SUH MINI

H

HSD

C-SD-TA

[illegible]

CARBIDE END-MILLS

G2

MDTA

HF VH/UP

MEF

All

MEX/MH

UH/MH

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

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 ²	600÷1000 N/mm ²	≤35 HRC	
	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)	45+55	30+40	25+35	70+90
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.008	0.007	0.006	0.009
	4	0.010	0.009	0.008	0.011
	5	0.013	0.011	0.010	0.014
	6	0.015	0.013	0.011	0.017
	8	0.020	0.017	0.015	0.026
	10	0.026	0.022	0.019	0.033
	12	0.032	0.027	0.024	0.042
	14	0.038	0.032	0.028	0.049
	16	0.043	0.037	0.032	0.056
	20	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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	0.5D x D	0.5D x D	1.5D x 0.1D	
	Vc (m/min)	80÷100	50÷70	30÷50	
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
	6	0.030	0.026	0.023	
	8	0.045	0.038	0.034	
	10	0.055	0.047	0.041	
	12	0.065	0.055	0.049	
	14	0.075	0.064	0.056	
	16	0.085	0.072	0.064	
	20	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 ²	600÷1000 N/mm ²	≤35 HRC	
	ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D	
	Vc (m/min)	80÷100	50÷70	30÷50	
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
	6	0.040	0.034	0.030	
	8	0.055	0.047	0.041	
	10	0.065	0.055	0.049	
	12	0.080	0.068	0.060	
	14	0.090	0.077	0.068	
	16	0.100	0.085	0.075	
	20	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-MILLSCARBIDE
BURRS

cylindrical shank, 2 flutes ball nose



N

MG
PV20

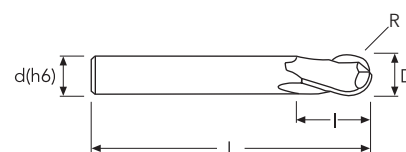
**<45
HRC**



C-SD-1A

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable

G2

MDTA

HF VH/UP

MFF

ALL

MEY/MH

LUL/MU

HSS

END-MILLS

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae		0.1D x 0.1D	0.1D x 0.1D	0.1D x 0.1D	0.1D x 0.1D
Vc (m/min)		80÷100	60÷80	40÷60	110÷130
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.60	0.030	0.023	0.021	0.036
2	1.20	0.040	0.030	0.028	0.048
3	1.80	0.050	0.038	0.035	0.060
4	2.40	0.060	0.045	0.042	0.072
5	3.00	0.070	0.053	0.049	0.084
6	3.60	0.080	0.060	0.056	0.096
8	4.80	0.090	0.068	0.063	0.108
10	6.00	0.105	0.079	0.074	0.126
12	7.20	0.120	0.090	0.084	0.144

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

cylindrical shank, 2 flutes ball nose, long



CUTTING PARAMETERS

INFO

MDTA250

Material Group ISO 513		P1 P2 K1	P3 P4 P7 M1 K2	P5 M2 K3	N1 N2 N3 N4
Hardness/Rm		≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	
ap x ae		0.1D x 0.1D	0.1D x 0.1D	0.1D x 0.1D	0.1D x 0.1D
Vc (m/min)		70÷90	50÷70	40÷50	100÷120
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.60	0.027	0.020	0.019	0.032
2	1.20	0.036	0.027	0.025	0.043
3	1.80	0.045	0.034	0.032	0.054
4	2.40	0.054	0.041	0.038	0.065
5	3.00	0.063	0.047	0.044	0.076
6	3.60	0.072	0.054	0.050	0.086
8	4.80	0.081	0.061	0.057	0.097
10	6.00	0.095	0.071	0.066	0.113
12	7.20	0.108	0.081	0.076	0.130

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

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

HF VH/UP

UNIVERSAL PURPOSE

INFO

CARBIDE
DRILLS

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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

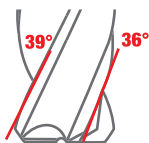
CARBIDE
END-MILLS

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

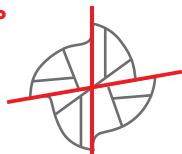
HSS
END-MILLS

CARBIDE
BURRS

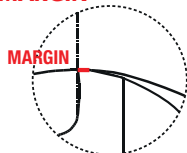
(1) VH



(2) UP



(3) MARGIN



ISO P

ISO M

ISO K

ISO S

ISO H



SLOTING



SIDE MILLING



HELICAL



RAMPING



VERTICAL



DRILLING



TROCHOIDAL

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), нержавеющая сталь (ISO M), чугун (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

INFO

HF840

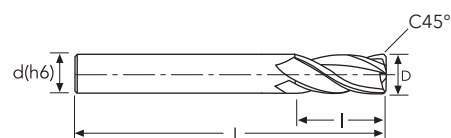
cylindrical shank, 45° chamfer

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.	C45°	C45° Tol.	d(h6)	l	l1	L	z	EDP No.	Stock
3	0/-0.020	0.10	+/-0.020	6	9		57	4	HF840030	●
4	0/-0.020	0.10	+/-0.020	6	11		57	4	HF840040	●
5	0/-0.020	0.10	+/-0.020	6	13		57	4	HF840050	●
6	0/-0.020	0.10	+/-0.020	6	13		57	4	HF840060	●
8	0/-0.020	0.20	+/-0.020	8	20		64	4	HF840080	●
10	0/-0.020	0.20	+/-0.020	10	22		72	4	HF840100	●
12	0/-0.020	0.20	+/-0.020	12	26		83	4	HF840120	●
14	0/-0.020	0.30	+/-0.020	14	26		83	4	HF840140	●
16	0/-0.020	0.30	+/-0.020	16	32		92	4	HF840160	●
18	0/-0.020	0.30	+/-0.020	18	32		92	4	HF840180	●
20	0/-0.020	0.40	+/-0.020	20	38		104	4	HF840200	●

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

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	D x D	D x D	0.5D x D	0.5D x D
	Vc (m/min)	130÷150	70÷90	50÷70	30÷50
	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	0.5D x D	0.25D x D	0.25D x D

CARBIDE
DRILLSPU-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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.2D x 0.3D	1.2D x 0.3D
	Vc (m/min)	160÷180	100÷120	70÷90	40÷60
	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	1.5D x 0.25D	1.2D x 0.1D	1.2D x 0.1D

HSS
DRILLSLFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLSG2
MDTA
HFVH/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 ²	600÷1000 N/mm ²	≤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)	130÷150	80÷100	60÷80	30÷50
	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	2° x 0.4D	1° x 0.4D	1° x 0.4D

HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

CUTTING PARAMETERS

HF840

CARBIDE
DRILLSPU-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 ²	600÷1000 N/mm ²	≤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

HSS
DRILLSLFTA
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 ²	600÷1000 N/mm ²	≤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

CARBIDE
END-MILLSG2
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 ²	600÷1000 N/mm ²	≤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

HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	2D x 0.2D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
	Vc (m/min)	190÷230	130÷150	100÷120	50÷70
	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		

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-MILLSCARBIDE
BURRS

NOTES:

Down milling CNC programming is required.

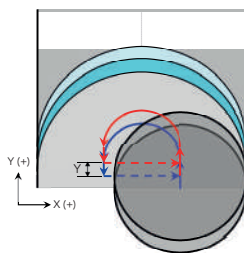
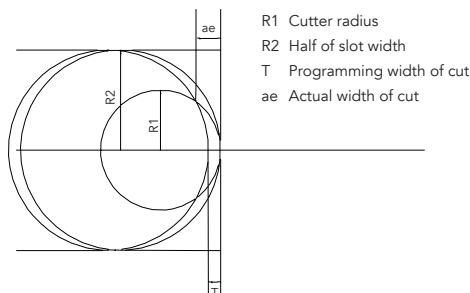
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



HF440

**OSAWA
NORM**

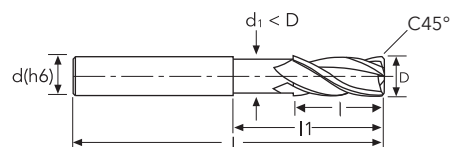
MG
PV300

**<40
HRC**



P	M	K	N	S	H
★	★	★		★	

★ 1st choice ☆ suitable

[illegible]

UH/MH

● stock standard ○ non-standard stock ▽ stock exhaustion

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	D x D	D x D	0.5D x D	0.5D x D
	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	0.013	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 ²	600÷1000 N/mm ²		
	ap x ae	1.5D x D	1.5D x D		
	Vc (m/min)	85÷105	55÷75		
	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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.2D x 0.3D	1.2D x 0.3D
	Vc (m/min)	130÷150	90÷110	60÷80	40÷60
	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-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

CUTTING PARAMETERS

HF440

CARBIDE
DRILLSPU-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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
α° x ae	5° x 0.4D	5° 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	1° x 0.4D	1° x 0.4D

HSS
DRILLSLFTA
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 ²	600÷1000 N/mm ²	≤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

CARBIDE
END-MILLSG2
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 ²	600÷1000 N/mm ²		
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		

HSS
END-MILLS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

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 ²	600÷1000 N/mm ²	≤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)	100÷120	60÷80	45÷65	30÷40
	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

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	D x D	D x D	0.5D x D	0.5D x D
	Vc (m/min)	85÷105	55÷75	40÷60	20÷40
	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	0.5D x D	0.25D x D

HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
 HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	2D x 0.2D	2D x 0.2D	1.5D x 0.1D	1.5D x 0.1D
Vc (m/min)	160÷200	110÷130	80÷100	50÷70
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
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.

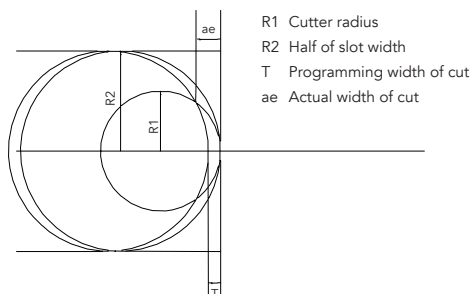
The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

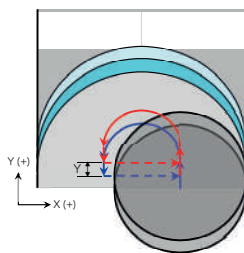
With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO



R1 Cutter radius
R2 Half of slot width
T Programming width of cut
ae Actual width of cut

CARBIDE
END-MILLS

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

HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

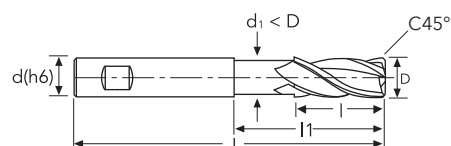
weldon shank and reduced neck, 45° chamfer



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	0.5D x D	0.5D x D
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	0.013	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
18	0.059	0.053	0.045	0.042
20	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 ²	600÷1000 N/mm ²		
ap x ae	1.5D x D	1.5D x D		
Vc (m/min)	85÷105	55÷75		
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		
18	0.048	0.043		
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			
Hardness/Rm	≤700 N/mm ²			
ap x ae	2D x D			
Vc (m/min)	60÷80			
D (mm)	fz (mm/z)			
10	0.023			
12	0.026			
14	0.029			
16	0.032			
18	0.036			
20	0.039			

HSS
END-MILLSCARBIDE
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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.2D x 0.3D	1.2D x 0.3D
	Vc (m/min)	130÷150	90÷110	60÷80	40÷60
	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

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 ²	600÷1000 N/mm ²	≤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
	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

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.

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤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
18	0.047	0.044	0.042	0.057
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 ²	600÷1000 N/mm ²		
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		
18	0.039	0.036		
20	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 ²			
α° x ae	45° x D			
Vc (m/min)	60÷80			
D (mm)	fz (mm/z)			
10	0.024			
12	0.028			
14	0.031			
16	0.035			
18	0.038			
20	0.042			

HSS
END-MILLSCARBIDE
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

 VERTICAL	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 ²	600÷1000 N/mm ²	≤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)	100÷120	60÷80	45÷65	30÷40
	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

 DRILLING	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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	D x D	D x D	0.5D x D	0.5D x D
	Vc (m/min)	85÷105	55÷75	40÷60	20÷40
	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
CARBIDE
END-MILLS
 G2
 MDTA
HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
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

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	2D x 0.2D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
Vc (m/min)	160÷200	110÷130	80÷100	50÷70
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.

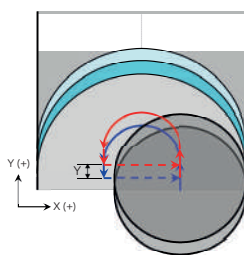
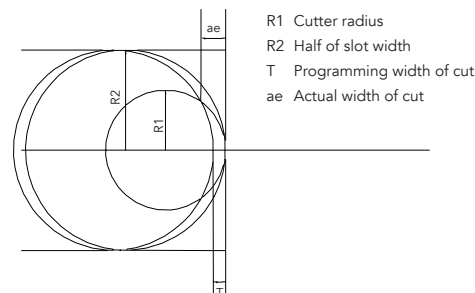
"ae" value max 0.2xD - "T" value max 0.1xD.

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.

LFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLS

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

HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF440 PARAMETERS.

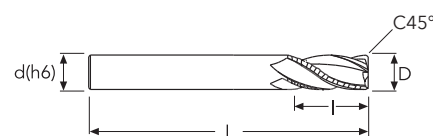
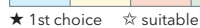
cylindrical shank, 45° chamfer, roughing HR

MG
PV300

**<40
HRC**



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	0.5D x D	0.5D x D
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)
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

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 ²	600÷1000 N/mm ²		
ap x ae	1.5D x D	1.5D x D		
Vc (m/min)	85÷105	55÷75		
D (mm)	fz (mm/z)	fz (mm/z)		
8	0.030	0.027		
10	0.036	0.033		
12	0.041	0.037		
14	0.047	0.042		
16	0.052	0.047		
20	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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.2D x 0.3D	1.2D x 0.3D
Vc (m/min)	130÷150	90÷110	60÷80	40÷60
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.035	0.031	0.028	0.038
8	0.045	0.041	0.036	0.050
10	0.054	0.049	0.044	0.060
12	0.062	0.056	0.050	0.068
14	0.070	0.063	0.056	0.077
16	0.078	0.070	0.062	0.086
20	0.095	0.085	0.076	0.104

HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	α° x ae	8° x 0.4D	6° x 0.4D	4° 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)
	6	0.020	0.019	0.016	0.016
	8	0.026	0.024	0.021	0.021
	10	0.031	0.029	0.026	0.025
	12	0.036	0.033	0.029	0.029
	14	0.040	0.037	0.033	0.033
	16	0.045	0.041	0.037	0.036
	20	0.055	0.050	0.045	0.044

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 ²	600÷1000 N/mm ²	≤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)
	8	0.030	0.028	0.026	0.036
	10	0.036	0.033	0.032	0.044
	12	0.041	0.038	0.036	0.050
	14	0.047	0.043	0.041	0.056
	16	0.052	0.048	0.045	0.062
	20	0.063	0.058	0.055	0.076

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 ²	600÷1000 N/mm ²		
	α° x ae	30° x D	15° x D		
	Vc (m/min)	85÷105	45÷65		
	D (mm)	fz (mm/z)	fz (mm/z)		
	10	0.030	0.027		
	12	0.034	0.031		
	14	0.038	0.035		
	16	0.042	0.039		
	20	0.051	0.047		

CARBIDE
END-MILLS
 G2
 MDTA
 HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤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)	100÷120	60÷80	45÷65	30÷40
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

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	2D x 0.2D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
Vc (m/min)	160÷200	110÷130	80÷100	50÷70
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.

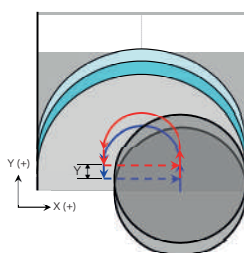
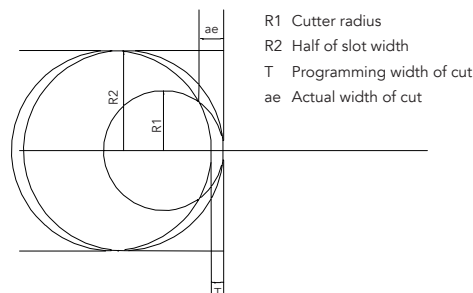
The cutting conditions are based on CNC programming with medium dynamic speed.

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

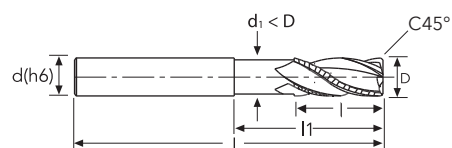
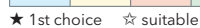
G2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLSCARBIDE
BURRS

cylindrical shank and reduced neck, 45° chamfer, roughing HR



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	0.5D x D	0.5D x D
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)
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

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 ²	600÷1000 N/mm ²		
ap x ae	1.5D x D	1.5D x D		
Vc (m/min)	85÷105	55÷75		
D (mm)	fz (mm/z)	fz (mm/z)		
8	0.027	0.024		
10	0.033	0.029		
12	0.037	0.034		
14	0.042	0.038		
16	0.047	0.042		
20	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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.2D x 0.3D	1.2D x 0.3D
Vc (m/min)	130÷150	90÷110	60÷80	40÷60
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

HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	α° x ae	7° x 0.4D	5° 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)
	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

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 ²	600÷1000 N/mm ²	≤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)
	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

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 ²	600÷1000 N/mm ²		
	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	0.027	0.024		
	12	0.030	0.028		
	14	0.034	0.031		
	16	0.038	0.035		
	20	0.046	0.042		

CARBIDE
END-MILLS
 G2
 MDTA
 HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤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)	100÷120	60÷80	45÷65	30÷40
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

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	2D x 0.2D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
Vc (m/min)	160÷200	110÷130	80÷100	50÷70
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

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.

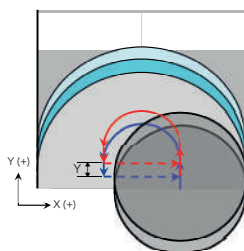
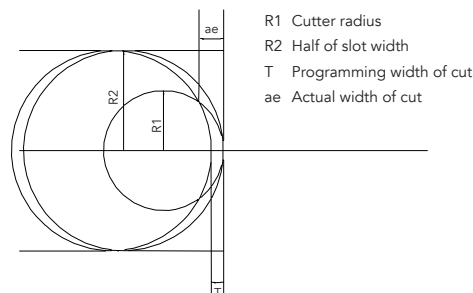
The cutting conditions are based on CNC programming with medium dynamic speed.

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

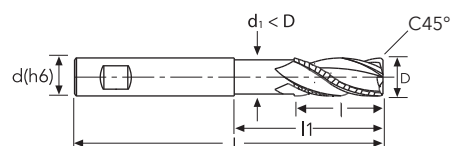
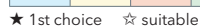
HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

weldon shank and reduced neck, 45° chamfer, roughing HR



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	0.5D x D	0.5D x D
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)
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		
Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²		
ap x ae	1.5D x D	1.5D x D		
Vc (m/min)	85÷105	55÷75		
D (mm)	fz (mm/z)	fz (mm/z)		
8	0.027	0.024		
10	0.033	0.029		
12	0.037	0.034		
14	0.042	0.038		
16	0.047	0.042		
20	0.057	0.051		



Material Group ISO 513	P1 P2 P7 K1			
Hardness/Rm	≤700 N/mm ²			
ap x ae	2D x D			
Vc (m/min)	60÷80			
D (mm)	fz (mm/z)			
10	0.024			
12	0.028			
14	0.031			
16	0.035			
20	0.043			

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

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

	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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.2D x 0.3D	1.2D x 0.3D
	Vc (m/min)	130÷150	90÷110	60÷80	40÷60
	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

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	α° x ae	7° x 0.4D	5° 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)
	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

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 ²	600÷1000 N/mm ²	≤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)
	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

CARBIDE
END-MILLS
 G2
 MDTA
 HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.
 FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF444 PARAMETERS.

INFO

CUTTING PARAMETERS

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		
Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²		
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	0.027	0.024		
12	0.030	0.028		
14	0.034	0.031		
16	0.038	0.035		
20	0.046	0.042		



Material Group ISO 513	P1 P2 P7 K1			
Hardness/Rm	≤700 N/mm ²			
α° x ae	45° x D			
Vc (m/min)	60÷80			
D (mm)	fz (mm/z)			
10	0.026			
12	0.030			
14	0.034			
16	0.038			
20	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 ²	600÷1000 N/mm ²	≤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)	100÷120	60÷80	45÷65	30÷40
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

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

	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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	2D x 0.2D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
	Vc (m/min)	160÷200	110÷130	80÷100	50÷70
	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

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

NOTES:

Down milling CNC programming is required.

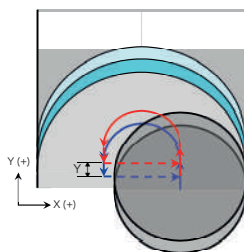
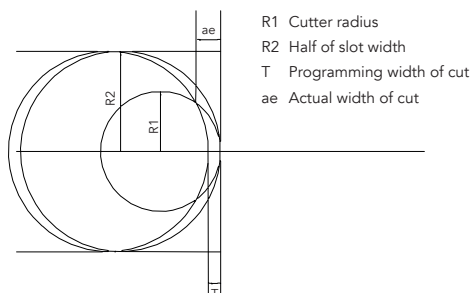
"ae" value max 0.2xD - "T" value max 0.1xD.

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.

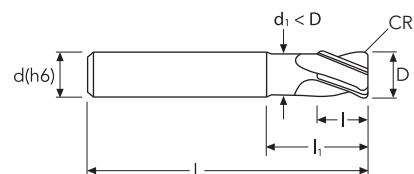
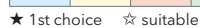
HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS
 PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.
 FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF444 PARAMETERS.

HF342

Diagram illustrating the corner radius (CR) of a drill bit. The CR is the radius of the rounded tip of the drill bit, which is shown in a cross-sectional view.



C-SD-1A



● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	D x D	D x D	0.5D x D	0.5D 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)
	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
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	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	D x D	D x D	0.5D x D	0.5D x D
	Vc (m/min)	160÷180	100÷120	70÷90	40÷60
	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
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 ²	600÷1000 N/mm ²	≤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)	130÷150	80÷100	60÷80	30÷50
	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
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-MILLSCARBIDE
BURRS

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
α° x ae	15° x D	10° x D	5° x D	5° x D
Vc (m/min)	120÷140	70÷90	55÷75	25÷45
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



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 ²	600÷1000 N/mm ²	≤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)	120÷140	70÷90	55÷75	25÷45
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



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 ²	600÷1000 N/mm ²	≤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
ap x ae	≤ D5	0.5D x D	0.25D x D	0.25D x D

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

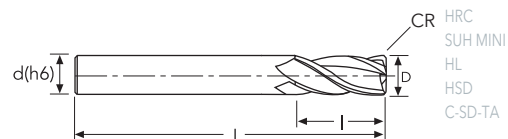
cylindrical shank, corner radius



INFO



★ 1st choice ☆ suitable



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

[illegible]

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	0.5D x D	0.5D x D
Vc (m/min)	130÷150	70÷90	50÷70	30÷50
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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	0.5D x D	0.5D x D
Vc (m/min)	160÷180	100÷120	70÷90	40÷60
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 ²	600÷1000 N/mm ²	≤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)	130÷150	80÷100	60÷80	30÷50
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

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 ²	600÷1000 N/mm ²	≤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 ²	600÷1000 N/mm ²	≤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 ²	600÷1000 N/mm ²	≤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

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	2D x 0.2D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
Vc (m/min)	190÷230	130÷150	100÷120	50÷70
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.

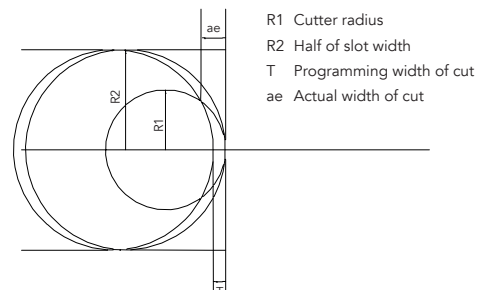
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

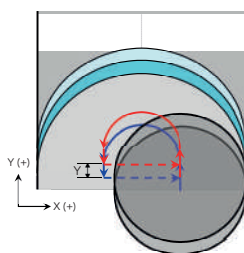
The cutting conditions are based on CNC programming with medium dynamic speed.

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.



R1 Cutter radius
 R2 Half of slot width
 T Programming width of cut
 ae Actual width of cut

LFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLS
 G2
 MDTA
HF VH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

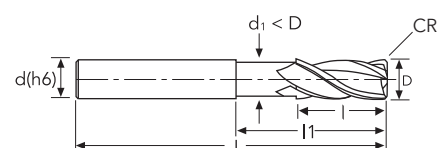
cylindrical shank and reduced neck, corner radius



INFO



★ 1st choice ☆ suitable



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

[illegible]

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	0.5D x D	0.5D x D
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	0.013	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	0.25D 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 ²	600÷1000 N/mm ²		
ap x ae	1.5D x D	1.5D x D		
Vc (m/min)	85÷105	55÷75		
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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	0.5D x D	0.5D x D
Vc (m/min)	130÷150	90÷140	60÷80	40÷60
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	1.2D x 0.1D	1.2D x 0.1D

HSS
END-MILLS

CARBIDE

BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

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 ²	600÷1000 N/mm ²	≤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 ²	600÷1000 N/mm ²	≤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 ²	600÷1000 N/mm ²		
	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-MILLSCARBIDE
BURRS

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤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)	100÷120	60÷80	45÷65	30÷40
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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	0.5D x D	0.5D x D
Vc (m/min)	85÷105	55÷75	40÷60	20÷40
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-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	2D x 0.2D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
	Vc (m/min)	160÷200	110÷130	80÷100	50÷70
	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
	20	0.164	0.148	0.131	0.181
ap x ae	≤ D5	1.5D x 0.1D	1.5D 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
HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH

HSS END-MILLS

CARBIDE BURRS

NOTES:

Down milling CNC programming is required.

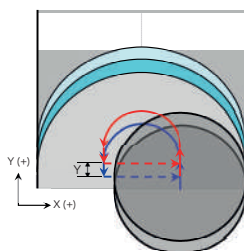
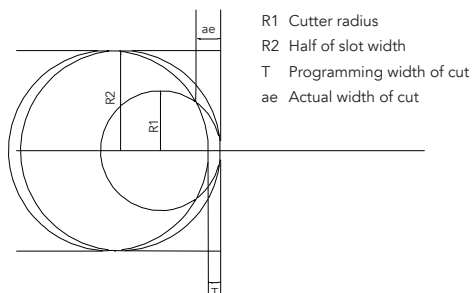
"ae" value max 0.2xD - "T" value max 0.1xD.

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.

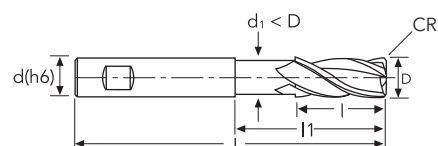
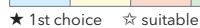
With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



weld on shank and reduced neck, corner radius



C-SD-1A



● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

HF443

	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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	D x D	D x D	0.5D x D	0.5D x D
	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	0.013	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
	18	0.059	0.053	0.045	0.042
	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 ²	600÷1000 N/mm ²		
	ap x ae	1.5D x D	1.5D x D		
	Vc (m/min)	85÷105	55÷75		
	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		
	18	0.048	0.043		
	20	0.053	0.047		

HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO

	Material Group ISO 513	P1 P2 P7 K1			
	Hardness/Rm	≤700 N/mm ²			
	ap x ae	2D x D			
	Vc (m/min)	60÷80			
	D (mm)	fz (mm/z)			
	10	0.023			
	12	0.026			
	14	0.029			
	16	0.032			
	18	0.036			
	20	0.039			

CARBIDE
END-MILLS
 G2
 MDTA
 HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
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

CUTTING PARAMETERS

HF443

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

SIDE MILLING	Material Group ISO 513	P1P2P7K1	P3P4M1K2K3	P5M2M3K4S1S4	S2S3S5
	Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.2D x 0.3D	1.2D x 0.3D
	Vc (m/min)	130÷150	90÷110	60÷80	40÷60
	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

HSS
DRILLSLFTA
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 ²	600÷1000 N/mm ²	≤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
	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

CARBIDE
END-MILLSG2
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 ²	600÷1000 N/mm ²	≤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
18	0.047	0.044	0.042	0.057
20	0.052	0.048	0.046	0.063

HSS
END-MILLSCARBIDE
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

	Material Group ISO 513	P1 P2 P7 K1	P3 P4 M1 K2 K3		
	Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²		
	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		
	18	0.039	0.036		
	20	0.043	0.039		

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

	Material Group ISO 513	P1 P2 P7 K1			
	Hardness/Rm	≤700 N/mm ²			
	α° x ae	45° x D			
	Vc (m/min)	60÷80			
	D (mm)	fz (mm/z)			
	10	0.024			
	12	0.028			
	14	0.031			
	16	0.035			
	18	0.038			
	20	0.042			

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 ²	600÷1000 N/mm ²	≤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)	100÷120	60÷80	45÷65	30÷40
	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
END-MILLS
 G2
 MDTA
 HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
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

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	D x D	D x D	0.5D x D	0.5D x D
Vc (m/min)	85÷105	55÷75	40÷60	20÷40
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	0.25D 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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	2D x 0.2D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
Vc (m/min)	160÷200	110÷130	80÷100	50÷70
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.

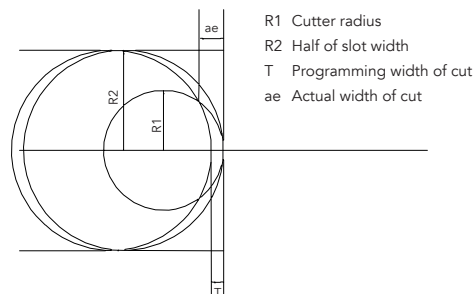
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

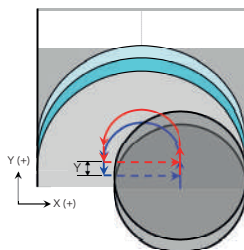
The cutting conditions are based on CNC programming with medium dynamic speed.

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.



R1 Cutter radius
 R2 Half of slot width
 T Programming width of cut
 ae Actual width of cut

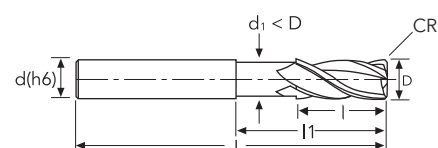
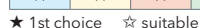
HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.
 FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF442 PARAMETERS.

cylindrical shank and reduced neck, long reach,
corner radius



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

HF542

CARBIDE
DRILLSPU-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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	0.5D x D	0.3D x D	0.2D x D	0.2D x D
Vc (m/min)	90÷110	60÷80	40÷60	20÷40
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

HSS
DRILLSLFTA
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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.2D x 0.2D	1.2D x 0.2D
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)
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

CARBIDE
END-MILLSG2
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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
α° x ae	4° x 0.4D	3° x 0.4D	3° x 0.4D	2° x 0.4D
Vc (m/min)	90÷110	60÷80	40÷60	20÷40
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

HSS
END-MILLSCARBIDE
BURRS

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
α° x ae	7° 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)
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

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

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 ²	600÷1000 N/mm ²	≤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	45÷55	20÷30
	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

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	D x D	D x D	0.5D x D	0.5D x D
	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)
	6	0.010	0.009	0.008	0.011
	8	0.013	0.011	0.010	0.014
	10	0.015	0.014	0.012	0.017
	12	0.017	0.016	0.014	0.019
	14	0.019	0.017	0.016	0.021
	16	0.022	0.019	0.017	0.024
	20	0.026	0.024	0.021	0.029

HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

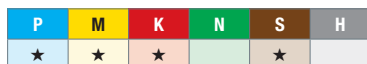
HF942



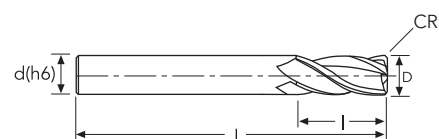
CR



C-SD-1A



SIDE MILLING

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.2D x 0.2D	1.2D x 0.2D
	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)
	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

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	α° x ae	4° x 0.4D	3° x 0.4D	3° x 0.4D	2° x 0.4D
	Vc (m/min)	90÷110	60÷80	40÷60	20÷40
	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

INFO

CUTTING PARAMETERS

HF942

CARBIDE
DRILLSPU-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 ²	600÷1000 N/mm ²	≤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
DRILLSLFTA
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 ²	600÷1000 N/mm ²	≤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-MILLSG2
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 ²	600÷1000 N/mm ²	≤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
ap x ae	≤ D5	0.5D x D	0.25D x D	0.25D x D

HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

HF942

 TROCHOIDAL	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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	2D x 0.1D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
	Vc (m/min)	140÷160	100÷120	70÷90	40÷60
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.034	0.031	0.027	0.037
	5	0.044	0.040	0.035	0.048
	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
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	1.2D x 0.05D	1.2D x 0.05D

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-MILLSCARBIDE
BURRS

NOTES:

Down milling CNC programming is required.

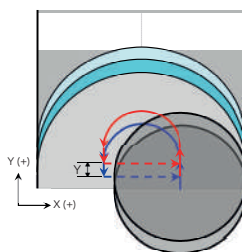
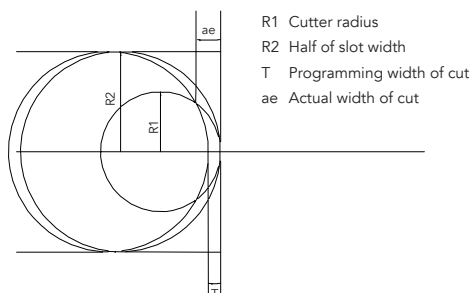
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



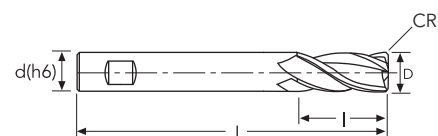
HF943



P	M	K	N	S	H
★	★	★		★	



SIDE MILLING

[illegible]

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.2D x 0.2D	1.2D x 0.2D
	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)
	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

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	α° x ae	4° x 0.4D	3° x 0.4D	3° x 0.4D	2° x 0.4D
	Vc (m/min)	90÷110	60÷80	40÷60	20÷40
	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 PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.
 FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF942 PARAMETERS.

INFO

CUTTING PARAMETERS

HF943

CARBIDE
DRILLSPU-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 ²	600÷1000 N/mm ²	≤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
DRILLSLFTA
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 ²	600÷1000 N/mm ²	≤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-MILLSG2
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 ²	600÷1000 N/mm ²	≤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
ap x ae	≤ D5	0.5D x D	0.25D x D	0.25D x D

HSS
END-MILLSCARBIDE
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

	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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	2D x 0.1D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
	Vc (m/min)	140÷160	100÷120	70÷90	40÷60
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.034	0.031	0.027	0.037
	5	0.044	0.040	0.035	0.048
	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
ap x ae	≤ D5	1.5D x 0.1D	1.5D x 0.1D	1.2D x 0.05D	1.2D x 0.05D

CARBIDE DRILLS

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

NOTES:

Down milling CNC programming is required.

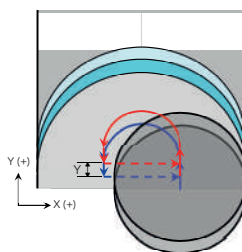
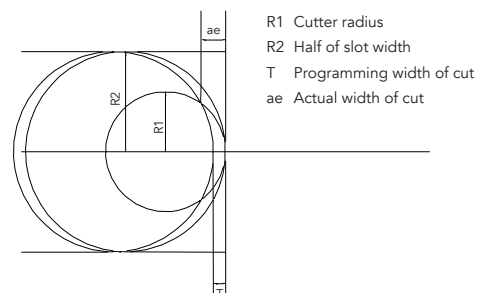
"ae" value max 0.2xD - "T" value max 0.1xD.

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
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.

HF642

**OSAWA
NORM**

MG
PV300

**<40
HRC**



36°/37°/38°



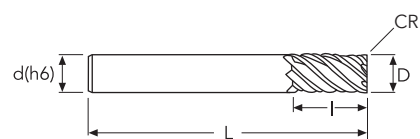
Z5



C-SD-1A

P	M	K	N	S	H
★	★	★		★	

★ 1st choice ☆ suitable



● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

HF642

	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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.2D x 0.3D	1.2D x 0.3D
	Vc (m/min)	160÷180	100÷120	70÷90	40÷60
	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
DRILLSPU-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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	α° x ae	5° x 0.4D	4° x 0.4D	3° x 0.4D	2° x 0.4D
	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)
	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
DRILLSLFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLSG2
MDTA
HFVH/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 ²	600÷1000 N/mm ²	≤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	0.018	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-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤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	0.023	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

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	2D x 0.2D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
Vc (m/min)	190÷230	130÷150	100÷120	50÷70
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	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.

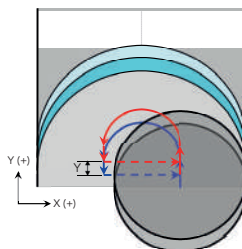
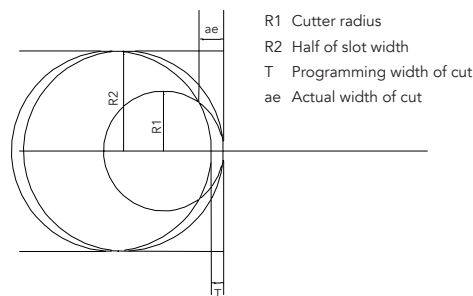
"ae" value max 0.2xD - "T" value max 0.1xD.

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.

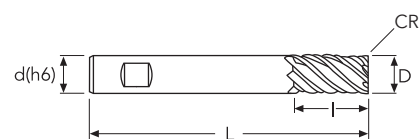
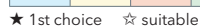
HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

weldon shank, 5 flutes ideal for trochoidal milling, corner radius



| INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

HF643

CARBIDE
DRILLSPU-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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.2D x 0.3D	1.2D x 0.3D
Vc (m/min)	160÷180	100÷120	70÷90	40÷60
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	1.2D x 0.2D	1.2D x 0.2D

HSS
DRILLSLFTA
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 ²	600÷1000 N/mm ²	≤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)	130÷150	80÷100	60÷80	30÷50
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-MILLSG2
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 ²	600÷1000 N/mm ²	≤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	0.018	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-MILLSCARBIDE
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

INFO

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 ²	600÷1000 N/mm ²	≤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	0.023	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

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	2D x 0.2D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
	Vc (m/min)	190÷230	130÷150	100÷120	50÷70
	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

HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO

NOTES:

Down milling CNC programming is required.

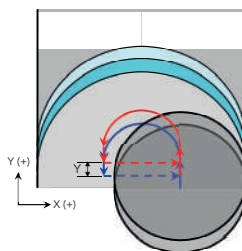
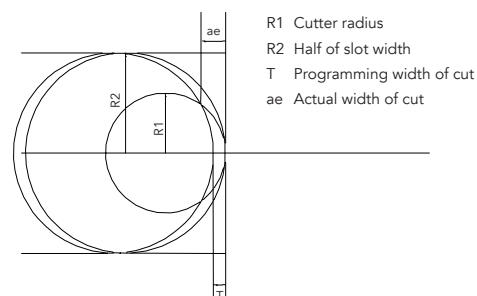
"ae" value max 0.2xD - "T" value max 0.1xD.

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
HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS
 PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.
 FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF642 PARAMETERS.

HF742

**OSAWA
NORM**

MG
PV300

**<40
HRC**



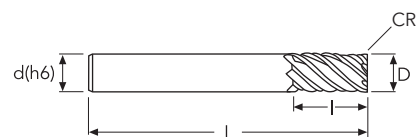
36°/37°/38°



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

P	M	K	N	S	H
★	★	★		★	

★ 1st choice ☆ suitable



● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.2D x 0.2D	1.2D x 0.2D
	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)
	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

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	α° x ae	4° x 0.4D	3° x 0.4D	3° x 0.4D	2° x 0.4D
	Vc (m/min)	90÷110	60÷80	40÷60	20÷40
	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

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	α° x ae	5° x D	4° 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)
	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

CARBIDE END-MILLS

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

HSS END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

INFO

HF742

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

VERTICAL	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 ²	600÷1000 N/mm ²	≤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)
	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

TROCHOIDAL	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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	3D x 0.1D	3D x 0.1D	2D x 0.1D	2D x 0.1D
	Vc (m/min)	130÷170	100÷120	70÷90	40÷60
	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

HSS
DRILLSLFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLSG2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

NOTES:

Down milling CNC programming is required.

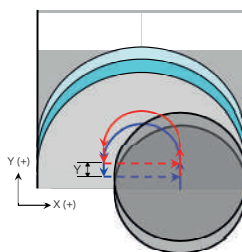
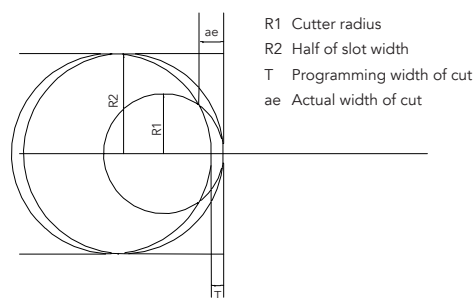
"ae" value max 0.2xD - "T" value max 0.1xD.

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.

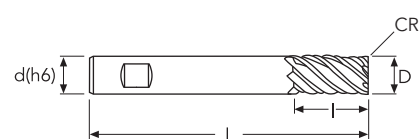
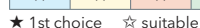
With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.



weldon shank, long 5 flutes ideal for trochoidal milling, corner radius



| INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.2D x 0.2D	1.2D x 0.2D
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)
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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
α° x ae	4° x 0.4D	3° x 0.4D	3° x 0.4D	2° x 0.4D
Vc (m/min)	90÷110	60÷80	40÷60	20÷40
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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
α° x ae	5° x D	4° 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)
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

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

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

INFO

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 ²	600÷1000 N/mm ²	≤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)
	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 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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	3D x 0.1D	3D x 0.1D	2D x 0.1D	2D x 0.1D
	Vc (m/min)	130÷170	100÷120	70÷90	40÷60
	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

HSS DRILLS

 LFTA
 SUTA
 HSS-HSS/CO

NOTES:

Down milling CNC programming is required.

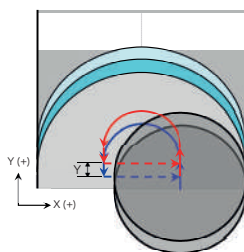
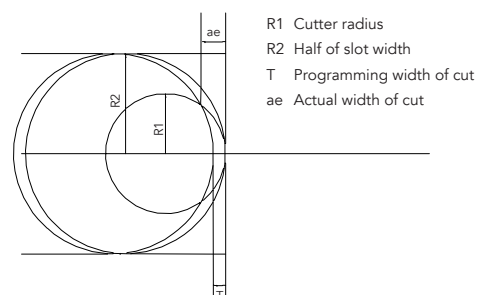
"ae" value max 0.2xD - "T" value max 0.1xD.

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.



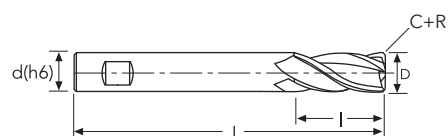
CARBIDE END-MILLS

 G2
 MDTA
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.



CARBIDE BURRS

CUTTING PARAMETERS

INFO

HF871

	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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
	ap x ae	D x D	D x D	0.5D x D	0.5D 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)
	1	0.005	0.005	0.004	0.004
	2	0.010	0.009	0.008	0.007
	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	D1	0.25D x D	0.25D x D	0.2D x D	0.2D x D
ap x ae	≤ D3	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 ²	600÷1000 N/mm ²		
	ap x ae	1.5D x D	1.5D x D		
	Vc (m/min)	100÷120	60÷80		
	D (mm)	fz (mm/z)	fz (mm/z)		
	8	0.028	0.025		
	10	0.034	0.030		
	12	0.038	0.035		
	14	0.043	0.039		
	16	0.048	0.043		
	18	0.053	0.048		
	20	0.058	0.053		

HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
 HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH

	Material Group ISO 513	P1 P2 P7 K1			
	Hardness/Rm	≤700 N/mm ²			
	ap x ae	2D x D			
	Vc (m/min)	75÷95			
	D (mm)	fz (mm/z)			
	10	0.025			
	12	0.029			
	14	0.032			
	16	0.036			
	18	0.040			
	20	0.044			

HSS
END-MILLSCARBIDE
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

CUTTING PARAMETERS

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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.2D x 0.3D	1.2D x 0.3D
Vc (m/min)	160÷180	100÷120	70÷90	40÷60
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	1.5D 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 ²	600÷1000 N/mm ²	≤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)	130÷150	80÷100	60÷80	30÷50
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-MILLSCARBIDE
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	P1 P2 P7 K1	P3 P4 M1 K2 K3	P5 M2 M3 K4 S1 S4	S2 S3 S5
	Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²	≤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		
	Hardness/Rm	≤700 N/mm ²	600÷1000 N/mm ²		
	α° x ae	30° x D	15° x D		
	Vc (m/min)	80÷100	60÷80		
	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		
	18	0.039	0.036		
	20	0.043	0.039		

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 ²	600÷1000 N/mm ²	≤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

CARBIDE
END-MILLS
 G2
 MDTA
 HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
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

CUTTING PARAMETERS

HF871

CARBIDE
DRILLSPU-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 ²	600÷1000 N/mm ²	≤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)
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
DRILLSLFTA
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 ²	600÷1000 N/mm ²	≤35 HRC	≤40 HRC
ap x ae	2D x 0.2D	2D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
Vc (m/min)	190÷230	130÷150	100÷120	50÷70
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	D1	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-MILLSG2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

NOTES:

Down milling CNC programming is required.

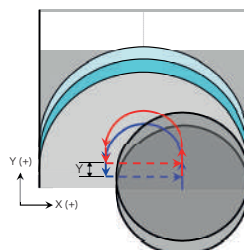
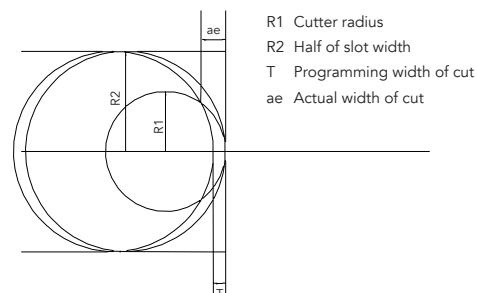
"ae" value max 0.2xD - "T" value max 0.1xD.

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.

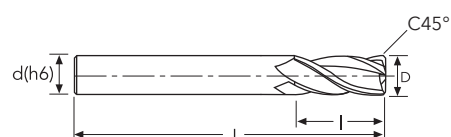
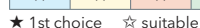


PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.
FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF840 PARAMETERS.

cylindrical shank, 45° chamfer



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	0.5D x D	0.5D x D	0.3D x D	0.2D 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)
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	0.2D 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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	1.5D x 0.3D	1.5D x 0.2D	1.2D x 0.2D	D x 0.1D
Vc (m/min)	100÷120	70÷90	50÷70	40÷60
D (mm)	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	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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
α° x ae	5° x 0.4D	4° x 0.4D	3° x 0.4D	2° x 0.4D
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)
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	1° x 0.4D	1° x 0.4D

HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

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 ²	900÷1200 N/mm ²	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

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 ²	900÷1200 N/mm ²	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

HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
 HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

CUTTING PARAMETERS

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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	1-5D x 0.1D	1-5D x 0.1D	D x 0.1D	D x 0.1D
Vc (m/min)	130÷150	100÷120	60÷80	50÷70
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.

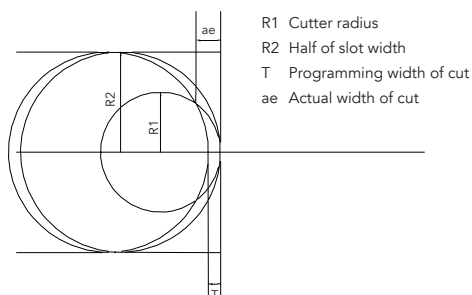
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

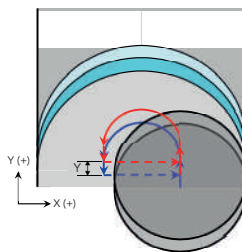
The cutting conditions are based on CNC programming with medium dynamic speed.

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


R1 Cutter radius
 R2 Half of slot width
 T Programming width of cut
 ae Actual width of cut

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

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

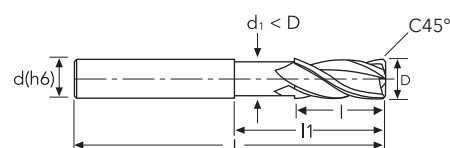
cylindrical shank and reduced neck, 45° chamfer



| INFO



★ 1st choice ☆ suitable

[illegible]

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

CUTTING PARAMETERS

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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	0.5D x D	0.5D x D	0.3D x D	0.2D x D
Vc (m/min)	70÷90	50÷70	30÷50	20÷40
D (mm)	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
		0.3D 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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	1.5D x 0.3D	1.5D x 0.2D	1.2D x 0.2D	D x 0.1D
Vc (m/min)	90÷110	60÷80	40÷60	30÷50
D (mm)	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
		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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
α° x ae	5° x 0.4D	4° x 0.4D	3° x 0.4D	2° x 0.4D
Vc (m/min)	70÷90	50÷70	30÷50	20÷40
D (mm)	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
		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

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 ²	900÷1200 N/mm ²	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

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 ²	900÷1200 N/mm ²	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

HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
 HFVH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

INFO

CUTTING PARAMETERS

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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	1.5D x 0.1D	1.5D x 0.1D	D x 0.1D	D x 0.1D
Vc (m/min)	110÷130	80÷100	50÷70	40÷60
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.

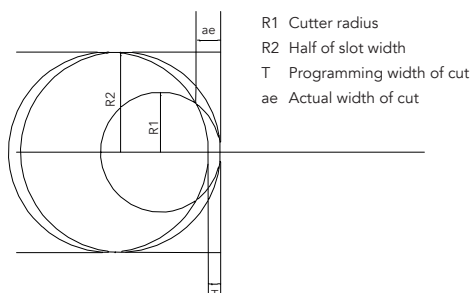
The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

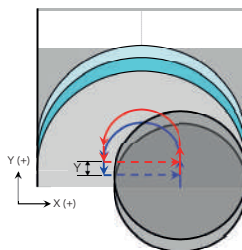
With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO



R1 Cutter radius
R2 Half of slot width
T Programming width of cut
ae Actual width of cut

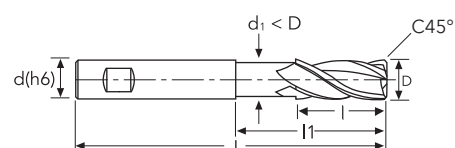
CARBIDE
END-MILLS

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

HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

weldon shank and reduced neck, 45° chamfer



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	0.5D x D	0.5D x D	0.3D x D	0.2D x D
Vc (m/min)	70÷90	50÷70	30÷50	20÷40
D (mm)	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	0.2D 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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	1.5D x 0.3D	1.5D x 0.2D	1.2D x 0.2D	D x 0.1D
Vc (m/min)	90÷110	60÷80	40÷60	30÷50
D (mm)	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	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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
α° x ae	5° x 0.4D	4° x 0.4D	3° x 0.4D	2° x 0.4D
Vc (m/min)	70÷90	50÷70	30÷50	20÷40
D (mm)	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	1° x 0.4D	1° x 0.4D

HSS
END-MILLSCARBIDE
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

	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 ²	900÷1200 N/mm ²	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

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 ²	900÷1200 N/mm ²	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

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.

INFO

CUTTING PARAMETERS

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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	1.5D x 0.1D	1.5D x 0.1D	D x 0.1D	D x 0.1D
Vc (m/min)	110÷130	80÷100	50÷70	40÷60
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.

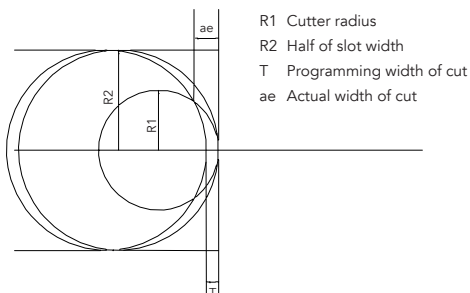
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

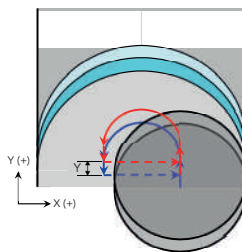
The cutting conditions are based on CNC programming with medium dynamic speed.

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


R1 Cutter radius
 R2 Half of slot width
 T Programming width of cut
 ae Actual width of cut

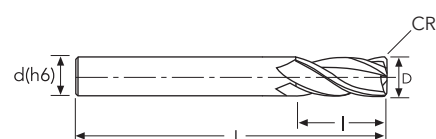
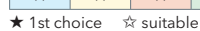
CARBIDE
END-MILLS
 G2
 MDTA
HF VH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH PRECISION WELDON CHUCK AND STABLE MACHINING CONDITION.
 FOR APPLICATION ON HIGH POWER MILLING CHUCK, PLEASE REFER TO HF450 PARAMETERS.

cylindrical shank, corner radius



| INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	0.5D x D	0.5D x D	0.3D x D	0.2D 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)
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	0.2D 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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	1.5D x 0.3D	1.5D x 0.2D	1.2D x 0.2D	D x 0.1D
Vc (m/min)	100÷120	70÷90	50÷70	40÷60
D (mm)	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	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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
α° x ae	5° x 0.4D	4° x 0.4D	3° x 0.4D	2° x 0.4D
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)
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	1° x 0.4D	1° x 0.4D

HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

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 ²	900÷1200 N/mm ²	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

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 ²	900÷1200 N/mm ²	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

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

CUTTING PARAMETERS

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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	1.5D x 0.1D	1.5D x 0.1D	D x 0.1D	D x 0.1D
Vc (m/min)	130÷150	100÷120	60÷80	50÷70
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.

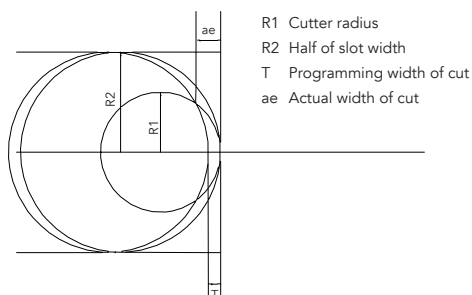
"ae" value max 0.2xD - "T" value max 0.1xD.

The use of end mill with diameter 30-40% smaller than the width of the slot is recommended.

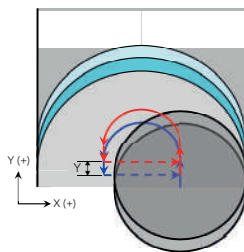
The cutting conditions are based on CNC programming with medium dynamic speed.

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


R1 Cutter radius
 R2 Half of slot width
 T Programming width of cut
 ae Actual width of cut

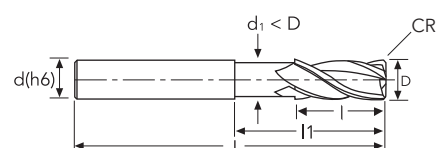
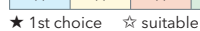
CARBIDE
END-MILLS
 G2
 MDTA
HF VH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

cylindrical shank and reduced neck, corner radius



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	0.5D x D	0.5D x D	0.3D x D	0.2D x D
Vc (m/min)	70÷90	50÷70	30÷50	20÷40
D (mm)	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	0.2D 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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	1.5D x 0.3D	1.5D x 0.2D	1.2D x 0.2D	D x 0.1D
Vc (m/min)	90÷110	60÷80	40÷60	30÷50
D (mm)	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	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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
α° x ae	5° x 0.4D	4° x 0.4D	3° x 0.4D	2° x 0.4D
Vc (m/min)	70÷90	50÷70	30÷50	20÷40
D (mm)	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	1° x 0.4D	1° x 0.4D

HSS
END-MILLSCARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

CUTTING PARAMETERS

INFO

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 ²	900÷1200 N/mm ²	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

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 ²	900÷1200 N/mm ²	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

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

CUTTING PARAMETERS

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 ²	900÷1200 N/mm ²	35÷45 HRC	≤55 HRC
ap x ae	1.5D x 0.1D	1.5D x 0.1D	D x 0.1D	D x 0.1D
Vc (m/min)	110÷130	80÷100	50÷70	40÷60
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.

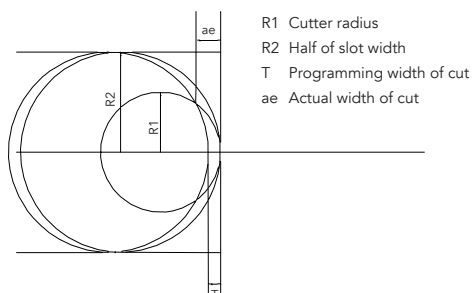
The cutting conditions are based on CNC programming with medium dynamic speed.

With lower CNC dynamic speed, use the same cutting conditions or reduce the cutting speed Vc.

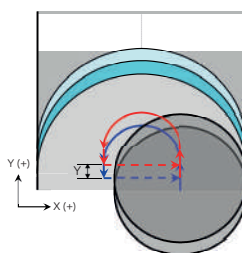
With higher CNC dynamic speed, reduce the "T" value by approximately -30 -50% and apply the maximum available cutting speed Vc.

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO



R1 Cutter radius
R2 Half of slot width
T Programming width of cut
ae Actual width of cut

CARBIDE
END-MILLS

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

HSS
END-MILLSCARBIDE
BURRS

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

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

cylindrical shank, 2 flutes



VA



UMG
ENDLESS

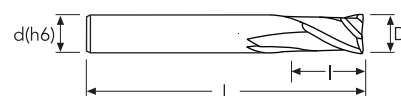
**<45
HRC**



P	M	K	N	S	H
★	★			★	



SLOTING

UH/MH

● stock standard ○ non-stock standard ▽ stock exhaustion

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 ²	700÷1000 N/mm ²	≤35 HRC	≤45 HRC
	ap x ae	0.5D x D	0.5D x D	0.3D x D	0.2D x D
	Vc (m/min)	90÷110	50÷70	30÷50	20÷40
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.005	0.004	0.004	0.004
	2	0.009	0.008	0.007	0.007
	3	0.012	0.010	0.009	0.009
	4	0.017	0.015	0.014	0.014
	5	0.023	0.020	0.018	0.018
	6	0.029	0.024	0.023	0.023
	8	0.035	0.029	0.028	0.028
	10	0.040	0.034	0.032	0.032
	12	0.046	0.039	0.037	0.037
	14	0.052	0.044	0.041	0.041
	16	0.058	0.049	0.046	0.046

< D3 mm: ap = 0.1D ÷ 0.2D

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	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm ²	700÷1000 N/mm ²	≤35 HRC	≤45 HRC
	ap x ae	1.5D x 0.5D	1.5D x 0.5D	D x 0.3D	D x 0.1D
	Vc (m/min)	90÷110	60÷80	40÷60	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.006	0.005	0.004	0.004
	2	0.011	0.009	0.009	0.009
	3	0.014	0.012	0.011	0.011
	4	0.021	0.018	0.017	0.017
	5	0.028	0.023	0.022	0.022
	6	0.035	0.029	0.028	0.028
	8	0.041	0.035	0.033	0.033
	10	0.048	0.041	0.039	0.039
	12	0.055	0.047	0.044	0.044
	14	0.062	0.053	0.050	0.050
	16	0.069	0.059	0.055	0.055

< 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

	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm ²	700÷1000 N/mm ²	≤35 HRC	≤45 HRC
	ap x ae	D x D	D x D	0.5D x D	0.2D x D
	Vc (m/min)	90÷110	50÷70	30÷50	20÷40
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.003	0.002	0.002	0.002
	2	0.006	0.005	0.004	0.004
	3	0.007	0.006	0.006	0.006
	4	0.010	0.009	0.008	0.008
	5	0.014	0.012	0.011	0.011
	6	0.017	0.015	0.014	0.014
	8	0.021	0.018	0.017	0.017
	10	0.024	0.021	0.019	0.019
	12	0.028	0.023	0.022	0.022
	14	0.031	0.026	0.025	0.025
	16	0.035	0.029	0.028	0.028

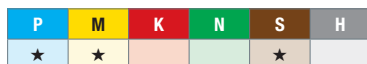
< D3 mm: ap = 0.1D ÷ 0.2D

HSS
END-MILLSCARBIDE
BURRS

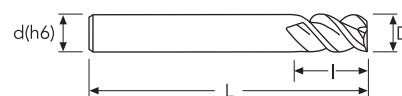
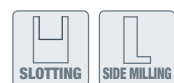
cylindrical shank, 3 flutes



≤ Ø18 > Ø18

HSD
GSD TA

★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-stock standard ▽ stock exhaustion

CUTTING PARAMETERS

INFO

MEFCSH3

	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm ²	700÷1000 N/mm ²	≤35 HRC	≤45 HRC
	ap x ae	0.5D x D	0.5D x D	0.3D x D	0.2D 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	0.022	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

	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm ²	700÷1000 N/mm ²	≤35 HRC	≤45 HRC
	ap x ae	0.5D x D	0.5D x D	0.3D x D	0.2D 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	0.026	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-MILLSCARBIDE
BURRS

cylindrical shank, 4 flutes



VA



UMG
ENDLESS

**<45
HRC**

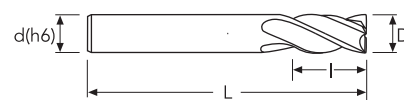


SQUARE



P	M	K	N	S	H
★	★			★	

★ 1st choice ☆ suitable



CARBIDE END-MILLS

G2

MDTA

MEE

ALL

ALU
MEY/MU

HSS
END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

INFO

MEFCS4

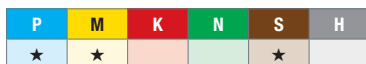
	Material Group ISO 513	P1 P2 P3	P4 P7 M1	P5 M2 M3 S1 S2 S4	P8 S3 S5
	Hardness/Rm	≤700 N/mm ²	700÷1000 N/mm ²	≤35 HRC	≤45 HRC
	ap x ae	1.5D x 0.1D	1.5D x 0.1D	1.5D x 0.1D	1.5D x 0.1D
	Vc (m/min)	90÷110	60÷80	40÷60	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.012	0.010	0.010	0.010
	4	0.015	0.013	0.012	0.012
	5	0.018	0.015	0.014	0.014
	6	0.023	0.020	0.018	0.018
	8	0.030	0.026	0.024	0.024
	10	0.038	0.032	0.030	0.030
	12	0.045	0.038	0.036	0.036
	14	0.052	0.044	0.042	0.042
	16	0.058	0.049	0.046	0.046
	18	0.066	0.056	0.053	0.053
	20	0.075	0.064	0.060	0.060

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

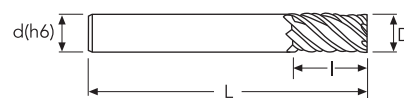
cylindrical shank, multi flute



CSD TA



★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-stock standard ▽ stock exhaustion

CUTTING PARAMETERS

INFO

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 ²	700÷1000 N/mm ²	≤35 HRC	≤45 HRC
	ap x ae	1.5D x 0.1D	1.5D x 0.1D	D x 0.1D	D x 0.05D
	Vc (m/min)	100÷140	70÷110	50÷80	40÷60
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.015	0.013	0.012	0.012
	8	0.020	0.017	0.016	0.016
	10	0.025	0.021	0.020	0.020
	12	0.030	0.026	0.024	0.024
	14	0.035	0.030	0.028	0.028
	16	0.040	0.034	0.032	0.032
	20	0.050	0.043	0.040	0.040

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

cylindrical shank, roughing



CARBIDE DRILLS

PU-HPU
TA-4HTA

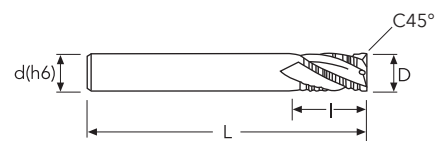
ALH

HRC

SUH MINI

HL

C-SD-TA

[illegible]

CARBIDE END-MILLS

G2

MDTA

HF VH/UP

MEF

MEF

ALU

MEX/MH

UH/MH

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-stock standard ▽ stock exhaustion

CUTTING PARAMETERS

INFO

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 ²	700÷1000 N/mm ²	≤35 HRC	≤45 HRC
	ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.2D	D x 0.1D
	Vc (m/min)	100÷140	70÷90	50÷70	40÷60
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	4	0.018	0.015	0.014	0.014
	5	0.022	0.019	0.018	0.018
	6	0.028	0.024	0.022	0.022
	8	0.035	0.030	0.028	0.028
	10	0.040	0.034	0.032	0.032
	12	0.045	0.038	0.036	0.036
	14	0.050	0.043	0.040	0.040
	16	0.057	0.048	0.046	0.046
	20	0.073	0.062	0.058	0.058

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

MEF902

**OSAWA
NORM**

VA

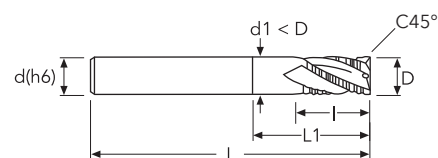
UMG
ENDLESS

**<45
HRC**



P	M	K	N	S	H
★	★			★	

★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-stock standard ▽ stock exhaustion

CUTTING PARAMETERS

INFO

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 ²	700÷1000 N/mm ²	≤35 HRC	≤45 HRC
	ap x ae	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.2D	D x 0.1D
	Vc (m/min)	100÷120	60÷80	45÷65	35÷45
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.027	0.023	0.021	0.021
	8	0.033	0.028	0.027	0.027
	10	0.038	0.032	0.030	0.030
	12	0.043	0.036	0.034	0.034
	14	0.048	0.040	0.038	0.038
	16	0.054	0.046	0.043	0.043
	20	0.069	0.059	0.055	0.055

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

HFAL4

**OSAWA
NORM**

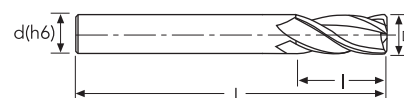
ALU

MG
BR

C-SD-TA

P	M	K	N	S	H
			★		

★ 1st choice ☆ suitable

UH/MH

● 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

CUTTING PARAMETERS

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

cylindrical shank, 3 flutes, corner radius

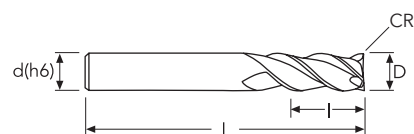
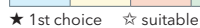


ALU

MG
POLISHED



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

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

INFO

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

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 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

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	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

HSS
END-MILLS

CARBIDE
BURRS

PARAMETERS SUGGESTED WITH HIGH POWER MILLING CHUCK AND STABLE MACHINING CONDITION

HFA53

**OSAWA
NORM**

ALU

MG
BR





































































































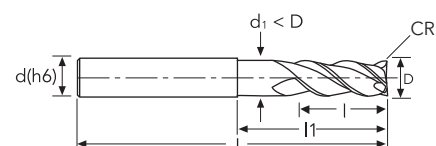




C-3D-1A

P	M	K	N	S	H
			★		

★ 1st choice ☆ suitable

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

HFA53

	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)	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	0.022	0.018	0.029
	4	0.035	0.030	0.025	0.039
	5	0.044	0.037	0.031	0.048
	6	0.052	0.044	0.036	0.057
	8	0.069	0.058	0.048	0.076
	10	0.084	0.071	0.059	0.092
	12	0.096	0.082	0.067	0.106
	14	0.112	0.095	0.078	0.123
	16	0.128	0.109	0.090	0.141
	18	0.141	0.120	0.099	0.155
	20	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	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.5D	1.5D 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)
	3	0.032	0.029	0.025	0.035
	4	0.042	0.038	0.034	0.046
	5	0.053	0.048	0.042	0.058
	6	0.062	0.056	0.050	0.069
	8	0.083	0.074	0.066	0.091
	10	0.101	0.091	0.081	0.111
	12	0.115	0.104	0.092	0.127
	14	0.134	0.121	0.108	0.148
	16	0.154	0.138	0.123	0.169
	18	0.169	0.152	0.135	0.186
	20	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	8° x 0.5D	5° x 0.5D	5° x 0.5D	8° x 0.5D
	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	0.016	0.013	0.020
	4	0.024	0.022	0.018	0.027
	5	0.030	0.027	0.022	0.033
	6	0.036	0.032	0.027	0.040
	8	0.048	0.043	0.035	0.052
	10	0.058	0.052	0.043	0.064
	12	0.066	0.059	0.049	0.073
	14	0.077	0.069	0.057	0.085
	16	0.088	0.079	0.065	0.097
	18	0.097	0.087	0.072	0.107
	20	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

CUTTING PARAMETERS

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

cylindrical shank, 1 flute, polished



ALU

MG

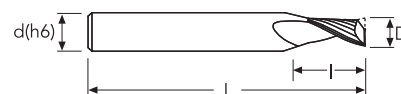
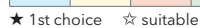
POLISHED



SQUARE



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

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	0.5D x D	0.5D x D	0.5D x D	0.5D x D
Vc (m/min)	300÷500	200÷400	150÷350	400÷600
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	D x 0.5D	D x 0.5D	D x 0.5D	D x 0.5D
Vc (m/min)	300÷600	200÷500	200÷400	400÷800
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	D x D	D x D	D x D	0.5D x D
Vc (m/min)	300÷400	150÷350	100÷300	300÷500
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

cylindrical shank, 2 flutes, polished

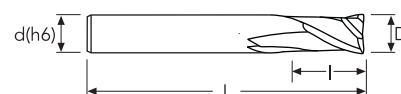
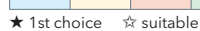


ALU

MG
POLISHED



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

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

CARBIDE
END-MILLS

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

HSS
END-MILLS

CARBIDE
BURRS

CUTTING PARAMETERS

MDCSA2

	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)	200÷400	150÷350	150÷350	500÷900
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.006	0.005	0.004	0.006
	1.5	0.008	0.007	0.006	0.008
	2	0.011	0.010	0.008	0.011
	3	0.014	0.012	0.010	0.014
	4	0.019	0.016	0.013	0.019
	5	0.024	0.020	0.016	0.024
	6	0.028	0.024	0.020	0.028
	8	0.037	0.032	0.026	0.037
	10	0.047	0.040	0.033	0.047
	12	0.056	0.048	0.039	0.056
	14	0.065	0.055	0.046	0.065
	16	0.074	0.063	0.052	0.074
	18	0.083	0.071	0.058	0.083
	20	0.092	0.079	0.065	0.092

< D3 ap x ae 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
HF VH/UP
MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLS

CARBIDE
BURRS

MDCSA3

**OSAWA
NORM**

ALU

MG
POLISHED



55°



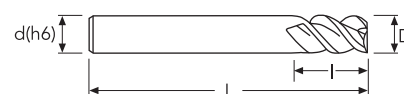
SQUARE



C-SD-1A



★ 1st choice ☆ suitable

[illegible]

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

MDCSA3

	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)	200÷600	150÷350	150÷250	500÷900
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.010	0.009	0.007	0.010
	1.5	0.015	0.013	0.011	0.015
	2	0.020	0.017	0.014	0.020
	3	0.025	0.022	0.018	0.025
	4	0.034	0.029	0.024	0.034
	5	0.042	0.036	0.030	0.042
	6	0.051	0.043	0.035	0.051
	8	0.067	0.057	0.047	0.067
	10	0.084	0.072	0.059	0.084
	12	0.101	0.086	0.071	0.101
	14	0.117	0.100	0.082	0.117
	16	0.133	0.113	0.093	0.133
	18	0.150	0.127	0.105	0.150
	20	0.166	0.141	0.116	0.166

< D3 ap x ae 0.25D x D

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 0.3D	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D
	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	0.012	0.010	0.008	0.012
	1.5	0.018	0.015	0.013	0.018
	2	0.024	0.021	0.017	0.024
	3	0.030	0.026	0.021	0.030
	4	0.041	0.034	0.028	0.041
	5	0.051	0.043	0.036	0.051
	6	0.061	0.052	0.043	0.061
	8	0.081	0.069	0.057	0.081
	10	0.101	0.086	0.071	0.101
	12	0.121	0.103	0.085	0.121
	14	0.141	0.120	0.099	0.141
	16	0.160	0.136	0.112	0.160
	18	0.180	0.153	0.126	0.180
	20	0.200	0.170	0.140	0.200

< D3 ap x ae D x 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-MILLSCARBIDE
BURRS

cylindrical shank, 3 flutes polished, long



MDA310



MDA311 - MDA312

CARBIDE DRILLS

PU-HPU
TA-4HTA

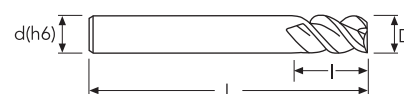
AIH

SUH MINI

C-SD-TA



★ 1st choice ☆ suitable

[illegible]

● 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-MILLSCARBIDE
BURRS

INFO		CUTTING PARAMETERS				
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	0.1D x D	0.1D x D	0.1D x D	0.1D x D
		Vc (m/min)	130÷230	100÷160	80÷120	250÷450
		D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
		8	0.040	0.034	0.028	0.040
		10	0.051	0.043	0.035	0.051
		12	0.060	0.051	0.042	0.060
		16	0.080	0.068	0.056	0.080
		20	0.100	0.085	0.070	0.100
 HSS DRILLS LFTA SUTA HSS-HSS/CO						
		Material Group ISO 513	N1	N2 N3	N4	N5
		Hardness/Rm				
		ap x ae	2.5D x 0.05D	2.5D x 0.05D	2.5D x 0.05D	2.5D x 0.05D
		Vc (m/min)	150÷250	100÷200	100÷160	300÷500
		D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
		8	0.048	0.041	0.034	0.048
		10	0.061	0.052	0.042	0.061
		12	0.073	0.062	0.051	0.073
		16	0.096	0.081	0.067	0.096
		20	0.120	0.102	0.084	0.120
CARBIDE END-MILLS G2 MDTA HF VH/UP MEF ALU MEX/MH UH/MH						
HSS END-MILLS						
CARBIDE BURRS						

cylindrical shank, 6F, polished

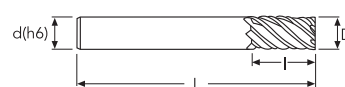
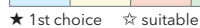


ALU

MG
POLISHED



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

MDCSAM

L SIDE MILLING	Material Group ISO 513	N1	N2 N3	N4	N5
	Hardness/Rm				
	ap x ae	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D
	Vc (m/min)	600÷1000	400÷800	300÷700	900÷1300
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.050	0.043	0.035	0.050
	8	0.067	0.057	0.047	0.067
	10	0.084	0.071	0.059	0.084
	12	0.100	0.085	0.070	0.100
	20	0.120	0.102	0.084	0.120

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

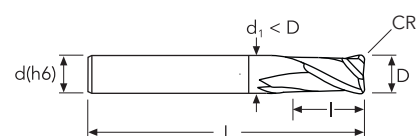
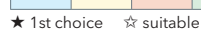
cylindrical shank, 2 flutes, corner radius



ALU

MG
PV200

| INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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	0.5D x D	0.5D x D	0.5D x D	0.5D x D
Vc (m/min)	200÷600	200÷400	150÷350	600÷1000
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.030	0.025	0.021	0.033
3	0.040	0.034	0.028	0.044
4	0.050	0.042	0.035	0.054
5	0.059	0.050	0.041	0.064
6	0.077	0.066	0.054	0.085
8	0.095	0.080	0.066	0.104
10	0.108	0.092	0.076	0.119
12	0.126	0.107	0.088	0.139

< D3 ap x ae 0.25D x D

HSS
DRILLS



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÷600	250÷450	200÷400	600÷1000
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
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

< 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

cylindrical shank, 2 flutes ball nose, polished

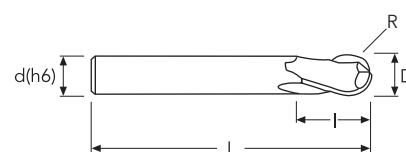
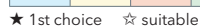


ALU

MG
POLISHED



| INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

MDCAB2

Material Group ISO 513		N1	N2 N3	N4	N5
Hardness/Rm					
ap x ae		0.2D x 0.4D	0.2D x 0.4D	0.2D x 0.4D	0.2D x 0.4D
Vc (m/min)		200÷600	250÷450	200÷400	600÷1000
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.80	0.013	0.011	0.010	0.013
1.5	1.20	0.017	0.015	0.013	0.017
2	1.60	0.017	0.015	0.013	0.017
2.5	2.00	0.021	0.019	0.017	0.021
3	2.40	0.025	0.023	0.020	0.025
4	3.20	0.035	0.032	0.028	0.035
5	4.00	0.045	0.040	0.036	0.045
6	4.80	0.053	0.048	0.043	0.053
8	6.40	0.067	0.060	0.054	0.067
10	8.00	0.080	0.072	0.064	0.080
12	9.60	0.094	0.084	0.075	0.094



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

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

cylindrical shank, 2 flutes, miniature



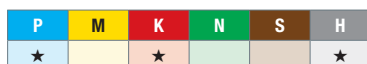
CARBIDE DRILLS

PU-HPU
TA-4HTA

SUH

ALH
HRC
© 2000 ALHSUH MINI
HL

HSD
C-SD-TA



★ 1st choice ☆ suitable

[illegible]

CARBIDE END-MILLS

G2
MDTAHF VH/UP
MEE

MEF
ALU
RAM/ROM

UH/MH

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-stock standard ▽ stock exhaustion

CUTTING PARAMETERS

INFO

MEXM2

 SLOTTING	Material Group ISO 513		P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5				
	Hardness/Rm		≤1000 N/mm²		≤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÷90		50÷70		30÷50		20÷40	
	D (mm)	ap (mm)	fz (mm/z)		fz (mm/z)		fz (mm/z)		fz (mm/z)	
	0.3	0.02	0.004		0.004		0.003		0.003	
	0.4	0.02	0.006		0.005		0.005		0.004	
	0.5	0.03	0.007		0.006		0.006		0.005	
	0.6	0.03	0.008		0.007		0.006		0.006	
	0.8	0.04	0.010		0.009		0.008		0.007	
	1	0.05	0.012		0.011		0.010		0.008	
	1.2	0.06	0.022		0.020		0.018		0.015	
	1.4	0.07	0.024		0.022		0.019		0.017	
	1.5	0.08	0.025		0.023		0.020		0.018	
	1.6	0.08	0.026		0.023		0.021		0.018	
1.8	0.09	0.028		0.025		0.022		0.020		
2	0.10	0.030		0.027		0.024		0.021		

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

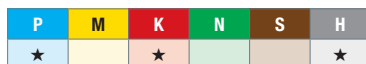
HSS END-MILLS

CARBIDE BURRS

cylindrical shank, 2 flutes, short cutting length, miniature



C-SD-TA



☆ suitable



● stock standard ○ non-stock standard ▽ stock exhaustion

CUTTING PARAMETERS

INFO

MEXM2SC

	Material Group ISO 513		P2P3P4K1K2	P4P5K3	P6K4	H1H4H5	
	Hardness/Rm		≤1000 N/mm ²		≤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)	ap (mm)	fz (mm/z)		fz (mm/z)	fz (mm/z)	fz (mm/z)
	0.2	0.01	0.003		0.003	0.002	0.002
	0.3	0.02	0.004		0.004	0.003	0.003
	0.4	0.02	0.006		0.005	0.005	0.004
	0.5	0.03	0.007		0.006	0.006	0.005
	0.6	0.03	0.008		0.007	0.006	0.006
	0.8	0.04	0.010		0.009	0.008	0.007
	0.9	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

MEXLN2

cylindrical shank, 2 flutes, extended and reduced neck

OSAWA
NORM

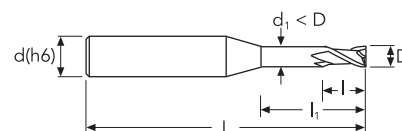
MEX

UMG
ENDLESS
ORANGE<55
HRC

40°

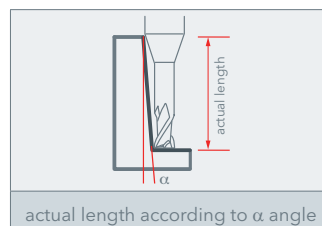
SQUARE

ZZ

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.	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	●

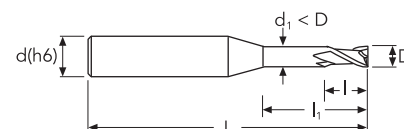
HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
 HF VH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

MEXLN2

cylindrical shank, 2 flutes, extended and reduced neck



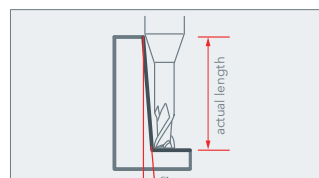
INFO

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

actual length according to α angle

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	●

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

MEXLN2

Material Group ISO 513			P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm			≤1000 N/mm ²	≤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

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

CUTTING PARAMETERS

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-MILLSCARBIDE
BURRS

Material Group ISO 513			P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm			≤1000 N/mm ²	≤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)
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



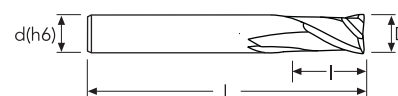
cylindrical shank, 2 flutes



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-stock standard ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae	0.5D x D	0.3D x D	0.2D x D	0.1D x D
Vc (m/min)	70÷110	50÷90	40÷60	20÷40
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.006	0.005	0.005	0.004
2	0.010	0.009	0.008	0.007
3	0.014	0.013	0.012	0.010
4	0.020	0.018	0.016	0.014
5	0.026	0.023	0.020	0.018
6	0.032	0.029	0.026	0.023
8	0.038	0.034	0.031	0.027
10	0.046	0.041	0.037	0.032
12	0.055	0.050	0.044	0.039
14	0.064	0.057	0.051	0.045
16	0.072	0.065	0.058	0.051
18	0.082	0.074	0.066	0.058
20	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-MILLSCARBIDE
BURRS

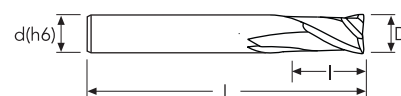
cylindrical shank, 2 flutes, long



INFO



★ 1st choice ☆ suitable

[illegible]

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

CUTTING PARAMETERS

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 ²	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae	0.5D x D	0.3D x D	0.2D x D	0.1D x D
Vc (m/min)	70÷110	50÷90	40÷60	20÷40
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.005	0.005	0.004	0.004
1.5	0.006	0.005	0.005	0.004
2	0.009	0.008	0.007	0.006
3	0.012	0.011	0.010	0.008
4	0.018	0.016	0.014	0.013
5	0.024	0.022	0.019	0.017
6	0.029	0.026	0.023	0.020
8	0.035	0.032	0.028	0.025
10	0.041	0.037	0.033	0.029
12	0.050	0.045	0.040	0.035

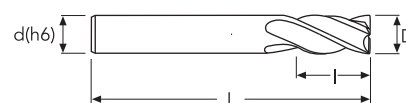
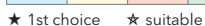
≤ D3 mm: ap = 0.4 mm

HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
 HF VH/UP
 MEF
 ALU
MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

cylindrical shank, 4 flutes unequal pitch



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-stock standard ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	≤35 HRC	35÷45 HRC	45÷55 HRC
		ap x ae	D x 0.05D	D x 0.05D	D x 0.05D	D x 0.05D
		Vc (m/min)	120÷160	100÷140	90÷120	80÷100
		D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
		1	0.007	0.006		0.006
		2	0.010	0.010	0.010	0.010
		3	0.016	0.016	0.016	0.016
		4	0.027	0.027	0.027	0.027
		5	0.036	0.036	0.036	0.036
		6	0.043	0.043	0.043	0.043
		8	0.060	0.060	0.060	0.060
		10	0.085	0.085	0.085	0.085
		12	0.100	0.100	0.100	0.100
		14	0.120	0.120	0.120	0.120
		16	0.150	0.150	0.150	0.150
		18	0.175	0.175	0.175	0.175
		20	0.200	0.200	0.200	0.200
		22	0.215	0.215	0.215	0.215
		25	0.225	0.225	0.225	0.225

HSS
DRILLSLFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLSG2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

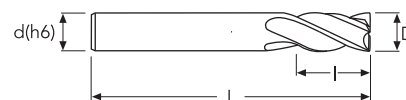
cylindrical shank, 4 flutes, long



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-stock standard ▽ stock exhaustion

INFO

CUTTING PARAMETERS

MEXCL4

	Material Group ISO 513	P2P3P4K1K2	P4P5K3	P6K4	H1H4H5
	Hardness/Rm	≤1000 N/mm ²	≤35 HRC	35÷45 HRC	45÷55 HRC
	ap x ae	1.5D x 0.1D	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D
	Vc (m/min)	60÷100	50÷70	30÷50	20÷40
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	2	0.014	0.013	0.012	0.010
	3	0.022	0.020	0.017	0.015
	4	0.029	0.026	0.023	0.020
	5	0.033	0.029	0.026	0.023
	6	0.036	0.033	0.029	0.025
	8	0.047	0.042	0.038	0.033
	10	0.060	0.054	0.048	0.042
	12	0.072	0.065	0.058	0.051
	14	0.083	0.075	0.066	0.058
	16	0.094	0.084	0.075	0.065
	20	0.119	0.107	0.095	0.083
25	0.150	0.135	0.120	0.105	

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

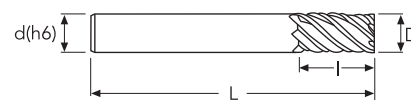
cylindrical shank, multi flute



INFO



★ 1st choice ☆ suitable



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

[illegible]

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE
BURRS

CUTTING PARAMETERS

INFO

MEXCSHMCARBIDE
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 ²	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae	1.5D x 0.1D	1.5D x 0.1D	1.5D x 0.05D	1.5D x 0.05D
Vc (m/min)	120÷160	90÷130	60÷100	50÷70
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.008	0.008	0.007	0.006
4	0.012	0.011	0.010	0.008
5	0.014	0.013	0.012	0.010
6	0.018	0.016	0.014	0.013
8	0.028	0.025	0.022	0.019
10	0.034	0.030	0.027	0.024
12	0.041	0.037	0.033	0.029
14	0.048	0.043	0.038	0.034
16	0.056	0.051	0.045	0.039
18	0.065	0.059	0.052	0.046
20	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-MILLSCARBIDE
BURRS

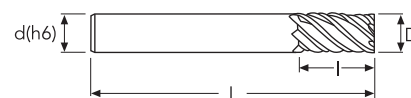
cylindrical shank, multi flute, long



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

[illegible]

● stock standard ○ non-stock standard ▽ stock exhaustion

INFO

CUTTING PARAMETERS

MEXCLHM

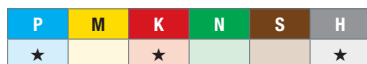
	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm ²	≤35 HRC	35÷45 HRC	45÷55 HRC
	ap x ae	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D
	Vc (m/min)	80÷120	50÷90	40÷60	20÷40
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	3	0.007	0.006	0.006	0.005
	4	0.010	0.009	0.008	0.007
	5	0.012	0.011	0.010	0.009
	6	0.015	0.014	0.012	0.011
	8	0.023	0.021	0.019	0.016
	10	0.029	0.026	0.023	0.020
	12	0.035	0.031	0.028	0.024
	14	0.041	0.037	0.033	0.029
	16	0.048	0.043	0.038	0.034
	18	0.055	0.050	0.044	0.039
	20	0.063	0.057	0.050	0.044

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

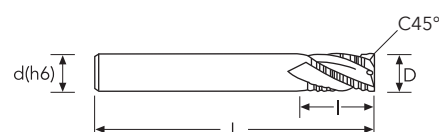
cylindrical shank, roughing



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

[illegible]

INFO

CUTTING PARAMETERS

MEXCSFR



Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm	≤1000 N/mm ²	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae	0.5D x D	0.5D x D	0.3D x D	0.1D x D
Vc (m/min)	70÷90	50÷70	40÷60	20÷40
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



Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm	≤1000 N/mm ²	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae	1.5D x 0.3D	1.5D x 0.3D	D x 0.1D	D x 0.05D
Vc (m/min)	80÷100	60÷80	50÷70	30÷50
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

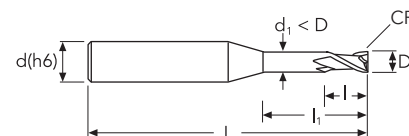
CARBIDE
DRILLS
 PU-HPU
 TA-4HTA
 SUH
 ALH
 HRC
 SUH MINI
 HL
 HSD
 C-SD-TA
HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
 HF VH/UP
 MEF
 ALU
MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

MEXLN2R

cylindrical shank, 2 flutes, extended and reduced neck, corner radius



INFO

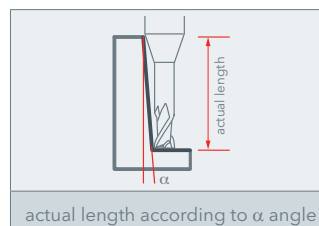


CARBIDE DRILLS

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)	I	I1	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	●

HSS DRILLS

LFTA
SUTA
HSS-HSS/CO

CARBIDE END-MILLS

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

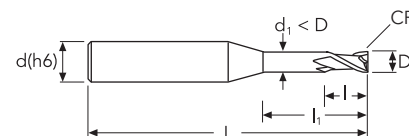
HSS END-MILLS

CARBIDE BURRS

INFO

MEXLN2R

cylindrical shank, 2 flutes, extended and reduced neck, corner radius

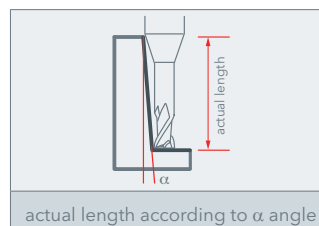


CARBIDE DRILLS

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	●

HSS DRILLS

LFTA
SUTA
HSS-HSS/CO

CARBIDE END-MILLS

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

HSS END-MILLS

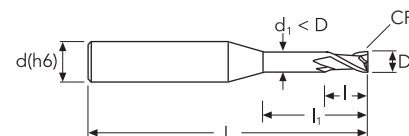
CARBIDE BURRS

MEXLN2R

cylindrical shank, 2 flutes, extended and reduced neck, corner radius



INFO

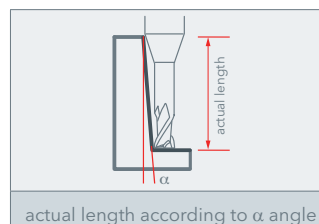


CARBIDE DRILLS

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)	I	I1	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	●

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

MEXLN2R

Material Group ISO 513			P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm			≤1000 N/mm ²	≤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
1.5	≤ 15D	0.03	0.014	0.013	0.012	0.010
	≥ 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
1.6	≤ 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
1.6	≤ 15D	0.04	0.016	0.014	0.012	0.011
	≥ 15D	0.02	0.013	0.012	0.010	0.009

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

CUTTING PARAMETERS

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-MILLSCARBIDE
BURRS

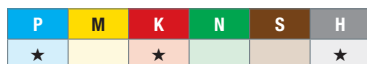
Material Group ISO 513			P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm			≤1000 N/mm ²	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae			ap x D	ap x D	ap x D	ap x D
Vc (m/min)			70÷110	50÷90	40÷60	20÷40
D (mm)	l1 (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1.8	≤ 6D	0.09	0.028	0.025	0.022	0.020
	≤ 8D	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



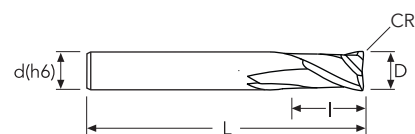
cylindrical shank, 2 flutes, long, corner radius



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

[illegible]

● stock standard ○ non-stock standard ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae	0.3D x D	0.3D x D	0.2D x D	0.05D x D
Vc (m/min)	70÷110	50÷90	40÷60	20÷40
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	0.005	0.005	0.004	0.004
3	0.006	0.005	0.005	0.004
4	0.009	0.008	0.007	0.006
5	0.012	0.011	0.010	0.008
6	0.018	0.016	0.014	0.013
8	0.024	0.022	0.019	0.017
10	0.029	0.026	0.023	0.020
12	0.035	0.032	0.028	0.025
16	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-MILLSCARBIDE
BURRS

MEXCS4R

cylindrical shank, 4 flutes, corner radius

OSAWA
NORM

MEX

UMG
ENDLESS
ORANGE<55
HRC

40°

RADIUS

Z4

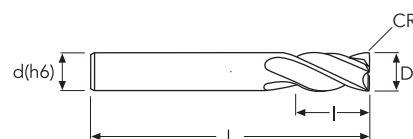
INFO

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/-0.015	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	●

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

● stock standard ○ non-stock standard ▽ stock exhaustion

cylindrical shank, 4 flutes, corner radius



CARBIDE DRILLS

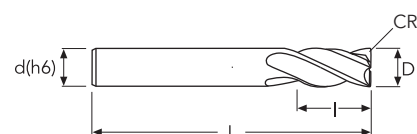
PU-HPU
TA-4HTA

ALH

SLIM MINI

HSD
CSD TA

C-SD-1A

[illegible]

CARBIDE END-MILLS

G2

MDTA

HF VH/UP

MFF

ALL

ALU
Y/MU

MEX/MH

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-stock standard ▽ stock exhaustion

CUTTING PARAMETERS

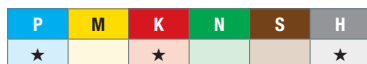
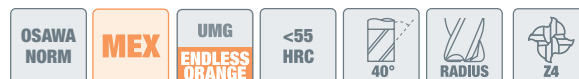
MEXCS4R

	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm ²	≤35 HRC	35÷45 HRC	45÷55 HRC
	ap x ae	D x 0.1D	D x 0.1D	D x 0.05D	D x 0.05D
	Vc (m/min)	80÷120	50÷90	40÷60	20÷40
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.009	0.008	0.007	0.006
	2	0.017	0.015	0.014	0.012
	3	0.026	0.023	0.020	0.018
	4	0.034	0.031	0.027	0.024
	5	0.038	0.034	0.031	0.027
	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
	18	0.125	0.113	0.100	0.088
	20	0.140	0.126	0.112	0.098

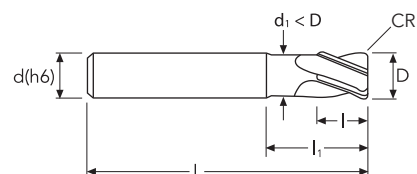
INFO

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-MILLSCARBIDE
BURRS

cylindrical shank, 4 flutes, short, corner radius



★ 1st choice ☆ suitable



● stock standard ○ non-stock standard ▽ stock exhaustion

CUTTING PARAMETERS

INFO

MEX410R

	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm ²	≤35 HRC	35÷45 HRC	45÷55 HRC
	ap x ae	D x 0.1D	D x 0.1D	D x 0.05D	D x 0.05D
	Vc (m/min)	80÷120	50÷90	40÷60	20÷40
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	2	0.015	0.014	0.012	0.011
	3	0.023	0.021	0.018	0.016
	4	0.031	0.028	0.024	0.021
	5	0.034	0.031	0.028	0.024
	6	0.038	0.034	0.031	0.027
	8	0.050	0.045	0.040	0.035
	10	0.065	0.059	0.052	0.046
	12	0.077	0.069	0.061	0.054

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

MEXLS4R

	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm ²	≤35 HRC	35÷45 HRC	45÷55 HRC
	ap x ae	D x 0.1D	D x 0.05D	D x 0.05D	D x 0.05D
	Vc (m/min)	70÷110	50÷90	40÷60	20÷40
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	2	0.014	0.013	0.012	0.010
	3	0.022	0.020	0.017	0.015
	4	0.029	0.026	0.023	0.020
	5	0.033	0.029	0.026	0.023
	6	0.036	0.033	0.029	0.025
	8	0.047	0.042	0.038	0.033
	10	0.060	0.054	0.048	0.042
	12	0.072	0.065	0.058	0.051
	16	0.094	0.084	0.075	0.065

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

cylindrical shank, multi flute, short, corner radius



CARBIDE DRILLS

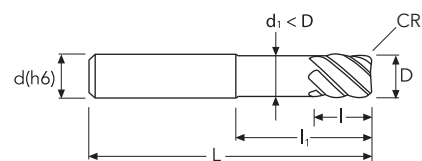
PU-HPU
TA-4HTA

ALH

SLIM MINI

HSD
CSD TA

C-SD-1A

[illegible]

DRILLS

LFTA

SUTA

HSS-HSS/CO

CARBIDE END-MILLS

MDTA

HF VH/UP

MFF

ALL

Y/MU

LUL/MU

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-stock standard ▽ stock exhaustion

CUTTING PARAMETERS

INFO

MEX610R

	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm ²	≤35 HRC	35÷45 HRC	45÷55 HRC
	ap x ae	D x 0.1D	D x 0.1D	D x 0.05D	D x 0.05D
	Vc (m/min)	120÷160	90÷130	60÷100	50÷70
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.018	0.016	0.014	0.013
	8	0.028	0.025	0.022	0.019
	10	0.034	0.030	0.027	0.024
	12	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

cylindrical shank, multi flute, long, corner radius



CARBIDE DRILLS

PU-HPU
TA-4HTA

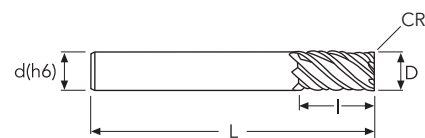
ALH

MINI

HL
UCB

HSD

C-SD-TA

[illegible]

CARBIDE END-MILLS

G2

MDTA

MEE

ALL

ALU
MEY/MU

MEX/MH

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-stock standard ▽ stock exhaustion

CUTTING PARAMETERS

INFO

MEX611R

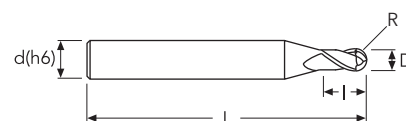
	Material Group ISO 513	P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
	Hardness/Rm	≤1000 N/mm ²	≤35 HRC	35÷45 HRC	45÷55 HRC
	ap x ae	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D
	Vc (m/min)	100÷140	80÷120	50÷70	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.015	0.014	0.012	0.011
	8	0.023	0.021	0.019	0.016
	10	0.029	0.026	0.023	0.020
	12	0.035	0.031	0.028	0.024

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

cylindrical shank, 2 flutes ball nose, miniature



COPYING

[illegible]

546

CUTTING PARAMETERS

INFO

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		0.05D x 0.1D	0.05D x 0.1D	0.05D x 0.1D	0.05D x 0.1D
	Vc (m/min)		80÷120	60÷100	40÷80	20÷60
	D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	0.1	0.04	0.004	0.004	0.003	0.003
	0.2	0.09	0.006	0.005	0.005	0.004
	0.3	0.13	0.008	0.007	0.006	0.006
	0.4	0.17	0.010	0.009	0.008	0.007
	0.5	0.22	0.012	0.011	0.010	0.008
	0.6	0.26	0.015	0.014	0.012	0.011
	0.7	0.31	0.018	0.016	0.014	0.013
	0.8	0.35	0.020	0.018	0.016	0.014
	0.9	0.39	0.023	0.021	0.018	0.016
	1	0.44	0.026	0.023	0.020	0.017
	1.5	0.79	0.040	0.036	0.030	0.026
	2	1.20	0.055	0.050	0.041	0.036

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

	α	n (rpm)	Vf (mm/min)
	15°	x 1.1	x 1.1

MHMB206

**OSAWA
NORM**

MH

NMG

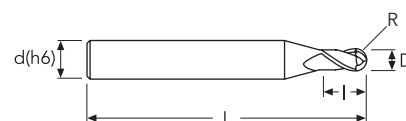
30÷70
HRC



C-SD-TA

P	M	K	N	S	H
★		★			★

★ 1st choice ★ suitable

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

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		0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D
	Vc (m/min)		80÷120	60÷100	40÷80	20÷60
	D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	0.4	0.17	0.010	0.009	0.008	0.007
	0.5	0.22	0.012	0.011	0.010	0.008
	0.6	0.26	0.015	0.014	0.012	0.011
	0.8	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

	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

MHLNB2

cylindrical shank, 2 flutes ball nose, extended and reduced neck, miniature

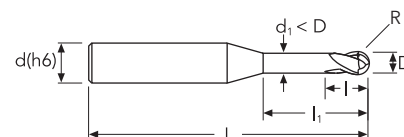
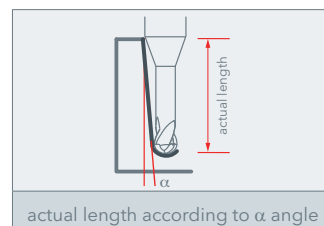


CARBIDE DRILLS

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
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

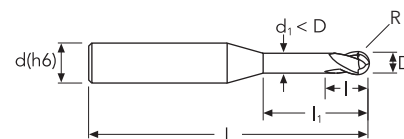
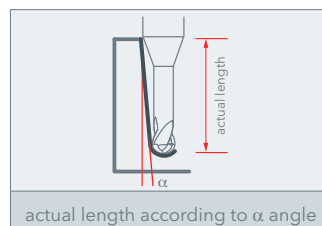
cylindrical shank, 2 flutes ball nose, extended and reduced neck, miniature



INFO

P	M	K	N	S	H
★		★			★

★ 1st choice ★ suitable



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
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

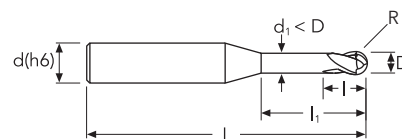
LFTA
SUTA
HSS-HSS/CO

CARBIDE END-MILLS

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

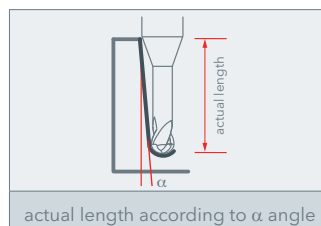
HSS END-MILLS

CARBIDE BURRS



C-SD-1A

★ 1st choice ★ suitable



CARBIDE BURRS

CUTTING PARAMETERS

INFO

MHLNB2

ROUND RIB

Material Group ISO 513				P3P4P5K2K3	P6K4H1H4H5	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)	
0.2	≤ 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	

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

	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

CUTTING PARAMETERS

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		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)	
	4	≤ 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

HSS
DRILLS

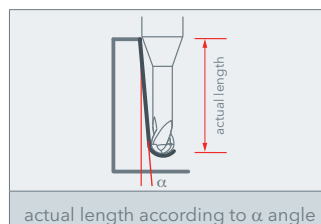
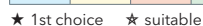
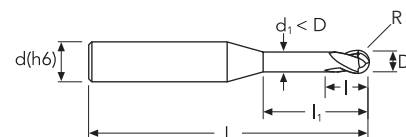
LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

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

HSS
END-MILLSCARBIDE
BURRS

cylindrical shank, 2 flutes ball nose, extended and reduced neck, miniature, 6 mm. shank

| 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

CUTTING PARAMETERS

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-MILLSCARBIDE
BURRS

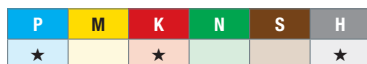
Material Group ISO 513				P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
Hardness/Rm				≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae				ap x 0.2D	ap x 0.2D	ap x 0.2D	ap x 0.2D
Vc (m/min)				140÷160	110÷130	80÷100	50÷70
D (mm)	l1 (mm)	ap (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
0.5	≤ 6D	0.03	0.22	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
	≤ 12D	0.04	0.49	0.032	0.020	0.018	0.015
2	>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
	≥ 15D	0.06	0.06	0.030	0.027	0.024	0.021

	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

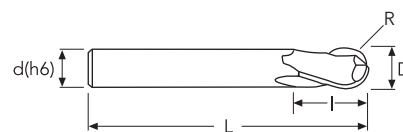
cylindrical shank, 2 flutes ball nose



INFO



★ 1st choice ☆ suitable



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

CUTTING PARAMETERS

MEXCSB2

Material Group ISO 513		P2 P3 P4 K1 K2	P4 P5 K3	P6 K4	H1 H4 H5
Hardness/Rm		≤1000 N/mm ²	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae		0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D
Vc (m/min)		120÷160	80÷120	60÷100	50÷70
D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.44	0.009	0.008	0.007	0.006
1.5	0.79	0.012	0.011	0.010	0.008
2	1.20	0.012	0.011	0.010	0.008
2.5	1.65	0.015	0.014	0.012	0.011
3	2.14	0.018	0.016	0.014	0.013
4	3.20	0.025	0.023	0.020	0.018
5	4.33	0.032	0.029	0.026	0.022
6	5.50	0.038	0.034	0.030	0.027
8	7.84	0.048	0.043	0.038	0.034
10	10.00	0.057	0.051	0.046	0.040
12	11.76	0.067	0.060	0.054	0.047
14	12.83	0.080	0.072	0.064	0.056
16	12.80	0.095	0.086	0.076	0.067
18	10.80	0.108	0.097	0.086	0.076
20	12.00	0.108	0.097	0.086	0.076



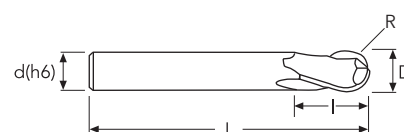
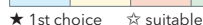
α	n (rpm)	Vf (mm/min)
15°	x 1.1	x 1.1

HSS
DRILLSLFTA
SUTA
HSS-HSS/COCARBIDE
END-MILLSG2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

cylindrical shank, 2 flutes ball nose, long reach



| INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-stock standard ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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 ²	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae		0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D
Vc (m/min)		100÷140	80÷120	60÷80	40÷60
D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.44	0.015	0.014	0.012	0.011
2	0.87	0.021	0.019	0.017	0.015
3	1.31	0.027	0.024	0.022	0.019
4	1.74	0.037	0.033	0.029	0.026
5	2.18	0.045	0.041	0.036	0.032
6	2.62	0.051	0.046	0.041	0.036
8	3.49	0.060	0.054	0.048	0.042
10	4.36	0.068	0.061	0.054	0.048
12	5.23	0.077	0.069	0.061	0.054
14	6.10	0.089	0.080	0.071	0.062
16	6.97	0.102	0.092	0.082	0.071
18	7.85	0.115	0.103	0.092	0.080
20	8.72	0.132	0.119	0.106	0.092

HSS
DRILLS

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

LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

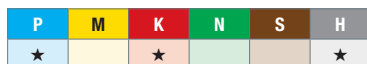
G2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLSCARBIDE
BURRS

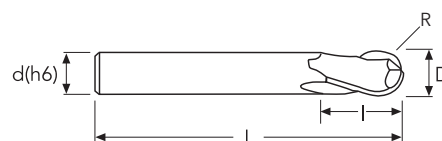
cylindrical shank, 2 flutes ball nose, extra long reach



INFO



★ 1st choice ☆ suitable



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

[illegible]

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

INFO

CUTTING PARAMETERS

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 ²	≤35 HRC	35÷45 HRC	45÷55 HRC
ap x ae		0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D
Vc (m/min)		90÷130	60÷100	50÷70	30÷50
D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.44	0.015	0.014	0.012	0.011
2	0.87	0.021	0.019	0.017	0.015
3	1.31	0.027	0.024	0.022	0.019
4	1.74	0.037	0.033	0.029	0.026
5	2.18	0.045	0.041	0.036	0.032
6	2.62	0.051	0.046	0.041	0.036
8	3.49	0.060	0.054	0.048	0.042
10	4.36	0.068	0.061	0.054	0.048
12	5.23	0.077	0.069	0.061	0.054
14	6.10	0.089	0.080	0.071	0.062
16	6.97	0.102	0.092	0.082	0.071
18	7.85	0.115	0.103	0.092	0.080
20	8.72	0.132	0.119	0.106	0.092

HSS
DRILLS

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

 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

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-микрозернистость 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
DRILLS

LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

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

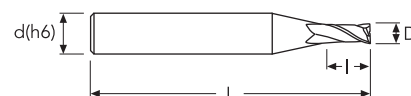
HSS
END-MILLS

CARBIDE
BURRS

cylindrical shank, 2F, miniature



C-SD-TA



● stock standard ○ non-standard stock ▽ stock exhaustion

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)	
	0.1	0.01	0.002		0.002		0.002		0.001	
	0.2	0.01	0.003		0.003		0.002		0.002	
	0.3	0.02	0.004		0.004		0.003		0.003	
	0.4	0.02	0.006		0.005		0.005		0.004	
	0.5	0.03	0.007		0.006		0.006		0.005	
	0.6	0.03	0.008		0.007		0.006		0.006	
	0.8	0.04	0.010		0.009		0.008		0.007	
	0.9	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

OSAWA
NORM

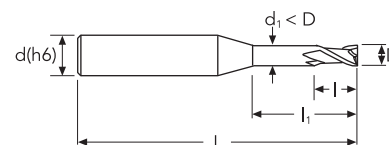
UH

NMG
UH RED<70
HRC

40°

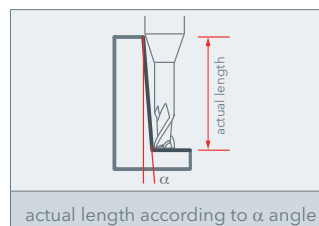
SQUARE

ZZ

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.	C	C Tol.	d(h6)	I	I1	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	●

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

UHLN2

cylindrical shank, 2F, extended and reduced neck

OSAWA
NORM

UH

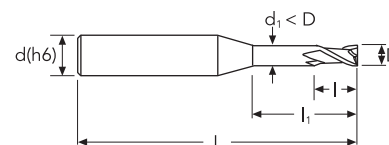
NMG
UH RED<70
HRC

40°

SQUARE

ZZ

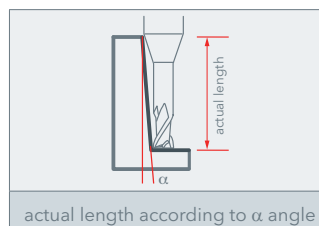
INFO

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

actual length according to α angle

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

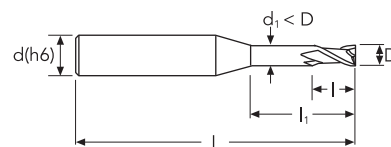
LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

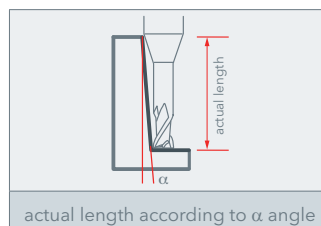
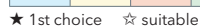
G2
MDTA
HF-VH/UP
MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLSCARBIDE
BURRS

cylindrical shank, 2F, extended and reduced neck



C-SD-1A



● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

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

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

CUTTING PARAMETERS

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-MILLSCARBIDE
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)
1.8	≤ 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



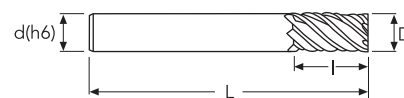
cylindrical shank, multi flute



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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	1.5D x 0.1D	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D
Vc (m/min)	140÷180	100÷140	80÷100	60÷80
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.008	0.008	0.007	0.006
4	0.012	0.011	0.010	0.008
5	0.014	0.013	0.012	0.010
6	0.018	0.016	0.014	0.013
8	0.028	0.025	0.022	0.019
10	0.034	0.030	0.027	0.024
12	0.041	0.037	0.033	0.029
14	0.048	0.043	0.038	0.034
16	0.056	0.051	0.045	0.039
18	0.066	0.059	0.053	0.046
20	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-MILLSCARBIDE
BURRS

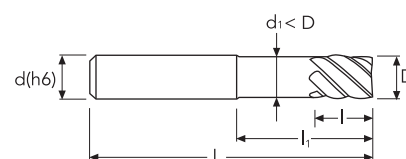
cylindrical shank, multi flute, long



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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	60÷65 HRC
ap x ae	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D
Vc (m/min)	90÷130	70÷110	50÷70	30÷50
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.007	0.006	0.006	0.005
4	0.010	0.009	0.008	0.007
5	0.012	0.011	0.010	0.009
6	0.015	0.014	0.012	0.011
8	0.023	0.021	0.019	0.016
10	0.029	0.026	0.023	0.020
12	0.035	0.031	0.028	0.024
14	0.041	0.037	0.033	0.029
16	0.048	0.043	0.038	0.034
20	0.066	0.060	0.053	0.046

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

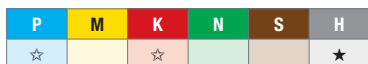
G2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLSCARBIDE
BURRS

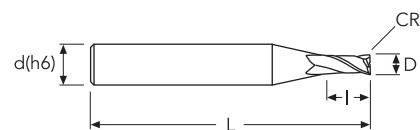
cylindrical shank, 2F, miniature, 6 mm. shank



| INFO



★ 1st choice ☆ suitable



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

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

UHM206

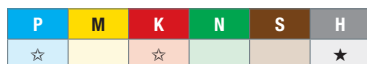
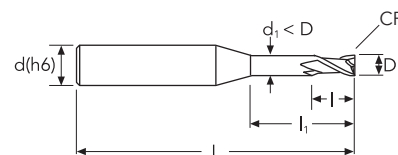
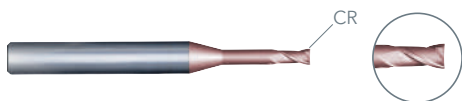
CARBIDE
DRILLS
 PU-HPU
 TA-4HTA
 SUH
 ALH
 HRC
 SUH MINI
 HL
 HSD
 C-SD-TA


SLOTING

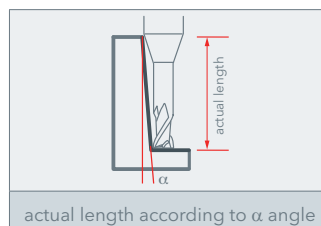
Material Group ISO 513		P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
Hardness/Rm		≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae		ap x D	ap x D	ap x D	ap x D
Vc (m/min)		80÷120	60÷100	50÷70	30÷50
D (mm)	ap (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
0.3	0.02	0.004	0.004	0.003	0.003
0.4	0.02	0.006	0.005	0.005	0.004
0.5	0.03	0.007	0.006	0.006	0.005
0.6	0.03	0.008	0.007	0.006	0.006
0.8	0.04	0.010	0.009	0.008	0.007
1	0.05	0.012	0.011	0.010	0.008
1.5	0.08	0.025	0.023	0.020	0.018
2	0.10	0.030	0.027	0.024	0.021

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

cylindrical shank, 2F, extended and reduced neck,
corner radius



SQUARE RIB

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

CUTTING PARAMETERS

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-MILLSCARBIDE
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
3	> 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
	≤ 10D	0.11	0.028	0.025	0.022	0.020
	≤ 12D	0.08	0.022	0.020	0.018	0.015
4	≤ 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
	≤ 8D	0.17	0.043	0.038	0.034	0.030
	≤ 10D	0.14	0.035	0.032	0.028	0.025
6	≤ 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
	≤ 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



OSAWA
NORM

UH

NMG
UH RED

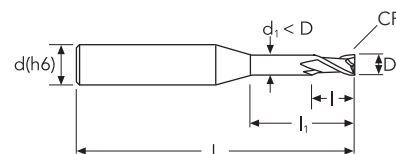
<70
HRC

40°

RADIUS

ZZ

INFO

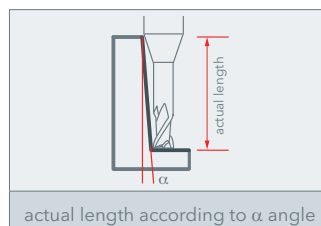


CARBIDE
DRILLS

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)	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
HFVH/UP
MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLS

CARBIDE
BURRS

INFO

UH212

cylindrical shank, 2F, extended and reduced neck,
corner radius

OSAWA
NORM

UH

NMG
UH RED<70
HRC

40°

RADIUS

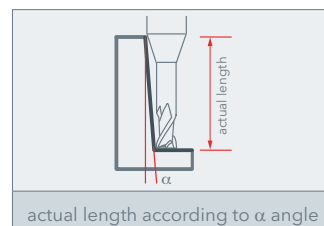
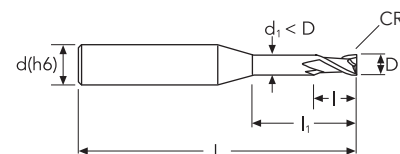
ZZ

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 angleHSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

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

HSS
END-MILLSCARBIDE
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	●

INFO

CUTTING PARAMETERS

UH212

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

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

CUTTING PARAMETERS

INFO

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
	> 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

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

cylindrical shank, 2F, reduced neck, corner radius



CARBIDE DRILLS

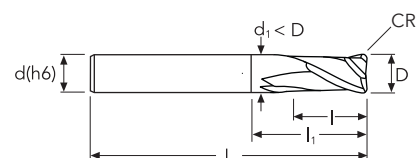
PU-HPU
TA-4HTA

ALH

SLIM MINI

HSD
CSD TA

C-SD-1A

[illegible]

CARBIDE END-MILLS

G2

MDTA

MEE

ALL

ALU
MEY/MUMEX/MA
1111/1111

UH/MH

HSS
END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

INFO

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	0.3D x D	0.2D x D	0.2D x D	0.1D x D
	Vc (m/min)	80÷120	60÷100	50÷70	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.007	0.006	0.006	0.005
	2	0.012	0.011	0.010	0.008
	3	0.017	0.015	0.014	0.012
	4	0.023	0.021	0.018	0.016
	5	0.030	0.027	0.024	0.021
	6	0.038	0.034	0.030	0.027
	8	0.050	0.045	0.040	0.035
	10	0.065	0.059	0.052	0.046
	12	0.080	0.072	0.064	0.056

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

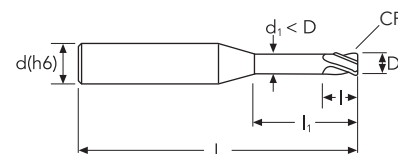
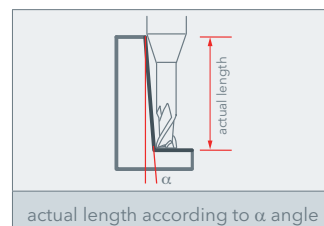
cylindrical shank, 4F Unequal Pitch,
extended and reduced neck, corner radius

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

HSS
END-MILLSCARBIDE
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	●

UHF4LN

cylindrical shank, 4F Unequal Pitch,
extended and reduced neck, corner radius



OSAWA
NORM

UH

NMG
UH RED

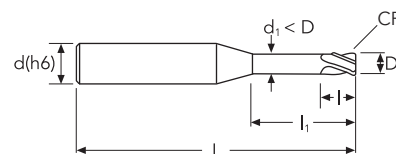
<70
HRC

25°

RADIUS

Z4 UP

INFO

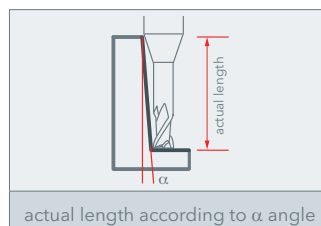


CARBIDE
DRILLS

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/-0.010	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

CUTTING PARAMETERS

INFO

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)
1	≤ 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
1.5	≤ 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
2	≤ 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
2.5	≤ 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
3	> 15D	0.04	0.009	0.008	0.007	0.006
	≤ 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
4	> 15D	0.05	0.010	0.009	0.008	0.007
	≤ 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

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

UHF-RT

cylindrical shank, multiflutes radius type
for high feed machining

OSAWA
NORM

UH

NMG
UH RED<70
HRC

20°

HIGH FEED

Z4

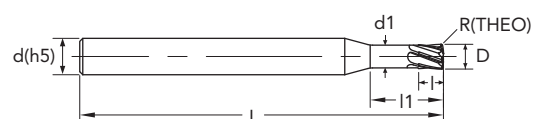
Z6

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)	I	I1	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	●

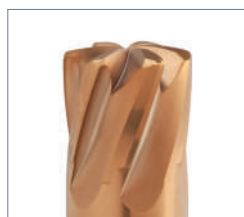
● stock standard ○ non-standard stock

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-MILLSCARBIDE
BURRS

CUTTING PARAMETERS

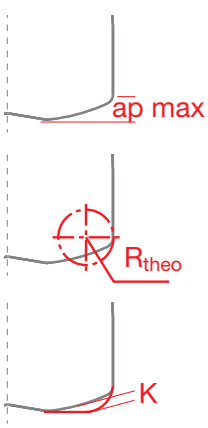
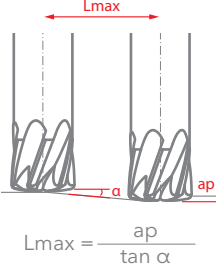
INFO

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	0.03D x 0.55D	0.03D x 0.55D	0.03D x 0.55D	
	Vc (m/min)	100÷120	80÷100	50÷70	
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	
	2	0.070	0.050	0.040	
	3	0.100	0.080	0.060	
	4	0.150	0.100	0.080	
	5	0.200	0.120	0.100	
	6	0.250	0.200	0.150	
	8	0.350	0.250	0.200	
	10	0.400	0.300	0.250	
	12	0.450	0.350	0.300	

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		EXAMPLE	EXAMPLE	
								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

INFO

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	0.03D x 0.3D	0.03D x 0.3D	0.02D x 0.3D	0.02D x 0.3D
	Vc (m/min)	110÷150	90÷130	60÷100	50÷70
	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	D2 - D3	0.02D x 0.3D	0.02D x 0.25D	0.01D x 0.02D	0.01D x 0.02D

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

cylindrical shank, 4F, reduced neck, corner radius



CARBIDE DRILLS

PU-HPU
TA-4HTA

ALH

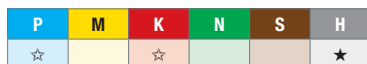
MINI

SUH MINI

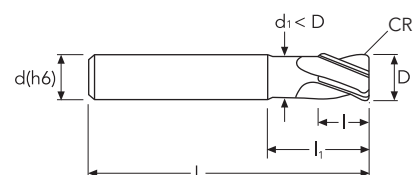
H

C-SD-TA

C-SD-1A



★ 1st choice ☆ suitable

[illegible]

CARBIDE END-MILLS

G2

MDTA

HF VH/UP

MEE

ALL

MEX/MH

UH/MH

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

INFO

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	D x 0.1D	D x 0.05D	D x 0.05D	D x 0.05D
	Vc (m/min)	90÷130	60÷100	50÷70	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	1	0.010	0.009	0.008	0.007
	2	0.020	0.018	0.016	0.014
	3	0.030	0.027	0.024	0.021
	4	0.040	0.036	0.032	0.028
	5	0.045	0.041	0.036	0.032
	6	0.050	0.045	0.040	0.035
	8	0.065	0.059	0.052	0.046
	10	0.085	0.077	0.068	0.060
	12	0.100	0.090	0.080	0.070

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

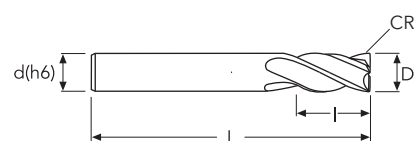
cylindrical shank, 4F, corner radius

CARBIDE
DRILLS

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

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-MILLSCARBIDE
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	●

INFO

CUTTING PARAMETERS

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	D x 0.1D	D x 0.05D	D x 0.05D	D x 0.05D
Vc (m/min)	90÷130	60÷100	50÷70	30÷50
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.010	0.009	0.008	0.007
2	0.018	0.016	0.014	0.013
3	0.027	0.024	0.022	0.019
4	0.036	0.032	0.029	0.025
5	0.041	0.036	0.032	0.028
6	0.045	0.041	0.036	0.032
8	0.059	0.053	0.047	0.041
10	0.077	0.069	0.061	0.054
12	0.090	0.081	0.072	0.063
14	0.102	0.092	0.082	0.071
16	0.114	0.103	0.091	0.080
18	0.126	0.113	0.101	0.088
20	0.138	0.124	0.110	0.097

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

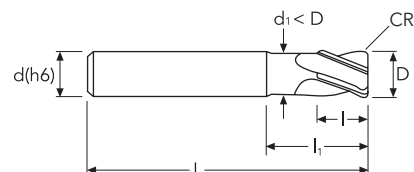
cylindrical shank, 4F, reduced neck, corner radius, long



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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
Hardness/Rm	≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
ap x ae	D x 0.05D	D x 0.05D	D x 0.05D	D x 0.05D
Vc (m/min)	90÷130	60÷100	50÷70	30÷50
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.027	0.024	0.022	0.019
4	0.036	0.032	0.029	0.025
5	0.041	0.036	0.032	0.028
6	0.045	0.041	0.036	0.032
8	0.059	0.053	0.047	0.041
10	0.077	0.069	0.061	0.054
12	0.090	0.081	0.072	0.063

HSS
DRILLS

LFTA
 SUTA
 HSS-HSS/CO

CARBIDE
END-MILLS

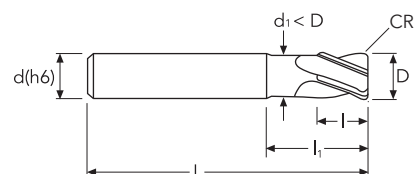
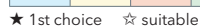
G2
 MDTA
 HF VH/UP
 MEF
 ALU
 MEX/MH
UH/MH

HSS
END-MILLSCARBIDE
BURRS

cylindrical shank, 4F, reduced neck, corner radius, long



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

UH412

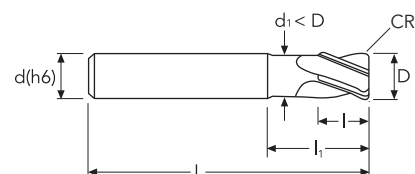
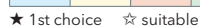
	Material Group ISO 513	P3 P4 P5 K2 K3	P6 K4 H1 H4 H5	H2	H3
	Hardness/Rm	≤45 HRC	45÷55 HRC	55÷60 HRC	60÷65 HRC
	ap x ae	D x 0.05D	D x 0.05D	D x 0.05D	D x 0.05D
	Vc (m/min)	80÷120	60÷100	50÷70	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	2	0.016	0.015	0.013	0.011
	3	0.024	0.022	0.019	0.017
	4	0.032	0.029	0.026	0.023
	5	0.036	0.033	0.029	0.026
	6	0.041	0.036	0.032	0.028
	8	0.053	0.047	0.042	0.037
	10	0.069	0.062	0.055	0.048
	12	0.081	0.073	0.065	0.057

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

cylindrical shank, 4F, reduced neck, corner radius, long



| INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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	D x 0.05D	D x 0.05D	D x 0.05D	D x 0.05D
	Vc (m/min)	70÷110	60÷80	40÷60	30÷50
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.041	0.036	0.032	0.028
	8	0.053	0.047	0.042	0.037
	10	0.069	0.062	0.055	0.048
	12	0.081	0.073	0.065	0.057
	16	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

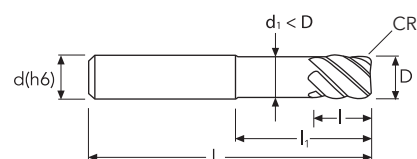
cylindrical shank, multi flute, reduced neck, corner radius



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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	D x 0.1D	D x 0.05D	D x 0.05D	D x 0.05D
	Vc (m/min)	140÷180	100÷140	70÷110	60÷80
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.018	0.016	0.014	0.013
	8	0.028	0.025	0.022	0.019
	10	0.034	0.030	0.027	0.024
	12	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

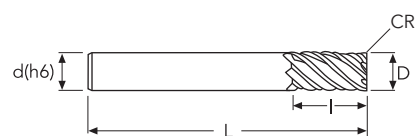
cylindrical shank, multi flute, long, corner radius



INFO



★ 1st choice ☆ suitable



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

[illegible]

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

CUTTING PARAMETERS

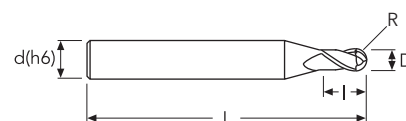
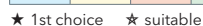
INFO

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	60÷65 HRC
	ap x ae	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D
	Vc (m/min)	110÷150	90÷130	60÷80	40÷60
	D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	6	0.015	0.014	0.012	0.011
	8	0.023	0.021	0.019	0.016
	10	0.029	0.026	0.023	0.020
	12	0.035	0.031	0.028	0.024
	16	0.048	0.043	0.038	0.034
	20	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

cylindrical shank, 2 flutes ball nose, miniature

[illegible]

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

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		0.05D x 0.1D	0.05D x 0.1D	0.05D x 0.1D	0.05D x 0.1D
Vc (m/min)		80÷120	60÷100	40÷80	20÷60
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
0.1	0.04	0.004	0.004	0.003	0.003
0.2	0.09	0.006	0.005	0.005	0.004
0.3	0.13	0.008	0.007	0.006	0.006
0.4	0.17	0.010	0.009	0.008	0.007
0.5	0.22	0.012	0.011	0.010	0.008
0.6	0.26	0.015	0.014	0.012	0.011
0.7	0.31	0.018	0.016	0.014	0.013
0.8	0.35	0.020	0.018	0.016	0.014
0.9	0.39	0.023	0.021	0.018	0.016
1	0.44	0.026	0.023	0.020	0.017
1.5	0.79	0.040	0.036	0.030	0.026
2	1.20	0.055	0.050	0.041	0.036



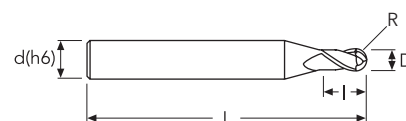
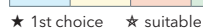
α	n (rpm)	Vf (mm/min)
15°	x 1.1	x 1.1

HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
 HF VH/UP
 MEF
 ALU
 MEX/MH
UH/MH
HSS
END-MILLSCARBIDE
BURRS

cylindrical shank, 2 flutes ball nose, miniature, 6 mm. shank



INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

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		0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D
	Vc (m/min)		80÷120	60÷100	40÷80	20÷60
	D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
	0.4	0.17	0.010	0.009	0.008	0.007
	0.5	0.22	0.012	0.011	0.010	0.008
	0.6	0.26	0.015	0.014	0.012	0.011
	0.8	0.35	0.020	0.018	0.016	0.014

	α	n (rpm)	Vf (mm/min)
	15°	x 1.1	x 1.1

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

MHLNB2

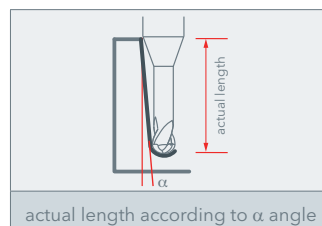
cylindrical shank, 2 flutes ball nose, extended and reduced neck, miniature



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)	I	I1	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
HFVH/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

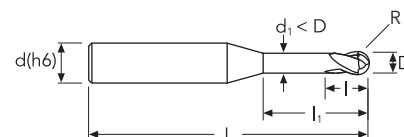
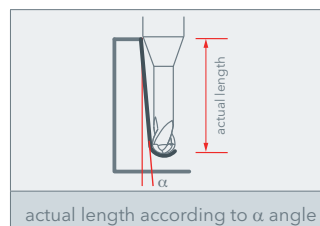


CARBIDE DRILLS

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

P	M	K	N	S	H
★		★			★

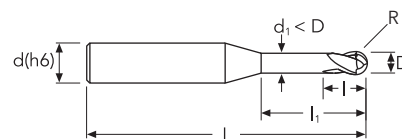
★ 1st choice ★ suitable



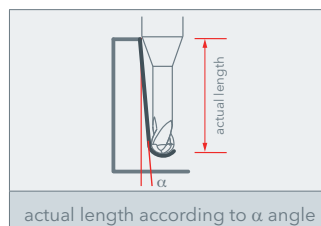
D	D Tol.	R	R Tol.	d(h6)	l	l1	d1	L	z	30°	1°	1°30'	2°	3°	EDP No.	Stock
1	0/-0.015	0.50	0/-0.020	4	0.8	14	0.9	50	2	14.64	15.13	15.65	16.19	17.37	MHLNB201014	●
1	0/-0.015	0.50	0/-0.020	4	0.8	16	0.9	50	2	16.71	17.27	17.86	18.49	19.84	MHLNB201016	●
1	0/-0.015	0.50	0/-0.020	4	0.8	20	0.9	60	2	20.84	21.55	22.29	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	●

● stock standard ○ non-standard stock ▽ stock exhaustion

cylindrical shank, 2 flutes ball nose, extended and reduced neck, miniature



★ 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

INFO

CUTTING PARAMETERS

MHLNB2

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

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)
0.2	≤ 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

CUTTING PARAMETERS

INFO

MHLNB2

 ROUND RIB	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)	
	4	≤ 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		

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

 α	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-MILLSCARBIDE
BURRS

CUTTING PARAMETERS

INFO

MHCRB2

ROUND RIB

Material Group ISO 513				P3P4P5K2K3	P6K4H1H4H5	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	
	>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	

	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

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

cylindrical shank, 2 flutes ball nose



CARBIDE DRILLS

PU-HPU
TA-4HTA

ALH

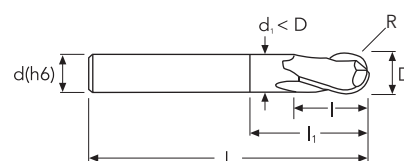
SLIM MINI

HSD
GSD TA

C-SD-1A



★ 1st choice ☆ suitable

[illegible]

CARBIDE END-MILLS

G2

MDTA

MEE

ALL

ALU
MEY/MUMEX/MA
111/111

UH/MH

HSS
END-MILLS

CARBIDE BURRS

CUTTING PARAMETERS

INFO

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		0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D
Vc (m/min)		140÷180	100÷140	80÷100	60÷80
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.44	0.009	0.008	0.007	0.006
1.5	0.79	0.012	0.011	0.010	0.008
2	1.20	0.012	0.011	0.010	0.008
2.5	1.65	0.015	0.014	0.012	0.011
3	2.14	0.018	0.016	0.014	0.013
4	3.20	0.025	0.023	0.020	0.018
5	4.33	0.032	0.029	0.026	0.022
6	5.50	0.038	0.034	0.030	0.027
8	7.84	0.048	0.043	0.038	0.034
10	10.00	0.057	0.051	0.046	0.040
12	11.76	0.067	0.060	0.054	0.047
14	12.83	0.080	0.072	0.064	0.056
16	12.80	0.095	0.086	0.076	0.067
18	10.80	0.108	0.097	0.086	0.076
20	12.00	0.108	0.097	0.086	0.076

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


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-MILLSCARBIDE
BURRS

CUTTING PARAMETERS

INFO

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		0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D
Vc (m/min)		120÷160	100÷130	70÷90	50÷70
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.44	0.015	0.014	0.012	0.011
2	0.87	0.021	0.019	0.017	0.015
3	1.31	0.027	0.024	0.022	0.019
4	1.74	0.037	0.033	0.029	0.026
5	2.18	0.045	0.041	0.036	0.032
6	2.62	0.051	0.046	0.041	0.036
8	3.49	0.060	0.054	0.048	0.042
10	4.36	0.068	0.061	0.054	0.048
12	5.23	0.077	0.069	0.061	0.054
14	6.10	0.089	0.080	0.071	0.062
16	6.97	0.102	0.092	0.082	0.071
18	7.85	0.115	0.103	0.092	0.080
20	8.72	0.132	0.119	0.106	0.092

CARBIDE DRILLS

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

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

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

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		0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D	0.05D x 0.2D
Vc (m/min)		110÷150	80÷120	50÷90	40÷60
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
1	0.44	0.015	0.014	0.012	0.011
2	0.87	0.021	0.019	0.017	0.015
3	1.31	0.027	0.024	0.022	0.019
4	1.74	0.037	0.033	0.029	0.026
5	2.18	0.045	0.041	0.036	0.032
6	2.62	0.051	0.046	0.041	0.036
8	3.49	0.060	0.054	0.048	0.042
10	4.36	0.068	0.061	0.054	0.048
12	5.23	0.077	0.069	0.061	0.054
14	6.10	0.089	0.080	0.071	0.062
16	6.97	0.102	0.092	0.082	0.071
18	7.85	0.115	0.103	0.092	0.080
20	8.72	0.132	0.119	0.106	0.092

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

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

HSS END MILLS



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DOVETAIL .	673
T-SLOT .	677
WOODRUFF .	679

Legenda
 Verzeichnis
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 Условные обозначения

STOCK		
●	stock standard stock standard Standard Lager	stock standard stock estándar складская позиция
○	non-standard stock stock non standard nicht Standard Lager	stock non standard stock no estándar не складская позиция
▽	stock exhaustion esaurimento stock Vorratserschöpfung	épuisement du stock agotamiento de stock складские остатки

APPLICATION GUIDELINES INDICAZIONI PER L'APPLICAZIONE LEITFADEN ZUR ANWENDUNG INDICATIONS POUR L'APPLICATION INDICACIONES PARA SU APLICACIÓN УКАЗАНИЯ ПО ПРИМЕНЕНИЮ		
★	1st choice 1° scelta 1. Wahl	1er choix 1ª elección 1-й выбор
☆	suitable adatto geeignet	adapté adecuado пригоден

SHANK ATTACCO SCHAFT QUEUE MANGO ХВОСТОВИК		
	cylindrical shank attacco cilindrico zylindrischer Schaft	queue cylindrique mango cilíndrico цилиндрическое крепление
	Weldon	

MILLING STRATEGY STRATEGIA DI FRESATURA FRÄSSTRATEGIE STRATÉGIES DE FRAISAGE ESTRATEGIA DE FRESADO СТРАТЕГИЯ ФРЕЗЕРОВАНИЯ		
	slotting fresatura di cave Nutfräsen	fraisage de pièce taillée dans la masse fresado de una sola pieza фрезерование пазов
	side milling contornatura Konturfräsen	contournage perfiladura фрезерование по контуру
	copying copiatura Kopieren	copiage copia копирование
	drilling foratura Bohren	perçage perforación сверление

🇮🇹 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 Т-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		
	✚ 2 flutes 🇮🇹 2 taglienti 🇩🇪 2 Schneiden	🇫🇷 2 arêtes de coupe 🇪🇸 2 filos 🇷🇺 2 зуба
	✚ 3 flutes 🇮🇹 3 taglienti 🇩🇪 3 Schneiden	🇫🇷 3 arêtes de coupe 🇪🇸 3 filos 🇷🇺 3 зуба
	✚ 4 flutes 🇮🇹 4 taglienti 🇩🇪 4 Schneiden	🇫🇷 4 arêtes de coupe 🇪🇸 4 filos 🇷🇺 4 зуба
	✚ 6 flutes 🇮🇹 6 taglienti 🇩🇪 6 Schneiden	🇫🇷 6 arêtes de coupe 🇪🇸 6 filos 🇷🇺 6 зубьев
	✚ >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		
	✚ roughing coarse pitch 🇮🇹 sgrossare passo grosso 🇩🇪 Schruppfräser Regelgewinde	🇫🇷 ébauche pas gros 🇪🇸 desbaste paso grueso 🇷🇺 черновая с крупным шагом
	✚ roughing fine pitch 🇮🇹 sgrossare passo fine 🇩🇪 Schruppfräser Feingewinde	🇫🇷 ébauche pas fin 🇪🇸 desbaste paso fino 🇷🇺 черновая с мелким шагом

✚ MATERIAL 🇮🇹 MATERIALE 🇩🇪 WERKSTOFF 🇫🇷 MATIÈRE 🇪🇸 MATERIAL 🇷🇺 МАТЕРИАЛ		
	✚ 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%
	✚ powder steel 🇮🇹 acciaio sinterizzato 🇩🇪 Sinterstahl	🇫🇷 acier fritté 🇪🇸 acero sinterizado 🇷🇺 порошковая сталь

✚ SURFACE TREATMENT 🇮🇹 TRATTAMENTO SUPERFICIALE 🇩🇪 OBERFLÄCHENBEHANDLUNG 🇫🇷 TRAITEMENT DE SURFACE 🇪🇸 TRATAMIENTO SUPERFICIAL 🇷🇺 ОБРАБОТКА ПОВЕРХНОСТИ		
	✚ uncoated 🇮🇹 non rivestito 🇩🇪 unbeschichtet	🇫🇷 non revêtu 🇪🇸 no revestido 🇷🇺 без покрытия

 Legenda
  Verzeichnis
  Légende
  Leyenda
  Условные обозначения

 COATINGS  RIVESTIMENTI  BESCHICHTUNGEN  REVÊTEMENTS  RECUBRIMIENTOS  ПОКРЫТИЕ		
		... PV200
 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	WS2	640	
	TAWS2	640	
	UMWS2	640	
	WL2	643	
	TAWL2	643	
	WSA2	645	
	WS3	647	
	TAWS3	647	
	WL3	649	
	TAWL3	649	
	TAWSH3	651	
	WS4(6)	653	
	TAWS4(6)	653	
	UMWS4	653	
	WL4(6)	655	
	TAWL4(6)	655	
HSS/Co - HSSP general purpose, roughing	TAWSR	657	
	WSFR	659	
	TAWSFR	659	
	UMWSFR	659	
	WLFR	661	
	TAWLFR	661	
HSS/Co general purpose, ball nose	WSB2	663	
	TAWSB2	663	
	WLB2	665	
	TAWLB2	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



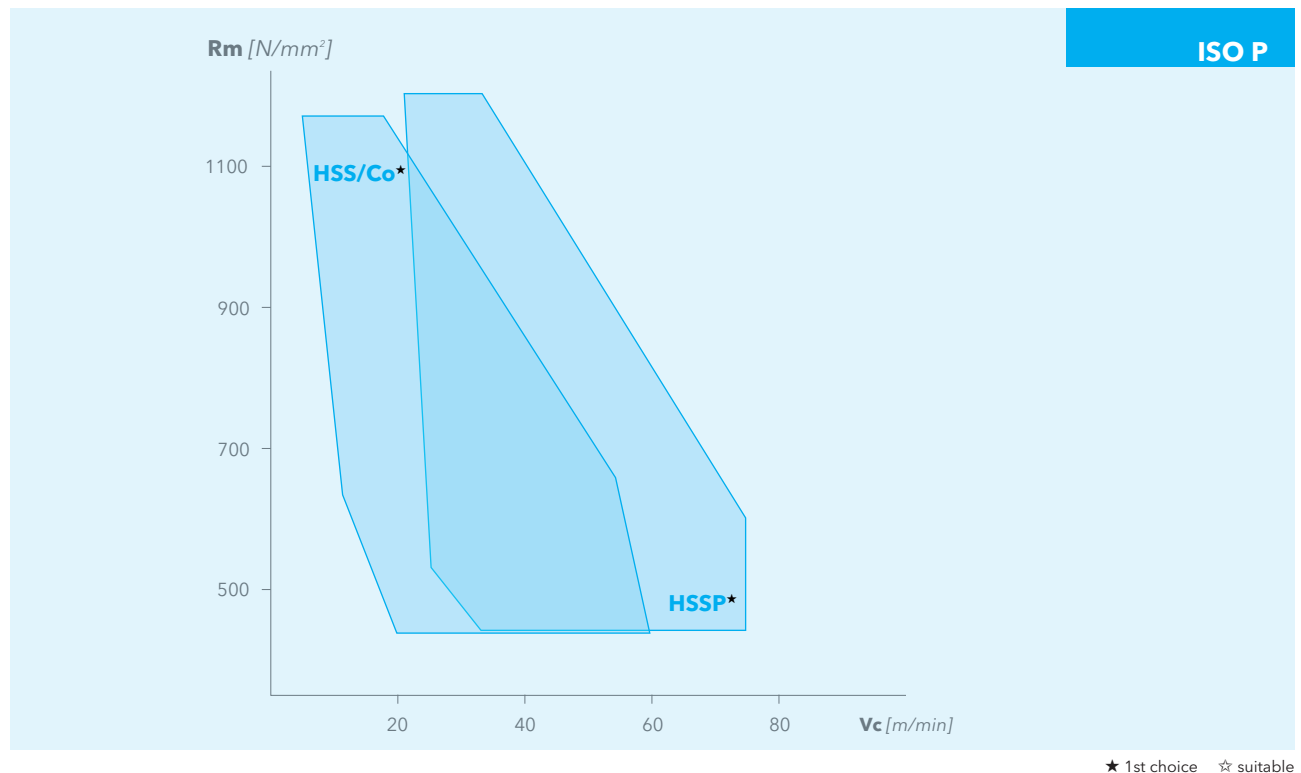
	ITEM No.	PAGE	
HSS/Co general purpose, shell	FM	667	
	TAFM	667	
	FFR	669	
HSS/Co general purpose, shell	TAFFR	669	
HSS/Co general purpose, corner rounding	WCR	671	
HSS/Co general purpose, dovetail	WDC	673	
	WDD	675	
HSS/Co general purpose, T-slot	WTM	677	
HSS/Co general purpose, woodruff	WWK	679	

 Indice grafico
  Auswahlhilfe
  Indice graphique
  Índice gráfico
  Руководство по выбору

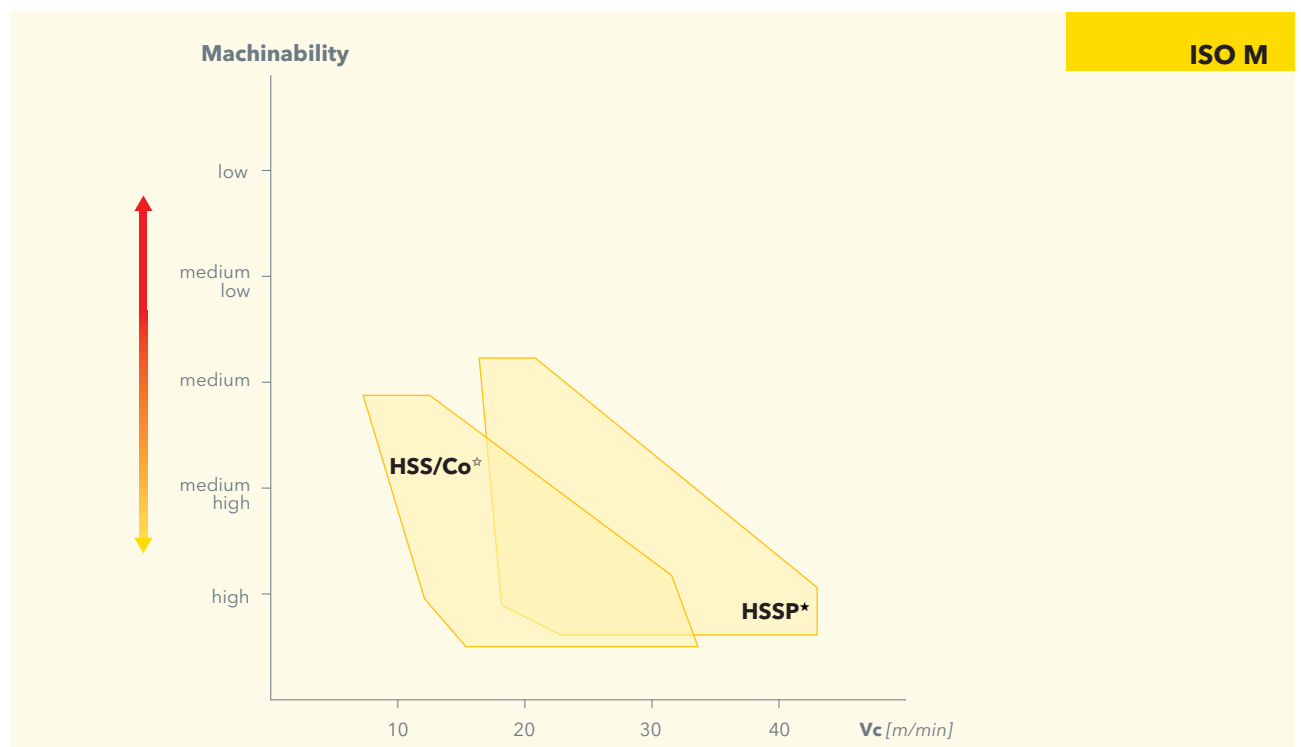
RANGE	NORM	TYPE	MATERIAL / COATING	HELIX ANGLE	GEOMETRY	Z	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H
40-100	DIN 1880	N	HSS/Co BR	30°	SQUARE	8-10	★	☆	★	☆		
40-100	DIN 1880	N	HSS/Co PV200	30°	SQUARE	8-10	★	☆	★	☆		
40-100	DIN 1880	N - HR	HSS/Co BR	30°	SQUARE	6-10	★	☆	★	☆		
40-100	DIN 1880	N - HR	HSS/Co PV200	30°	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

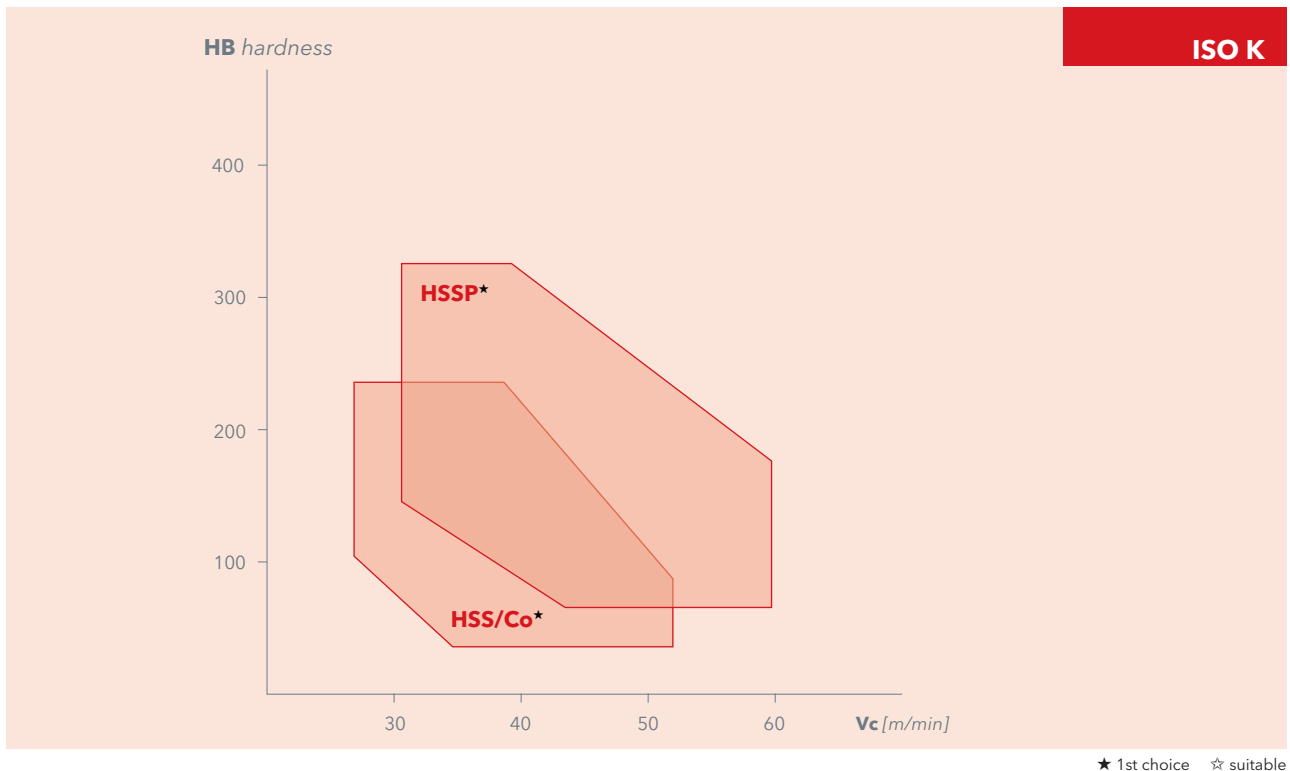


STAINLESS STEEL APPLICATION

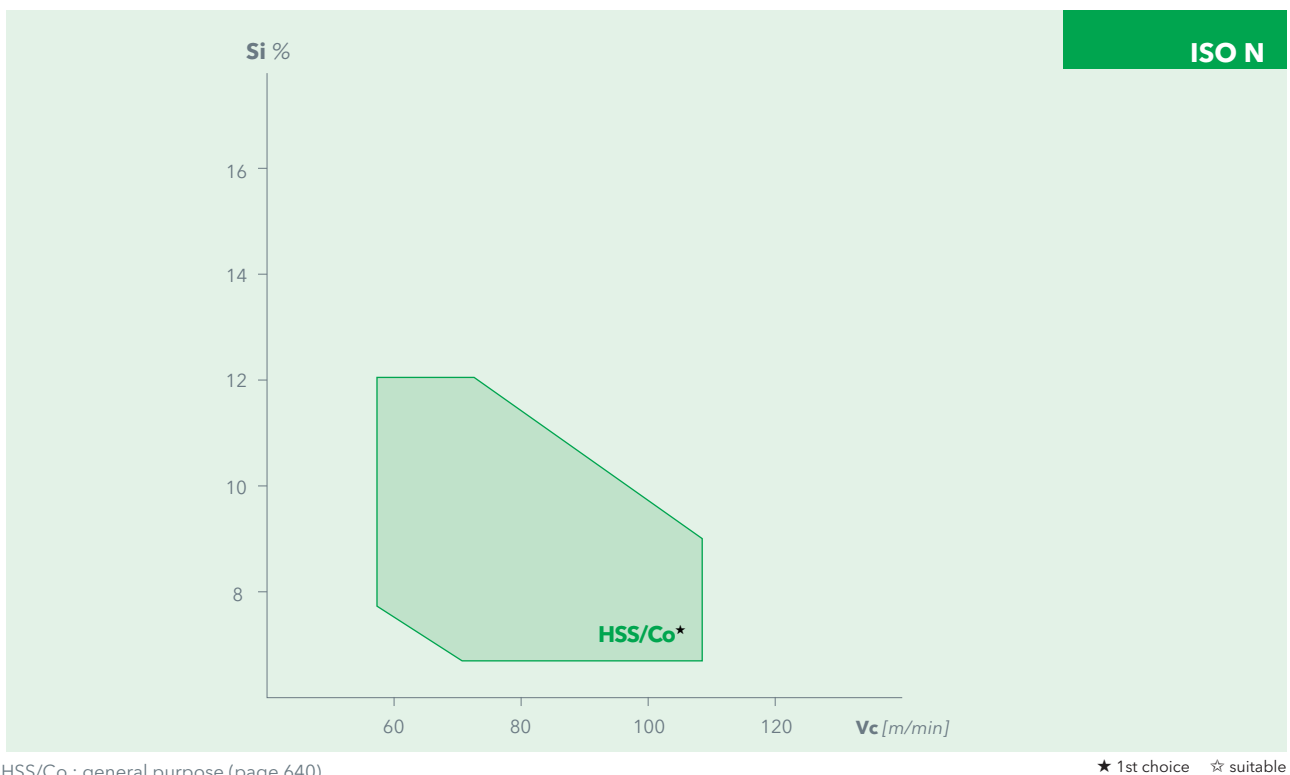


HSS/Co : general purpose (page 640)
HSSP : high performance (page 640)

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

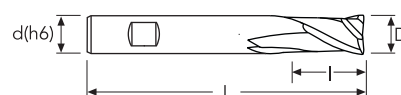
UM

HSS-P
PV200CARBIDE
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



							WS2		TAWS2		UMWS2	
D(e8)	D Tol.	d(h6)	l	l1	L	z	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

CUTTING PARAMETERS

INFO

TAWS2

UMWS2 (Vc = +20%) - WS2 (Vc = -20% ÷ -30%)

 SLOTING	Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
	ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
	Vc (m/min)	40÷60	30÷50	25÷35	15÷25
	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
DRILLSPU-HPU
TA-4HTA
SUH
ALH
HRC
SUH MINI
HL
HSD
C-SD-TAHSS
DRILLSLFTA
SUTA
HSS-HSS/CO

 SIDE MILLING	Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
	Hardness/Rm	≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
	ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.3D	1.5D x 0.3D
	Vc (m/min)	50÷70	40÷60	30÷40	20÷30
	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-MILLSG2
MDTA
HF-VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

INFO

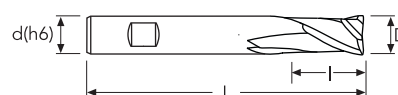
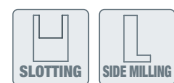
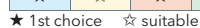
CUTTING PARAMETERS

TAWS2

UMWS2 (Vc = +20%) - WS2 (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-MILLSCARBIDE
BURRS

Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae	0.5D x D	0.5D x D	0.5D x D	0.5D x D
Vc (m/min)	30÷50	25÷35	20÷30	12÷18
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.005	0.003	0.002	0.002
4	0.007	0.004	0.003	0.003
5	0.009	0.006	0.005	0.005
6	0.011	0.008	0.006	0.006
8	0.016	0.010	0.008	0.008
10	0.020	0.014	0.012	0.011
12	0.024	0.018	0.015	0.014
14	0.029	0.022	0.018	0.017
16	0.034	0.026	0.021	0.020
18	0.039	0.030	0.025	0.023
20	0.044	0.035	0.029	0.027
22	0.049	0.040	0.033	0.031
24	0.053	0.044	0.037	0.034
25	0.055	0.047	0.039	0.037
26	0.058	0.050	0.041	0.039
28	0.061	0.052	0.044	0.041
30	0.064	0.055	0.046	0.043

weldon shank, 2 flutes, long

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

| 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

CUTTING PARAMETERS

TAWL2

WL2 (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 ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae	0.3D x D	0.3D x D	0.3D x D	0.3D x D
Vc (m/min)	30÷50	25÷35	20÷30	12÷18
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
ap x ae	≤ D5	0.25D x D		

HSS
DRILLSLFTA
SUTA
HSS-HSS/CO

Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae	0.2D x 0.1D	0.2D x 0.1D	0.2D x 0.1D	0.2D x 0.1D
Vc (m/min)	35÷55	30÷40	25÷35	12÷20
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
ap x ae	≤ D5	1.5D x 0.05D		

CARBIDE
END-MILLSG2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

weldon shank, 2 flutes for aluminium

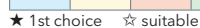
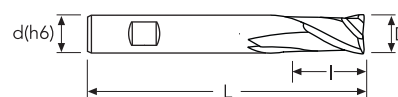


ALU

HSS/Co
BR



INFO


SIDE MILLING

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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

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

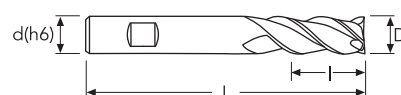
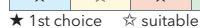

Material Group ISO 513	N1	N2	N3 N4	N5
Hardness/Rm				
ap x ae	0.5D x 0.5D	0.5D x 0.5D	0.5D x 0.5D	0.5D x 0.5D
Vc (m/min)	70÷90	55÷75	50÷60	90÷110
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	0.010	0.007	0.006	0.009
4	0.015	0.009	0.008	0.012
5	0.018	0.014	0.012	0.018
6	0.021	0.016	0.014	0.021
8	0.028	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-MILLSCARBIDE
BURRS

weldon shank, 3 flutes



| INFO



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

TAWS3

WS3 (Vc = -20% ÷ -30%)

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

SLOTING

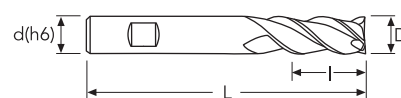
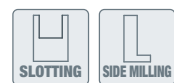
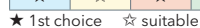


SIDE MILLING

Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae	0.3D x D	0.3D x D	0.3D x D	0.3D x D
Vc (m/min)	40÷60	30÷50	25÷35	15÷25
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		

Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.3D	1.5D x 0.3D
Vc (m/min)	50÷70	40÷60	30÷40	20÷30
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	1.5D x 0.25D	1.2D x 0.1D

weldon shank, 3 flutes, long

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

CUTTING PARAMETERS

TAWL3

WL3 (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 ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae	0.3D x D	0.3D x D	0.3D x D	0.2D x D
Vc (m/min)	30÷50	25÷35	20÷30	12÷18
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
ap x ae	≤ D5	0.25D x D		

HSS
DRILLSLFTA
SUTA
HSS-HSS/CO

Material Group ISO 513	P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm	≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae	2D x 0.1D	2D x 0.1D	2D x 0.1D	2D x 0.1D
Vc (m/min)	40÷50	30÷40	25÷35	10÷20
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
ap x ae	≤ D5	1.5D x 0.05D	1.5D x 0.05D	1.5D x 0.05D

CARBIDE
END-MILLSG2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

weldon shank 3 flutes

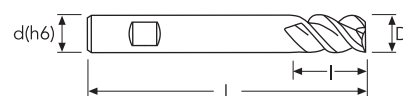
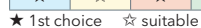


N

HSS/Co
PV200



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

CUTTING PARAMETERS

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 ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae	0.3D x D	0.3D x D	0.3D x D	0.3D x D
Vc (m/min)	40÷60	30÷50	25÷35	15÷25
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
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

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 ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.3D	1.5D x 0.3D
Vc (m/min)	50÷70	40÷60	30÷40	20÷30
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.018	0.017	0.015	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

CARBIDE
END-MILLS

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

HSS
END-MILLSCARBIDE
BURRS

INFO

CUTTING PARAMETERS

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-MILLSCARBIDE
BURRS

Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae		1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.3D	1.5D x 0.3D
Vc (m/min)		50÷70	40÷60	30÷40	20÷30
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	1.2D x 0.1D	1.2D x 0.1D

weldon shank, 4 flutes-6 flutes, long



N

HSS/Co
BR

HSS/Co
PV200



| INFO



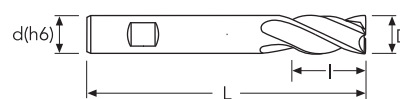
WL4(6)



TAWL4(6)

P	M	K	N	S	H
★	☆	★	☆		

★ 1st choice ☆ suitable

[illegible]

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

CUTTING PARAMETERS

TAWL4

WL4 (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-MILLSCARBIDE
BURRS

Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae		2D x 0.1D	2D x 0.1D	2D x 0.1D	2D x 0.1D
Vc (m/min)		40÷50	30÷40	25÷35	10÷20
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

weldon shank, roughing NR

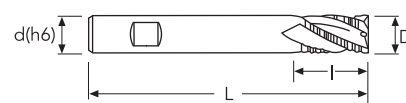
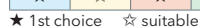


N

HSS/Co
PV200



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

CUTTING PARAMETERS

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 ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae	D x D	D x D	D x D	0.5D x D
Vc (m/min)	40÷60	30÷50	25÷35	15÷25
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.022	0.020	0.018	0.017
8	0.028	0.025	0.022	0.019
10	0.035	0.032	0.028	0.025
12	0.045	0.041	0.036	0.032
14	0.055	0.050	0.044	0.039
16	0.065	0.059	0.052	0.046
18	0.075	0.068	0.060	0.053
20	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 ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae	1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.3D	1.5D x 0.3D
Vc (m/min)	50÷70	40÷60	30÷40	20÷30
D (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
6	0.026	0.024	0.021	0.018
8	0.033	0.030	0.026	0.023
10	0.042	0.038	0.034	0.029
12	0.054	0.049	0.043	0.038
14	0.066	0.059	0.053	0.046
16	0.078	0.070	0.062	0.055
18	0.090	0.081	0.072	0.063
20	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

weldon shank, roughing HR



| INFO



WSFR

N

HSS/Co
BR

TAWSE

N

HSS/Co
PV200



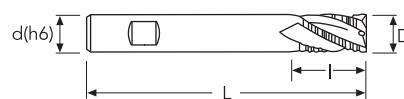
UMWSFR

UM

HSS-P
PV200

P	M	K	N	S	H
★	☆	★	☆		
★	★	★			

WSFR-TAWSFR
UMWSFR



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

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

TAWSF_RUMWSF_R (V_c = +20%) - WSF_R (V_c = -20% ÷ -30%)CARBIDE
DRILLS
 PU-HPU
 TA-4HTA
 SUH
 ALH
 HRC
 SUH MINI
 HL
 HSD
 C-SD-TA

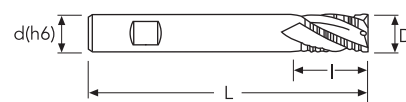
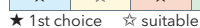

Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae		D x D	D x D	D x D	0.5D x D
V _c (m/min)		40÷60	30÷50	25÷35	15÷25
D (mm)	z	f _z (mm/z)	f _z (mm/z)	f _z (mm/z)	f _z (mm/z)
6	3	0.022	0.020	0.018	0.017
8	3	0.028	0.025	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 ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae		1.5D x 0.5D	1.5D x 0.5D	1.5D x 0.3D	1.5D x 0.3D
V _c (m/min)		50÷70	40÷60	30÷40	20÷30
D (mm)	z	f _z (mm/z)	f _z (mm/z)	f _z (mm/z)	f _z (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-MILLSCARBIDE
BURRS

weldon shank, roughing HR, long



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

TAWLFR

WLFR (Vc = -20% ÷ -30%)

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

SLOTING

Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae		0.5D x D	0.5D x D	0.5D x D	0.3D x D
Vc (m/min)		35÷45	25÷35	20÷30	10÷20
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
DRILLSLFTA
SUTA
HSS-HSS/CO

SIDE MILLING

Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae		1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.3D	1.5D x 0.2D
Vc (m/min)		35÷45	25÷35	20÷30	10÷20
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-MILLSG2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MHHSS
END-MILLSCARBIDE
BURRS

weldon shank, 2 flutes ball nose



INFO



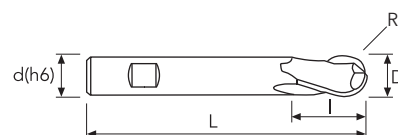
WSB2



TAWSB2



★ 1st choice ☆ suitable

[illegible]

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

CUTTING PARAMETERS

TAWSB2

WSB2 (Vc = -20% ÷ -30%)

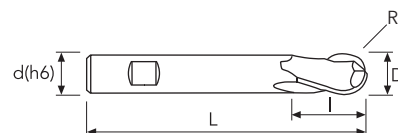
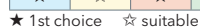
CARBIDE
DRILLS
 PU-HPU
 TA-4HTA
 SUH
 ALH
 HRC
 SUH MINI
 HL
 HSD
 C-SD-TA
HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
 HF VH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

Material Group ISO 513		P1 P2	P3 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae		0.1D x 0.2D	0.1D x 0.2D	0.1D x 0.2D	0.1D x 0.2D
Vc (m/min)		40÷60	30÷50	25÷35	15÷25
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
2	1.20	0.020	0.018	0.016	0.015
3	1.80	0.040	0.036	0.032	0.030
4	2.40	0.060	0.054	0.048	0.045
5	3.00	0.070	0.063	0.056	0.053
6	3.60	0.082	0.074	0.066	0.062
8	4.80	0.094	0.085	0.075	0.071
10	6.00	0.110	0.099	0.088	0.083
12	7.20	0.130	0.117	0.104	0.098
14	8.40	0.150	0.135	0.120	0.113
16	9.60	0.170	0.153	0.136	0.128
18	10.80	0.190	0.171	0.152	0.143
20	12.00	0.210	0.189	0.168	0.158
22	13.20	0.232	0.209	0.186	0.174
25	15.00	0.262	0.236	0.210	0.197
28	16.80	0.285	0.257	0.228	0.214
30	18.00	0.292	0.263	0.233	0.219



α	n (rpm)	Vf (mm/min)
15°	x 1.1	x 1.1

weldon shank, 2 flutes ball nose, 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
HF VH/UP
MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLS

CARBIDE
BURRS

INFO

CUTTING PARAMETERS

TAWLB2

WLB2 (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 ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae		0.1D x 0.2D	0.1D x 0.2D	0.1D x 0.2D	0.1D x 0.2D
Vc (m/min)		30÷40	25÷35	20÷30	12÷18
D (mm)	D(eff.) (mm)	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
3	1.80	0.034	0.031	0.027	0.026
4	2.40	0.051	0.046	0.041	0.038
5	3.00	0.060	0.054	0.048	0.045
6	3.60	0.070	0.063	0.056	0.052
8	4.80	0.080	0.072	0.064	0.060
10	6.00	0.094	0.084	0.075	0.070
12	7.20	0.111	0.099	0.088	0.083
14	8.40	0.128	0.115	0.102	0.096
16	9.60	0.145	0.130	0.116	0.108
18	10.80	0.162	0.145	0.129	0.121
20	12.00	0.179	0.161	0.143	0.134



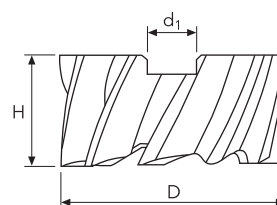
α	n (rpm)	Vf (mm/min)
15°	x 1.1	x 1.1

HSS
DRILLS
 LFTA
 SUTA
 HSS-HSS/CO
CARBIDE
END-MILLS
 G2
 MDTA
 HF VH/UP
 MEF
 ALU
 MEX/MH
 UH/MH
HSS
END-MILLSCARBIDE
BURRS

shell mill, multi flute



★ 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

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

TAFFM

FM (Vc = -20% ÷ -30%)

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 P7 K1	P4 M1 K2	P5 M2
Hardness/Rm		≤700 N/mm ²	600÷800 N/mm ²	800÷1000 N/mm ²	900÷1200 N/mm ²
ap x ae		0.25D x 0.75D	0.25D x 0.75D	0.25D x 0.75D	0.25D x 0.75D
Vc (m/min)		40÷60	30÷50	25÷35	15÷25
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
40	8	0.060	0.054	0.048	0.045
50	8	0.070	0.063	0.056	0.053
63	8	0.080	0.072	0.064	0.060
80	10	0.100	0.090	0.080	0.075
100	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

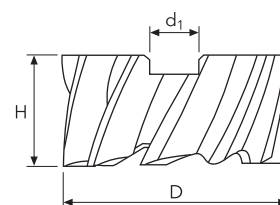
HSS
END-MILLS

CARBIDE
BURRS

shell mill, multi flute, roughing HR



★ 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

● stock standard ○ non-standard stock ▽ stock exhaustion

INFO

TAFFR

FFR (Vc = -20% ÷ -30%)

CARBIDE
DRILLS

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



SIDE MILLING

Material Group ISO 513		P1P2	P3P7K1	P4M1K2	P5M2
Hardness/Rm		≤700 N/mm²	600÷800 N/mm²	800÷1000 N/mm²	900÷1200 N/mm²
ap x ae		0.25D x 0.75D	0.25D x 0.75D	0.25D x 0.75D	0.25D x 0.75D
Vc (m/min)		40÷60	30÷50	25÷35	15÷25
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
40	8	0.080	0.072	0.064	0.060
50	8	0.100	0.090	0.080	0.075
63	8	0.120	0.108	0.096	0.090
80	10	0.120	0.108	0.096	0.090
100	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

corner rounding

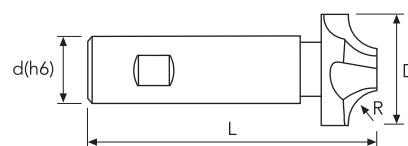
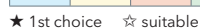


N

HSS/Co
BR



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

CUTTING PARAMETERS

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-MILLSCARBIDE
BURRS

Material Group ISO 513	P1 P2 P3 P4	P7 M1	K1 K2	N1 N2 N3 N4
Hardness/Rm	≤800 N/mm ²	≤750 N/mm ²	≤350 HB	
ap x ae	0.2D x 0.2D	0.2D x 0.2D	0.2D x 0.2D	0.2D x 0.2D
Vc (m/min)	30÷50	15÷25	30÷40	60÷80
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

Dovetail cutter



N

HSS/Co
BR

α

45°

O

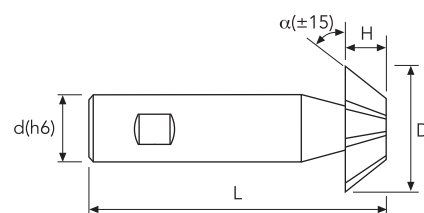
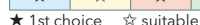
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Z6~Z12

INFO

WDC 45 WDC 60



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

LFTA
SUTA
HSS-HSS/CO

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

WDC 45° - 60°

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 ²	≤750 N/mm ²	≤350 HB	
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)
16	6	0.015	0.011	0.013	0.017
20	6	0.017	0.012	0.014	0.018
22	6	0.018	0.013	0.015	0.020
25	8	0.020	0.014	0.017	0.022
28	8	0.023	0.016	0.019	0.025
32	10	0.025	0.018	0.021	0.028
38	12	0.028	0.020	0.024	0.031

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

Dovetail cutter



N

HSS/Co
BR

α

45°

α

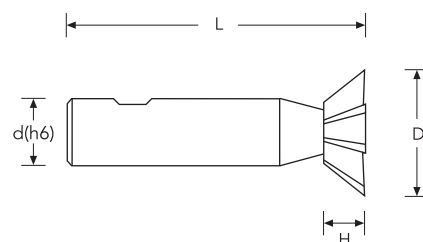
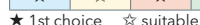
60°



76~Z12

INFO

WDD 45 WDD 60



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

LFTA
SUTA
HSS-HSS/CO

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

WDD 45° - 60°

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 ²	≤750 N/mm ²	≤350 HB	
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)
16	6	0.015	0.011	0.013	0.017
20	6	0.017	0.012	0.014	0.018
22	6	0.018	0.013	0.015	0.020
25	8	0.020	0.014	0.017	0.022
28	8	0.023	0.016	0.019	0.025
32	10	0.025	0.018	0.021	0.028
38	12	0.028	0.020	0.024	0.031

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

CARBIDE
END-MILLS

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

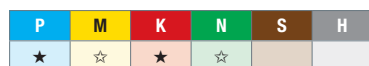
HSS
END-MILLS

CARBIDE
BURRS

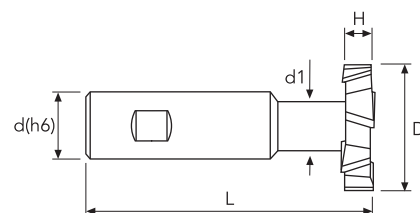
T-slot



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE
BURRS[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

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 ²	≤750 N/mm ²	≤350 HB	
ap x ae		DIN Norm 650	DIN Norm 650	DIN Norm 650	DIN Norm 650
Vc (m/min)		25÷35	12÷18	20÷30	40÷60
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
12.5	6	0.010	0.007	0.009	0.011
16	6	0.025	0.018	0.021	0.028
18	6	0.030	0.021	0.026	0.033
19	6	0.035	0.025	0.030	0.039
21	6	0.040	0.028	0.034	0.044
22	6	0.043	0.030	0.036	0.047
25	6	0.045	0.032	0.038	0.050
28	6	0.050	0.035	0.043	0.055
32	8	0.057	0.040	0.048	0.063
36	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

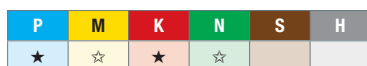
HSS
END-MILLS

CARBIDE
BURRS

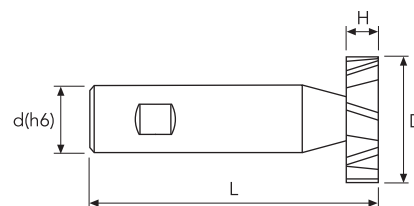
Woodruff



INFO



★ 1st choice ☆ suitable



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

LFTA
SUTA
HSS-HSS/CO

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

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

CUTTING PARAMETERS

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 ²	≤750 N/mm ²	≤350 HB	
ap x ae		DIN Norm 6888	DIN Norm 6888	DIN Norm 6888	DIN Norm 6888
Vc (m/min)		25+35	12+18	20+30	40+60
D (mm)	z	fz (mm/z)	fz (mm/z)	fz (mm/z)	fz (mm/z)
10.5	8	0.010	0.007	0.009	0.011
13.5	8	0.018	0.012	0.015	0.019
16.5	8	0.025	0.018	0.021	0.028
19.5	8	0.033	0.023	0.028	0.036
22.5	10	0.040	0.028	0.034	0.044
25.5	10	0.045	0.032	0.038	0.050
28.5	10	0.050	0.035	0.043	0.055
32.5	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

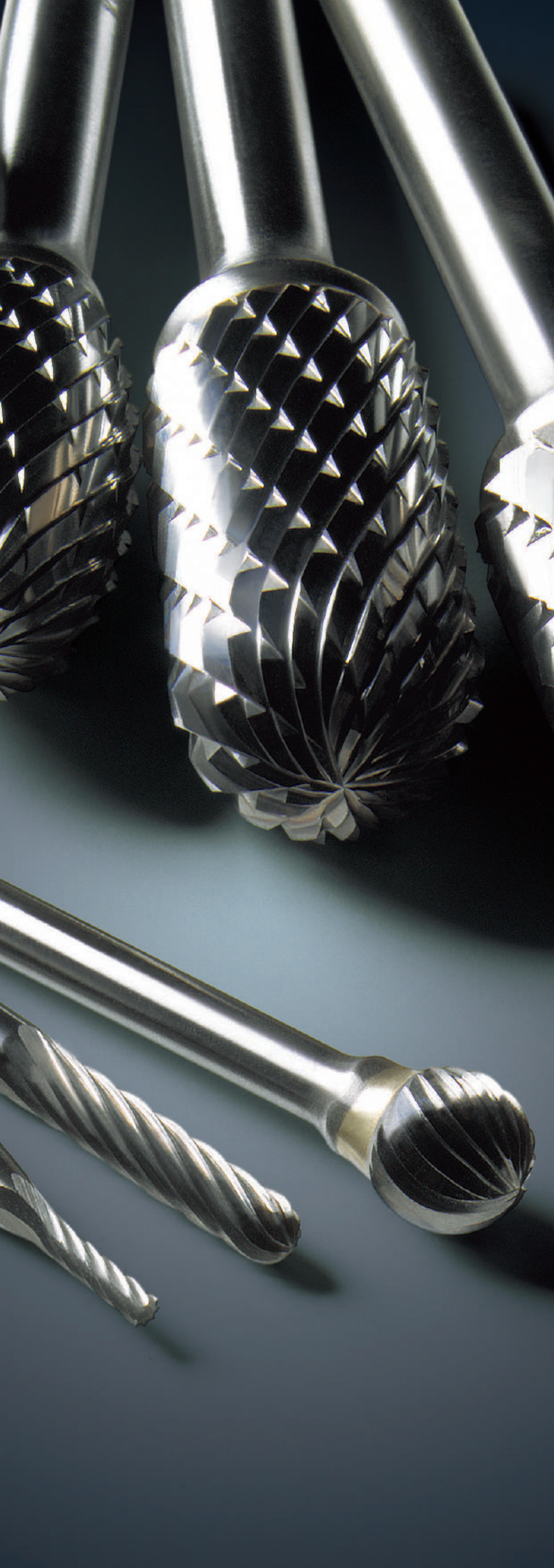
HSS
END-MILLS

CARBIDE
BURRS

CARBIDE BURRS



ITEM No.	PAGE	Ø3 mm	Ø6 mm
SA	685		
SB	686		
SC	687		
SD	688		
SE	689		
SF	690		
SG	691		
SH	692		
SJ	693		
SK	694		
SL	695		
SM	696		
SN	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

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



M



MPC



MNF

M

Double cut
Doppio taglio
2 Schneiden

Coupe double
Doble corte
Двойная заточка

MPC

Plain cut
Taglio piano
Flachschneide

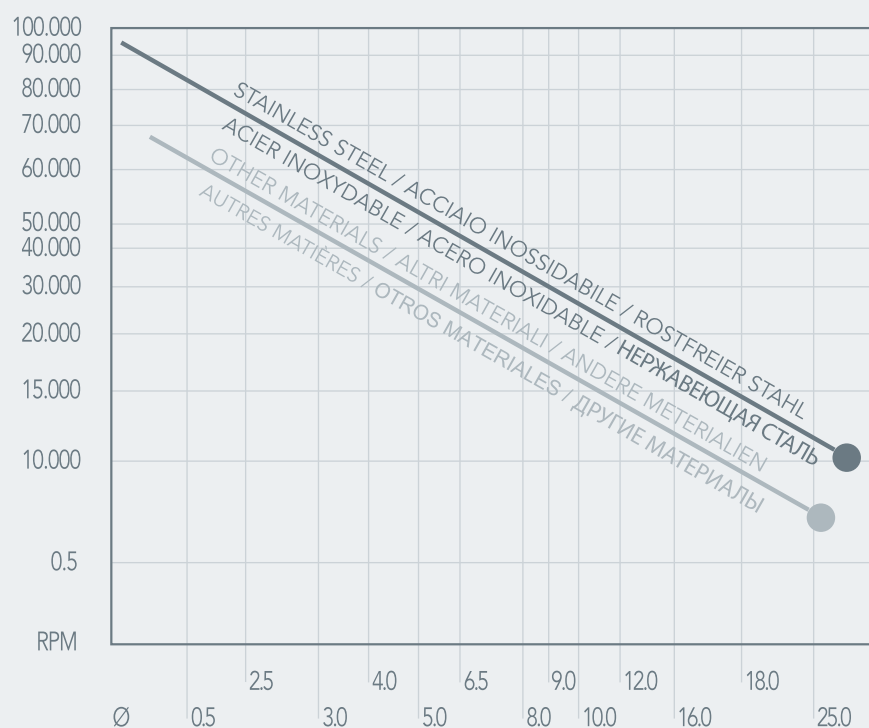
Coupe plane
Corte plano
Обычная заточка

MNF

Alucut

SPEED TABLE
TABELLA VELOCITÀ
GESCHWINDIGKEITSTABELLE

TABLEAU DE VITESSE
TABLA DE VELOCIDAD
ТАБЛИЦА СКОРОСТЕЙ



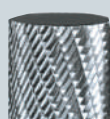
OSAWA NORM

INFO



-
- A schematic diagram of a tapered rod. The rod has a total length L and a diameter d . The right end of the rod is a rectangular section of length l , which is shaded with diagonal lines. The left end of the rod is a circular cross-section with diameter d .

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



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

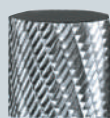
**OSAWA
NORM**

| INFO



-
- A schematic diagram of a tapered cantilever beam. The beam is fixed at the right end and free at the left end. The total length of the beam is labeled L . The diameter at the free end is labeled d , and the diameter at the fixed end is labeled D . A section of length l is highlighted at the fixed end with diagonal hatching.

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

HSS
DRILLS

LFTA
SUTA
HSS-HSS/CO

CARBIDE END-MILLS

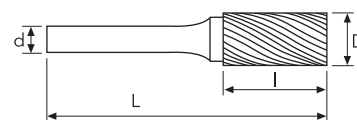
G2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLS

CARBIDE BURRS

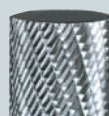
**OSAWA
NORM**

INFO



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

-  Always wear goggles when using the rotary burrs
 Per l'uso delle lime rotative è obbligatorio indossare occhiali protettivi
 Tragen Sie immer die Schutzbrille wenn Sie die Fräser benutzen
 Toujours porter les lunettes de sécurité en utilisant les limes rotatives
 Para usar las limas rotativas es obligatorio usar gafas de protección
 При работе с борфрезами всегда используйте защитные очки

[illegible]

LFTA
SUTA
HSS-HSS/CO

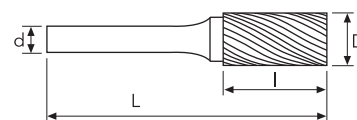
G2
MDTA
HF VH/UP
MEF
ALU
MEX/MH
UH/MH

HSS
END-MILLS

CARBIDE
BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

SF

**OSAWA
NORM**

C-SD-1A

 Always wear goggles when using the rotary burrs
 Per l'uso delle lime rotative è obbligatorio indossare occhiali protettivi
 Tragen Sie immer die Schutzbrille wenn Sie die Fräser benutzen
 Toujours porter les lunettes de sécurité en utilisant les limes rotatives
 Para usar las limas rotativas es obligatorio usar gafas de protección
 При работе с борфрезами всегда используйте защитные очки

MNE

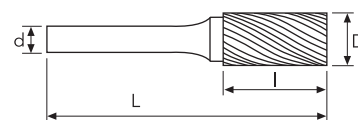


CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

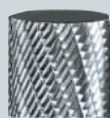
**OSAWA
NORM**

INFO



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

-  Always wear goggles when using the rotary burrs
 Per l'uso delle lime rotative è obbligatorio indossare occhiali protettivi
 Tragen Sie immer die Schutzbrille wenn Sie die Fräser benutzen
 Toujours porter les lunettes de sécurité en utilisant les limes rotatives
 Para usar las limas rotativas es obligatorio usar gafas de protección
 При работе с борфрезами всегда используйте защитные очки

[illegible]

LFTA
SUTA
HSS-HSS/CO

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

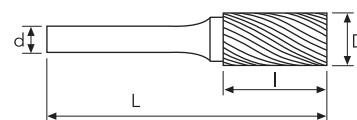
CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

SH



 Always wear goggles when using the rotary burrs
 Per l'uso delle lime rotative è obbligatorio indossare occhiali protettivi
 Tragen Sie immer die Schutzbrille wenn Sie die Fräser benutzen
 Toujours porter les lunettes de sécurité en utilisant les limes rotatives
 Para usar las limas rotativas es obligatorio usar gafas de protección
 При работе с борфрезами всегда используйте защитные очки



M	MPC	MNF
		

[illegible]

● stock standard ○ non-standard stock ▽ stock exhaustion

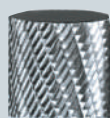
**OSAWA
NORM**

| INFO



-
- The diagram shows a tapered rod with a rectangular cross-section. The total length of the rod is labeled L . The diameter of the left end is labeled d . The length of the tapered section is labeled l . The right end of the rod has a rectangular cross-section with a width labeled D and a height labeled d .

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

[illegible]

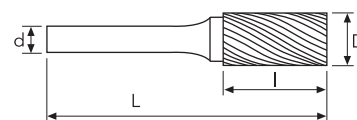
LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

SK

**OSAWA
NORM**

Always wear goggles when using the rotary burrs

Per l'uso delle lime rotative è obbligatorio indossare occhiali protettivi

Tragen Sie immer die Schutzbrille wenn Sie die Fräser benutzen

Toujours porter les lunettes de sécurité en utilisant les limes rotatives

Para usar las limas rotativas es obligatorio usar gafas de protección

При работе с борфрезами всегда используйте защитные очки

MNF



● stock standard ○ non-standard stock ▽ stock exhaustion

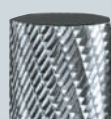
**OSAWA
NORM**

| INFO



-
- A schematic diagram of a tapered cantilever beam. The beam is fixed to a hatched rectangular block of length l and diameter D . The beam has a total length L and a constant diameter d at the free end. The beam tapers from diameter D at the fixed end to diameter d at the free end.

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

[illegible]

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

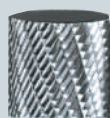
**OSAWA
NORM**

| INFO



-
- A schematic diagram of a tapered shaft. The shaft consists of a cylindrical section on the right and a tapered section on the left. The cylindrical section has a diameter D and a length l . The tapered section has a diameter d at its left end and a total length L from the left end to the right end of the cylindrical section. The tapered section is shaded with diagonal lines.

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

[illegible]

LFTA
SUTA
HSS-HSS/CO

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

HSS
END-MILLS

CARBIDE BURRS

● stock standard ○ non-standard stock ▽ stock exhaustion

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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