

JANVIER-JANUARY
2016

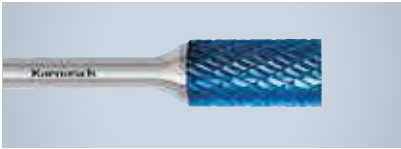
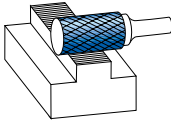
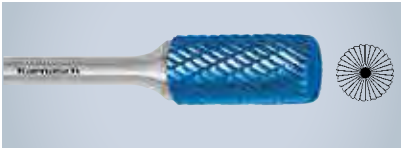
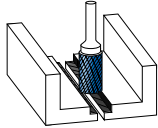

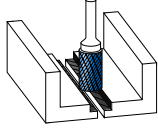
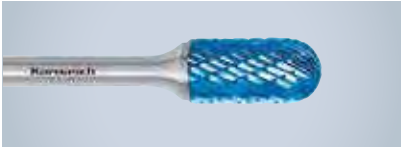
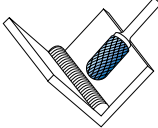

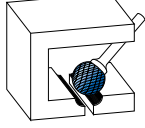

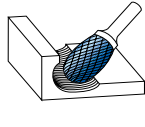
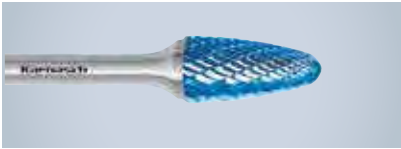
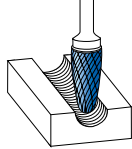

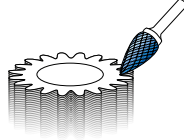
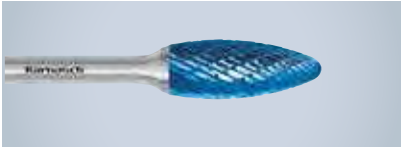
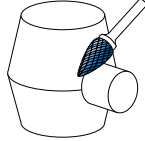

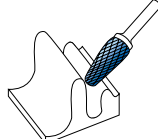
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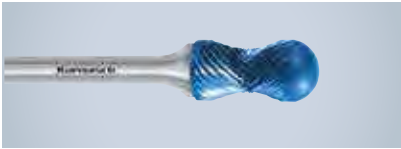
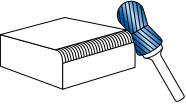
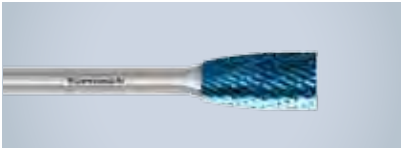
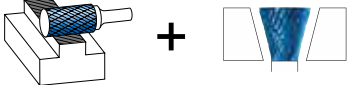


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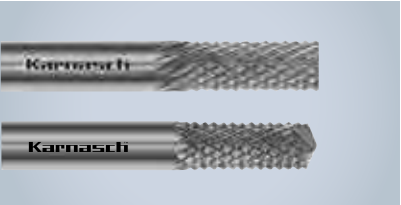



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Forme Shape Forme	Exemples d'utilisation Application exemple Ejemplo de aplicacion	DIN 8032	Karnasch Code	Pages du catalogue Catalog pages Páginas de catálogo
	 Cylindrique sans coupe en bout Cylindrical without end cut Cilindrica sin corte frontal	ZYA	A	16-17
	 Cylindrique + rayon Cylinder + radius Radio + Cilindro	ZYA	A	18
	 Cylindrique avec coupe en bout Cylindrical with end cut Cilindrica con taglio in testa	ZYB	B	19-20
	 Cylindrique bout rond Ball nosed cylinder Cilindrica con radio	WRC	C	21-22
	 Sphérique (boule) Ball Esférica	KUD	D	23-24
	 Ovale Oval Oval	TRE	E	25-26
	 Ogive bout rond Ball nosed tree Ojival	RBF	F	27-28
	 Ogive pointue Tree Ojival en punta	SPG	G	29-30
	 Flamme Flame Llama		H	31-32
	 Conique bout arrondi Ball nosed cone Cónica punta redonda	KEL	L	33-34

Forme Shape Forme	Exemples d'utilisation Application exemple Ejemplo de aplicacion	DIN 8032	Karnasch Code	Pages du catalogue Catalog pages Páginas de catálogo
	Conique bout pointu Cone Cónica punta recta		M	35-36
	Conique renversée Inverted cone Cónica Invertida		N	37
	Conique 60° Countersink 60° Cónica 60°		J	38
	Conique 90° Countersink 90° Cónica 90°		K	39
	Forme disque RIM shape Ranurar		S	40
	Combi-Curve Combi-Curve Combi-Curve			41-51
	Combi-Form Combi-Form Combi-Form			52-59

FRAISES ROTATIVES SPÉCIALES - SPECIAL BURRS - FRESA ROTATORIA ESPECIAL

	Fraises pour les matériaux synthétiques, GFK, CFK, graphite Routers for fibreglass, GFK, CFK, graphite Fresa para plástico GFK, CFK, grafito	 	P	60
	Fraises rotatives, fraises perceuses, scies à guichet pour serruriers Rotary cutters, drills, holesaws for locksmiths Fresas rotativas, fresas perforadoras, sierras perforadoras para servicios de apertura de puertas			61-63

Forme Shape Forme	Exemples d'utilisation Application example Ejemplo de aplicacion	DIN 8032	Karnasch Code	Pages du catalogue Catalog pages Páginas de catálogo
	<p>Mini-fraises Ø 1,0 / 1,5 / 2,0 mm Mini-burrs Ø 1,0 / 1,5 / 2,0 mm Mini-fresas Ø 1,0 / 1,5 / 2,0 mm</p>			64
	<p>Mini-fraises Aluminium Ø 2,0 / 3,0 mm Mini-burrs Aluminium Ø 2,0 / 3,0 mm Mini-fresas Aluminio Ø 2,0 / 3,0 mm</p>			65
	<p>Ø 3,0 / 6,0 mm pour super alliages, p.ex. l'usinage de turbines Ø 3,0 / 6,0 mm for super alloys e.g. working on turbines Ø 3,0 / 6,0 mm para superaleaciones, p. ej. mecanizado de turbinas</p>			66
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	<p>Fraises rotative en coffrets Burr kits Fresas rotativas en estuches</p>			75-84
	<p>Recommandations d'utilisation de sécurité et vitesses de rotation Recommendations for use, safety and operating speeds Recomendaciones de uso, de seguridad y velocidades</p>			85-86

HP-3



La denture universelle la plus utilisée:

Performance de coupe élevée grâce à la denture hélicoïdale alternée: usinage en douceur, copeaux courts. Pour tous les types d'acier, comme: la fonte brute, l'acier < 60 HRC, l'acier inoxydable (INOX), les alliages à base de nickel et de titane, également le cuivre, le laiton, le bronze.

The most widely used universal cutting style results:

High cutting action through cross cutting style – smooth operation – short chip. For use on all ferrous materials such as: cast iron, steel < 60 HRC, stainless steel, nickel basis and titanium alloy. Also copper, brass, bronze.

El tipo de corte universal más utilizado resultados:

Alta capacidad de desprendimiento de virutas debido al corte cruzado: – marcha suave – virutas cortas. Para todos los tipos de acero, como: – fundición de hierro – acero < 60 HRC – acero inoxidable (INOX) – aleación base níquel y de titanio. También cobre, latón, bronce.

MATÉRIAUX		UTILISATION	VITESSE DE COUPE (M/MIN)
Acier, acier moulé	Non trempé, non traité thermiquement jusqu'à 1200 N/mm ² (< 38 HRC)	Acier de construction, acier au carbone, acier à outil, acier non allié, acier cémenté, acier moulé.	Usinage grossier avec enlèvement important de matière
	Trempé, traité thermiquement supérieur à 1200 N/mm ² (> 38 HRC)	Acier à outil, acier trempé, acier allié, acier moulé	250–350
Acier inoxydable (INOX)	Résistant aux acides et à la corrosion	Acier inoxydable austénitique et ferritique	Usinage grossier avec enlèvement important de matière
Métaux non ferreux	Durs	Bronze, titane/alliages de titane, alliages d'aluminium durs (teneur élevée en silicium)	Usinage grossier avec enlèvement important de matière
	Résistant aux hautes températures	Alliages à base de nickel, alliages à base de cobalt (moteurs et turbines d'avion)	300–450
Fonte	Fonte grise, fonte blanche	Fonte à graphite lamellaire EN-GJL, à graphite sphéroïdal EN-GJS, fonte blanche recuite EN-GJMW, fonte noire EN-GJMB	Usinage grossier avec enlèvement important de matière
			450–600

MATERIAL GROUPS		APPLICATION	CUTTING SPEED (M/MIN)
Steel, cast steel	Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38 HRC)	Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels	Coarse machining with high stock removal
	Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC)	Tool steels, tempering steels, alloyed steel, cast steels	250–350
Stainless steel	Rust and acid-resistant steels	Austenitic and ferritic stainless steels	Coarse machining with high stock removal
Non-ferrous metals	Hard-non-ferrous metals	Bronze, titanium/titanium alloys, hard alu-alloys (high Si content)	250–350
	High-temperature resistant materials	Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction)	Coarse machining with high stock removal
Cast iron	Grey cast iron, white cast iron	Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB	Coarse machining with high stock removal
			450–600

MATERIALES		TIPO DE TRABAJO	VELOCIDAD DE CORTE (M/MIN)
Acero y fundición de acero	Aceros sin templar, no mejorados hasta 1200 N/mm ² (< 38 HRC)	Aceros construcción al carbono, aceros herramientas, aceros sin alear, aceros cementación y fundición de acero	Arranque de virutas basto con elevado arranque
	Aceros templados, mejorados a partir de 1200 N/mm ² (> 38 HRC)	Aceros herramientas, aceros mejorados, aceros aleados y fundición de acero	250–350
Acero fino (INOX)	Aceros inoxidables y resistentes a los ácidos	Aceros austeníticos y ferríticos	Arranque de virutas basto con elevado arranque
Metales no ferrosos	Metales no férricos duros	Bronce, titanio/aleaciones de titanio, aleaciones de aluminio duro (alto contenido de Si)	250–350
	Metales refractarios a altas temperaturas	Aleaciones con base de níquel y cobalto (construcción de transmisiones y turbinas)	Arranque de virutas basto con elevado arranque
Fundición	Hierro fundido gris y hierro fundido blanco	Hierro fundido con grafito laminar EN-GJL (GG), con grafito esférico/fundición nodular EN-GJS (GGG), fundición maleable blanca EN-GJMW (GTW) y fundición maleable negra EN-GJMB (GTS)	Arranque de virutas basto con elevado arranque
			450–600

HP-2



La denture simple la plus utilisée :

Performance de coupe élevée avec une bonne qualité de surface. Pour tous les types d'acier, comme : la fonte brute, l'acier < 60 HRC, l'acier inoxydable (INOX), les alliages à base de nickel et de titane, le cuivre, le laiton et le bronze.

The most widely used simple cutting style results :

High cutting action with good surface finish. For use on all ferrous materials such as : cast iron, steel < 60 HRC, stainless steel, nickel basis and titanium alloy. Also copper, brass, bronze.

El tipo de corte simple más utilizado resultado :

Alta capacidad de desprendimiento de virutas con buen acabado superficial. Para todos los tipos de acero, como : fundición de hierro, acero < 60 HRC, acero inoxidable (INOX), aleación base níquel y de titanio. También cobre, latón, bronce.

MATÉRIAUX			UTILISATION	VITESSE DE COUPE (M/MIN)
Acier, acier moulé	Non trempé, non traité thermiquement jusqu'à 1200 N/mm ² (< 38 HRC)	Acier de construction, acier au carbone, acier à outil, acier non allié, acier cémenté, acier moulé.	Usinage grossier avec enlèvement important de matière	450-600
	Trempé, traité thermiquement supérieur à 1200 N/mm ² (> 38 HRC)	Acier à outil, acier trempé, acier allié, acier moulé		250-350
Acier inoxydable (INOX)	Résistant aux acides et à la corrosion	Acier inoxydable austénitique et ferritique	Usinage grossier avec enlèvement important de matière	250-350
Métaux non ferreux	Durs	Bronze, titane/alliages de titane, alliages d'aluminium durs (teneur élevée en silicium)	Usinage grossier avec enlèvement important de matière	250-350
	Résistant aux hautes températures	Alliages à base de nickel, alliages à base de cobalt (moteurs et turbines d'avion)		300-450
Fonte	Fonte grise, fonte blanche	Fonte à graphite lamellaire EN-GJL, à graphite sphéroïdal EN-GJS, fonte blanche recuite EN-GJMW, fonte noire EN-GJMB	Usinage grossier avec enlèvement important de matière	450-600

MATERIAL GROUPS			APPLICATION	CUTTING SPEED (M/MIN)
Steel, cast steel	Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38 HRC)	Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels	Coarse machining with high stock removal	450-600
	Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC)	Tool steels, tempering steels, alloyed steel, cast steels		250-350
Stainless steel	Rust and acid-resistant steels	Austenitic and ferritic stainless steels	Coarse machining with high stock removal	250-350
Non-ferrous metals	Hard-non-ferrous metals	Bronze, titanium/titanium alloys, hard alu-alloys (high Si content)	Coarse machining with high stock removal	250-350
	High-temperature resistant materials	Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction)		300-450
Cast iron	Grey cast iron, white cast iron	Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB	Coarse machining with high stock removal	450-600

MATERIALES			TIPO DE TRABAJO	VELOCIDAD DE CORTE (M/MIN)
Acero y fundición de acero	Aceros sin temprar, no mejorados hasta 1200 N/mm ² (< 38 HRC)	Aceros construcción al carbono, aceros herramientas, aceros sin alear, aceros cementación y fundición de acero	Arranque de virutas basto con elevado arranque	450-600
	Aceros templados, mejorados a partir de 1200 N/mm ² (> 38 HRC)	Aceros herramientas, aceros mejorados, aceros aleados y fundición de acero		250-350
Acero fino (INOX)	Aceros inoxidables y resistentes a los ácidos	Aceros austeníticos y ferríticos	Arranque de virutas basto con elevado arranque	250-350
Metales no férricos	Metales no férricos duros	Bronce, titanio/aleaciones de titanio, aleaciones de aluminio duro (alto contenido de Si)	Arranque de virutas basto con elevado arranque	250-350
	Metales refractarios a altas temperaturas	Aleaciones con base de níquel y cobalto (construcción de transmisiones y turbinas)		300-450
Fundición	Hierro fundido gris y hierro fundido blanco	Hierro fundido con grafito laminar EN-GJL (GG), con grafito esférico/fundición nodular EN-GJS (GGG), fundición maleable blanca EN-GJMW (GTW) y fundición maleable negra EN-GJMB (GTS)	Arranque de virutas basto con elevado arranque	450-600

HP-4



🇫🇷 Denture hélicoïdale alternée extrêmement fine:

Excellent contrôle (même aux endroits difficilement accessibles), usinage en douceur, copeaux courts, bonne qualité de surface. Performance de coupe moyenne. Pour tous les types d'acier, comme l'acier très dur, env. 70 HRC, la fonte brute, l'acier inoxydable (INOX), les matériaux très résistants à la chaleur, comme alliage à base de nickel + cobalt.

🇬🇧 Through extra fine cross cutting style arise:

Excellent control (also at difficult to reach positions), smooth operation, short chips, good surface finish, medium cutting action. For all kinds of steel: up to extra hard steel ca. 70 HRC, Cast iron, Stainless steel. Heat-resistant substances, such as e.g. Nickel based + cobalt based alloys.

🇪🇸 Debido al corte cruzado extrafino surge:

Excelente control (también en lugares de acceso difícil), marcha suave, Virutas cortas, buen acabado superficial, capacidad media desprendimiento de virutas. Para todos los tipos de acero: Hastaaceros extra duros de aprox. 70 HRC, Fundición de hierro, acero inoxidable (INOX). Materiales refractarios, como p. ej. aleación base níquel + aleación base cobalto.

🇫🇷 MATÉRIAUX			UTILISATION	VITESSE DE COUPE (M/MIN)
Acier, acier moulé	Non trempé, non traité thermiquement jusqu'à 1200 N/mm² (< 38 HRC)	Acier de construction, acier au carbone, acier à outil, acier non allié, acier cémenté, acier moulé.	Usinage fin avec enlèvement moyen de matière	650-750
	Trempé, traité thermiquement supérieur à 1200 N/mm² (> 38 HRC)	Acier à outil, acier trempé, acier allié, acier moulé		450-600
Acier inoxydable (INOX)	Résistant aux acides et à la corrosion	Acier inoxydable austénitique et ferritique	Usinage fin avec enlèvement moyen de matière	450-600
Métaux non ferreux	Durs	Bronze, titane/alliages de titane, alliages d'aluminium durs (teneur élevée en silicium)	Usinage fin avec enlèvement moyen de matière	450-600
	Résistant aux hautes températures	Alliages à base de nickel, alliages à base de cobalt (moteurs et turbines d'avion)		
Fonte	Fonte grise, fonte blanche	Fonte à graphite lamellaire EN-GJL, à graphite sphéroïdal EN-GJS, fonte blanche recuite EN-GJMW, fonte noire EN-GJMB	Usinage fin avec enlèvement moyen de matière	650-750

🇬🇧 MATERIAL GROUPS			APPLICATION	CUTTING SPEED (M/MIN)
Steel, cast steel	Non-hardened, non-heat treated steels up to 1200 N/mm² (< 38 HRC)	Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels	Fine machining = medium stock removal	650-750
	Hardened, heat-treated steels exceeding 1200 N/mm² (> 38 HRC)	Tool steels, tempering steels, alloyed steel, cast steels		450-600
Stainless steel	Rust and acid-resistant steels	Austenitic and ferritic stainless steels	Fine machining = medium stock removal	450-600
Non-ferrous metals	Hard non-ferrous metals	Bronze, titanium/titanium alloys, hard alu-alloys (high Si content)	Fine machining = medium stock removal	450-600
	High-temperature resistant materials	Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction)		
Cast iron	Grey cast iron, white cast iron	Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB	Fine machining = medium stock removal	650-750

🇪🇸 MATERIALES			TIPO DE TRABAJO	VELOCIDAD DE CORTE (M/MIN)
Acero y fundición de acero	Aceros sin temprar, no mejorados hasta 1200 N/mm² (< 38 HRC)	Aceros construcción al carbono, aceros herramientas, aceros sin alear, aceros cementación y fundición de acero	Arranque de virutas fino = media arranque de material	650-750
	Aceros templados, mejorados a partir de 1200 N/mm² (> 38 HRC)	Aceros herramientas, aceros mejorados, aceros aleados y fundición de acero		450-600
Acero fino (INOX)	Aceros inoxidables y resistentes a los ácidos	Aceros austeníticos y ferríticos	Arranque de virutas fino = media arranque de material	450-600
Metales no férricos	Metales no férricos duros	Bronce, titanio/aleaciones de titanio, aleaciones de aluminio duro (alto contenido de Si)	Arranque de virutas fino = media arranque de material	450-600
	Metales refractarios a altas temperaturas	Aleaciones con base de níquel y cobalto (construcción de transmisiones y turbinas)		
Fundición	Hierro fundido gris y hierro fundido blanco	Hierro fundido con grafito laminar EN-GJL (GG), con grafito esférico/fundición nodular EN-GJS (GGG), fundición maleable blanca EN-GJMW (GTW) y fundición maleable negra EN-GJMB (GTS)	Arranque de virutas fino = media arranque de material	650-7500

HP-7



🇫🇷 Pour les coupes grossières et les forts enlèvements de matière :

Pour alliages d'aluminium, métaux légers, cuivre et alliages de cuivre, métaux non ferreux, plastiques, plastiques renforcés en fibres (GFK/CFK).

🇺🇸 For coarse cutting and highest material removal:

For aluminium alloy, light metals, soft copper and copper alloys (non-ferrous metals), plastics, fibre-reinforced plastics (GFK/CFK).

🇪🇸 Para desprendimiento de viruta gruesa y remoción de material extremadamente alta:

Por aleación de aluminio, metales ligeros, metales blandos no ferrosos, plásticos, plásticos reforzados con fibra (GFK/CFK).

🇫🇷 MATÉRIAUX			UTILISATION	VITESSE DE COUPE (M/MIN)
Métaux non ferreux	Matériaux non ferreux doux	Alliages d'aluminium, laiton, cuivre, zinc	Usinage grossier avec enlèvement important de matière	600 - 1100
			Usinage fin avec enlèvement faible de matière	900 - 1100
	Matériaux non ferreux durs	Bronze, titane, alliages d'aluminium (teneur élevée en silicium)	Usinage grossier avec enlèvement important de matière	600 - 1100
			Usinage fin avec enlèvement faible de matière	900 - 1100
Plastiques et autres matériaux	Plastiques renforcés en fibres(GFK/CFK), thermoplastiques, caoutchouc dur (ébonite)	Usinage grossier avec enlèvement important de matière	500 - 1100	
		Usinage fin avec enlèvement faible de matière	500 - 1100	

🇺🇸 MATERIAL GROUPS			APPLICATION	CUTTING SPEED (M/MIN)
Non-ferrous metals	Soft non-ferrous metals	Alu alloys, brass copper, zinc	Coarse machining = high stock removal	600 - 1100
			Fine machining = low stock removal	900 - 1100
	Hard non-ferrous metals	Bronze, titanium,hard aluminium alloys, (high Si content)	Coarse machining = high stock removal	600 - 1100
			Fine machining = low stock removal	900 - 1100
Plastics, other materials	Fibre-reinforced plastic (GFK/CFK) thermoplastics, hard rubber	Coarse machining = high stock removal	500 - 1100	
		Fine machining = low stock removal	500 - 1100	

🇪🇸 MATERIALES			TIPO DE TRABAJO	VELOCIDAD DE CORTE (M/MIN)
Metales no férricos	Metales no férricos blandos	Aleaciones de aluminio, latón, cobre y cinc	Arranque de material basto = elevado arranque	600 - 1100
			Arranque de material fino = mínimo arranque	900 - 1100
	Metales no férricos duros	Bronce, titanio y aleaciones de aluminio duro (alto contenido en Si)	Arranque de material basto = elevado arranque	600 - 1100
			Arranque de material fino = mínimo arranque	900 - 1100
Plásticos y otros materiales	Plásticos reforzados con fibra (GFK/CFK) termoplásticos y goma dura	Arranque de material basto = elevado arranque	500 - 1100	
		Arranque de material fino = mínimo arranque	500 - 1100	

HP-1



🇫🇷 Denture hélicoïdale alternée extrêmement robuste :

Résistance aux chocs (bris de dents, écaillages et bris de têtes réduits). Excellent contrôle et silencieux. Performance de coupe moyenne à élevée. Spécifique pour les superalliages les plus difficiles et les aciers inoxydables, comme : le titane, l'inconel, le hastelloy, le waspaloy, le duplex, l'amanox, etc. Exemple d'application : l'usinage d'ailettes de turbines d'avion, de turbines à gaz.

🇺🇸 Extremely robust cross cutting style results :

Impact resistance (tooth breakages, chipping, head breakages are minimised). Excellent control and quiet running. Medium to high cutting action. Especially for the most difficult super alloys + stainless steel, such as : Titanium, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc. Application example : Working aeroplane turbine blades, gas turbines.

🇪🇸 El corte cruzado extremadamente robusto da como resultado :

Insensibilidad a los golpes (se minimizan roturas de dientes, desprendimientos y roturas de cabeza). Excelente control y suavidad de marcha Media a alta capacidad de desprendimiento de viruta. Especial para superaleaciones + aceros inoxidable extremadamente difíciles, como : titanio, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc. Ejemplo de aplicación : mecanizado de álabes de turbina de avión, turbinas de gas.

🇫🇷 MATÉRIAUX			UTILISATION	VITESSE DE COUPE (M/MIN)
Alliages difficiles, superalliages	Titane, Inconel, Hastelloy, Waspaloy, Duplex, Amanox Udimet, Nicrofer, Conicro, René	Moteurs, moteurs et turbines d'avion, technologies de l'énergie, aéronautique et spatiale, industries pétrolière et gazière, turbines à gaz	Usinage grossier avec enlèvement important à moyen de la matière	250-350
Acier Inoxydable (INOX)	Aciers résistant aux acides et à la corrosion	Aciers inoxydables austénitique et ferritique	Usinage grossier avec enlèvement important à moyen de la matière	250-350
Acier, acier moulé	Non trempé, non traité thermiquement, jusqu'à 1200 N/mm ² (<38 HRC)	Aciers de construction, aciers au carbone, aciers à outils, aciers non alliés, aciers cémentés, acier moulés	Usinage grossier avec enlèvement important à moyen de la matière	450-600
	Trempé, traité thermiquement supérieur à 1200 N/mm ² (>38 HRC)	Aciers à outils, aciers trempés, acier alliés, aciers moulés	Usinage grossier avec enlèvement important à moyen de la matière	250-350
Fonte	Fonte grise, fonte blanche	Fonte à graphite lamellaire EN-GJL, fonte à graphite sphéroïdal EN-GJS, fonte blanche recuite EN-GJMW, fonte noire EN-GJMB	Usinage grossier avec enlèvement important à moyen de la matière	450-600

🇺🇸 MATERIAL GROUPS			APPLICATION	CUTTING SPEED (M/MIN)
Difficult alloys superalloys	Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox Udimet, Nicrofer, Conicro, René	Engines, aircraft engine and turbine construction, Energy technology, aerospace oil and gas industry, gas turbines	Coarse machining = high to medium stock removal	250-350
Stainless steel	Rust and acid-resistant steels	Austenitic and ferritic stainless steels	Coarse machining = high to medium stock removal	250-350
Steel cast steel	Non-hardened, non-heat treated steels up to 1200 N/mm ² (<38HRC)	Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels	Coarse machining = high to medium stock removal	450-600
	Hardened, heat treated steels exceeding 1200 N/mm ² (>38HRC)	tool steels, tempering steels, alloyed steels, cast steels	Coarse machining = high to medium stock removal	250-350
Cast iron	Grey cast iron, white cast iron	Cast-iron with flake graphite EN-GJL (GG), with nodular graphite cast iron EN-GJS (GGG), white annealed cast iron EN-GJMW (GTW), black cast iron EN-GJMB (GTS)	Coarse machining = high to medium stock removal	450-600

🇪🇸 MATERIALES			TIPO DE TRABAJO	VELOCIDAD DE CORTE (M/MIN)
Aleaciones difíciles superaleaciones	Titanio, Inconel, Hastelloy, Waspaloy, Duplex, Amanox Udimet, Nicrofer, Conicro, René	Motores, motores de avión y turbinas construcción tecnología de la energía, la industria aeroespacial Industria del petróleo y gas, turbinas de gas	Arranque de virutas basto = con alto a medio arranque	250-350
Acero fino (INOX)	Aceros inoxidable y resistentes a los ácidos	Aceros austeníticos y ferríticos	Arranque de virutas basto = con alto a medio arranque	250-350
Acero y fundición de acero	Aceros sin templar, no mejorados hasta 1200 N/mm ² (<38HRC)	Aceros construcción, aceros al carbono, aceros herramientas, aceros sin alear, aceros cementación y fundición de acero	Arranque de virutas basto = con alto a medio arranque	450-600
	Aceros templados mejorados a partir 1200 N/mm ² (>38HRC)	Aceros herramientas, aceros mejorados, aceros sin alear y fundición de acero	Arranque de virutas basto = con alto a medio arranque	250-350
Fundición	Hierro fundido gris y hierro fundido blanco	Hierro fundido con grafito laminar EN-GJL (GG), con grafito esférico/fundición nodular EN-GJS (GGG), fundición maleable blanca EN-GJMW (GTW), fundición maleable negra EN-GJMB (GTS)	Arranque de virutas basto = con alto a medio arranque	450-600

HP-5



Les dentures simples très fines offrent une excellente qualité de surface

De préférence pour l'ébavurage de finition de tous les types d'acier, tels aciers très durs, env. 70 HRC, la fonte brute, l'acier inoxydable (INOX), les matériaux très résistants à la chaleur, p.ex. les alliages à base de nickel + cobalt.

Extremely fine simple cutting style results in an excellent surface finish

Preferred for fine deburring all ferrous materials, such as: extra hard steel ca. up to 70 HRC, cast iron, stainless steel, heat resistant substances, such as, e.g. nickel based + cobalt based alloys.

El corte simple extremadamente fino da como resultado excelente acabado superficial:

Preferentemente para desbarbado fino de todos los tipos de acero, como: Hasta aceros extra duros de aprox. 70HRC. Fundición de hierro, Acero inoxidable (INOX). Materiales refractarios, como p. ej. aleaciones base níquel + aleaciones base cobalto

MATÉRIAUX			UTILISATION	VITESSE DE COUPE (M/MIN)
Acier, acier moulé	Non trempé, non traité thermiquement jusqu'à 1200 N/mm ² (< 38 HRC)	Acier de construction, acier au carbone, acier à outil, acier non allié, acier cémenté, acier moulé.	Usinage fin avec enlèvement moyen de la matière	650-750
	Trempé, traité thermiquement supérieur à 1200 N/mm ² (> 38 HRC)	Acier à outil, acier trempé, acier allié, acier moulé		450-600
Acier inoxydable (INOX)	Résistant aux acides et à la corrosion	Acier inoxydable austénitique et ferritique	Usinage fin avec enlèvement moyen de la matière	450-600
Métaux non ferreux	Durs	Bronze, titane/alliages de titane, alliages d'aluminium durs (teneur élevée en silicium)	Usinage fin avec enlèvement moyen de la matière	450-600
	Résistant aux hautes températures	Alliages à base de nickel, alliages à base de cobalt (moteurs et turbines d'avion)		
Fonte	Fonte grise, fonte blanche	Fonte à graphite lamellaire EN-GJL, à graphite sphéroïdal EN-GJS, fonte blanche recuite EN-GJMW, fonte noire EN-GJMB	Usinage fin avec enlèvement moyen de la matière	650-750

MATERIAL GROUPS			APPLICATION	CUTTING SPEED (M/MIN)
Steel, cast steel	Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38 HRC)	Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels	Fine machining = medium stock removal	650-750
	Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC)	Tool steels, tempering steels, alloyed steel, cast steels		450-600
Stainless steel	Rust and acid-resistant steels	Austenitic and ferritic stainless steels	Fine machining = medium stock removal	450-600
Non-ferrous metals	Hard-non-ferrous metals	Bronze, titanium/titanium alloys, hard alu-alloys (high Si content)	Fine machining = medium stock removal	450-600
	High-temperature resistant materials	Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction)		
Cast iron	Grey cast iron, white cast iron	Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB	Fine machining = medium stock removal	650-750

MATERIALES			TIPO DE TRABAJO	VELOCIDAD DE CORTE (M/MIN)
Acero y fundición de acero	Aceros sin templar, no mejorados hasta 1200 N/mm ² (< 38 HRC)	Aceros construcción al carbono, aceros herramientas, aceros sin alear, aceros cementación y fundición de acero	Arranque de virutas fino = media arranque de material	650-750
	Aceros templados, mejorados a partir de 1200 N/mm ² (> 38 HRC)	Aceros herramientas, aceros mejorados, aceros aleados y fundición de acero		450-600
Acero fino (INOX)	Aceros inoxidables y resistentes a los ácidos	Aceros austeníticos y ferríticos	Arranque de virutas fino = media arranque de material	450-600
Metales no férricos	Metales no férricos duros	Bronce, titanio/aleaciones de titanio, aleaciones de aluminio duro (alto contenido de Si)	Arranque de virutas fino = media arranque de material	450-600
	Metales refractarios a altas temperaturas	Aleaciones con base de níquel y cobalto (construcción de transmisiones y turbinas)		
Fundición	Hierro fundido gris y hierro fundido blanco	Hierro fundido con grafito laminar EN-GJL (GG), con grafito esférico/fundición nodular EN-GJS (GGG), fundición maleable blanca EN-GJMW (GTW) y fundición maleable negra EN-GJMB (GTS)	Arranque de virutas fino = media arranque de material	650-750

HP-6



Les dentures hélicoïdales alternées très grossières offrent :

Un enlèvement de matière extrêmement élevé (ébauche). Pour tous les matériaux ferreux, tels que : Fonte, acier <60 HRC, aussi pour le cuivre, le laiton, le bronze. Développé pour une utilisation dans des conditions difficiles d'ébauche, comme, par exemple, sur les chantiers navals, fonderies.



Extremely rough cross cutting style results :

High cutting action through cross cutting style – smooth operation – short chip. For use on all ferrous materials such as: Extremely fast metal removal (roughing). For all ferrous materials, such as: Cast iron, steel < 60 HRC, also for copper, brass, bronze. Developed for use in tough roughing conditions, such as, e.g., on shipyards, foundries.



El corte cruzado extremadamente grueso da como resultado :

Remoción de material extremadamente alta (desbastado). Para todos los tipos de acero, como : Fundición de hierro, acero < 60 HRC También para cobre, latón, bronce. Desarrollado para el desbastado intenso, como p. ej. en astilleros y fundiciones.

MATÉRIAUX			UTILISATION	VITESSE DE COUPE (M/MIN)
Acier, Acier moulé	Non-trempé, non-traité thermiquement, jusqu'à 1200 N/mm ² (< 38HRC)	Acier de construction, acier au carbone, acier à outils, acier non allié, acier cémenté, acier moulé	Usinage grossier avec enlèvement important de la matière avec charge d'impact	250 - 600
	Trempé, traité thermiquement supérieur à 1200 N/mm ² (> 38 HRC)	Acier à outils, acier trempé, acier allié, acier moulé		250 - 350
Métaux non ferreux	Résistant aux hautes températures	Alliages à base de nickel, alliages à base de cobalt (moteurs et turbines d'avion)	Usinage grossier avec enlèvement important de la matière avec charge d'impact	250 - 450
Fonte	Fonte grise, fonte blanche	Fonte à graphite lamellaire EN-GJL, fonte à graphite sphéroïdal EN-GJS, font blanche recuite EN-GJMW, fonte noir EN-GJMB	Usinage grossier avec enlèvement important de la matière avec charge d'impact	250 - 600

MATERIAL GROUPS			APPLICATION	CUTTING SPEED (M/MIN)
Steel cast steel	Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38HRC)	Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels	Coarse machining = high stock removal with impact load	250 - 600
	Hardened, heat treated steels exceeding 1200 N/mm ² (> 38HRC)	tool steels, tempering steels, alloyed steels, cast steels		250 - 350
Non-Ferrous metals	High-temperature resistant materials	Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction)	Coarse machining = high stock removal with impact load	250 - 450
Cast iron	Grey cast iron, white cast iron	Cast-iron with flake graphite EN-GJL (GG), with nodular graphite cast iron EN-GJS (GGG), white annealed cast iron EN-GJMW (GTW), black cast iron EN-GJMB (GTS)	Coarse machining = high stock removal with impact load	250 - 600

MATERIALES			TIPO DE TRABAJO	VELOCIDAD DE CORTE (M/MIN)
Acero y fundición de acero	Aceros sin templar, no mejorados hasta 1200 N/mm ² (< 38HRC)	Aceros construcción, aceros al carbono, aceros herramientas, aceros sin alea, aceros cementación fundición de acero	Arranque de virutas basto = elevado arranque de material con carga por choque	250 - 600
	Aceros templados mejorados a partir 1200 N/mm ² (> 38HRC)	Aceros herramientas, aceros mejorados, aceros sin alea y fundición de acero		250 - 350
Metales no férricos	Materiales refractarios a altas temperaturas	Aleaciones de níquel y cobalto (construcción de transmisiones y turbinas)	Arranque de virutas basto = elevado arranque de material con carga por choque	250 - 450
Fundición	Hierro fundido gris y hierro fundido blanco	Hierro fundido con grafito laminar EN-GJL (GG), con grafito esférico/fundición nodular EN-GJS (GGG), fundición maleable blanca EN-GJMW (GTW), fundición maleable negra EN-GJMB (GTS)	Arranque de virutas basto = elevado arranque de material con carga por choque	250 - 600



Spécifiquement pour l'acier inoxydable

Qualité d'usinage et durée de vie extrêmement élevées. Pour les aciers austénitiques et résistants aux acides et à la corrosion. Finition de surface de haute qualité. Dégage très peu de chaleur; ainsi aucune décoloration de la pièce travaillée.

Especially for stainless steel

Extremely high machining output and service life for all austenitic, rust- and acid-resilient steels. High-quality surface. No annealing colours at the workpiece due to low heat development.

Especial para acero inoxidable

Rendimiento de corte y vida útil extremadamente altos para todos los aceros austeníticos, resistentes al óxido y a los ácidos. Acabado superficial de alta calidad. Ninguna decoloración en la pieza de trabajo por calentamiento.

MATÉRIAUX			UTILISATION	VITESSE DE COUPE (M/MIN)
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Acier inoxydable (INOX)	Aciers résistant aux acides et à la corrosion	Aciers inoxydables austénitique et ferritique	Usinage grossier avec enlèvement important de matière	450 - 600
			Usinage fin avec enlèvement faible de matière	

MATERIAL GROUPS			APPLICATION	CUTTING SPEED (M/MIN)
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Stainless steel	Rust and acid-resistant steels	Austenitic and ferritic stainless steels	Coarse machining = high stock removal	450 - 600
			Fine machining = low stock removal	

MATERIALES			TIPO DE TRABAJO	VELOCIDAD DE CORTE (M/MIN)
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Acero fino (INOX)	Aceros inoxidables y resistentes a los ácidos	Aceros austeníticos y ferríticos	Arranque de material basto = elevado arranque	450 - 600
			Arranque de material fino = mínimo arranque	



Spécifiquement pour l'acier et l'acier moulé. Très grande qualité d'usinage

Jusqu'à 60% d'augmentation de la qualité d'usinage, comparativement à la denture conventionnelle. L'agressivité élevée produit de gros copeaux pour un enlèvement exceptionnel. Dégage très peu de chaleur; ainsi aucune décoloration de la pièce.

Especially for steel and cast steel. Extremely high machining output

Up to 60% higher machining output as compared to conventional cross interlocks. High aggressiveness produces large chips with outstanding chip removal. No annealing colours at the workpiece due to low heat development.

Especial para el acero y el acero fundido. Capacidad de corte extremadamente alta

Hasta un 60% mayor rendimiento de corte en comparación con dentados cruzados convencionales. Alta agresividad genera grandes virutas con excelente evacuación de virutas. Ninguna decoloración en la pieza de trabajo por calentamiento.

MATÉRIAUX		UTILISATION	VITESSE DE COUPE (M/MIN)
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Acier, Acier moulé	Non trempé, non traité thermiquement jusqu'à 1200 N/mm² (< 38 HRC)	Acier de construction, acier au carbone, acier à outil, acier non allié, acier cémenté, acier moulé	Usinage grossier avec enlèvement important de la matière avec charge d'impact	450 - 750
	Trempé, traité thermiquement supérieur à 1200 N/mm² (> 38 HRC)	Acier à outil, acier trempé, acier allié, acier moulé		

MATERIAL GROUPS		APPLICATION	CUTTING SPEED (M/MIN)
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Steel cast steel	Non-hardened, non-heat treated steels up to 1200 N/mm2 (< 38HRC)	Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels	Coarse machining = high stock removal with impact load	450 - 750
	Hardened, heat treated steels exceeding 1200 N/mm2 (>38HRC)	tool steels, tempering steels, alloyed steels, cast steels		

MATERIALES		TIPO DE TRABAJO	VELOCIDAD DE CORTE (M/MIN)
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Acero y fundición de acero	Aceros sin templar, no mejorados hasta 1200 N/mm2 (< 38HRC)	Aceros construcción, aceros al carbono, aceros herramientas, aceros sin alea, aceros cementación fundición de acero	Arranque de virutas basto = elevado arranque de material con carga por choque	450 - 750
	Aceros templados mejorados a partir 1200 N/mm2 (> 38HRC)	Aceros herramientas, aceros mejorados, aceros sin alea y fundición de acero		



1 Tranchant optimisé + finition parfaite (comme un miroir)
Optimized end cut + mirror finish
Optimización en el acabado del corte + acabado espejo.



- Karnasch optimise le tranchant pour améliorer la coupe une surface de finition parfaite.
- Karnasch optimised end cut design gives improved cutting action + very smooth surface finish (mirror finish).
- Karnasch optimiza y proporciona un acabado altamente fino en el trabajo desarrollado Generando al llamado Acabado Espejo.

2 Revêtement BLUE-TEC/BLACK-TEC
BLUE-TEC/BLACK-TEC coating
Recubrimiento BLUE-TEC/BLACK-TEC



- Le revêtement breveté BLUE-TEC, spécialement conçu pour les fraises rotatives, augmente la longévité de l'outil et améliore ses performances pour travailler le métal. Le revêtement BLACK-TEC est spécialement conçu pour les matériaux non-ferreux (Coupe HP-7). Une faible friction et un excellent dégagement des copeaux réduit l'encombrement des lèvres.
- Patented Blue-Tec coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals. Karnasch BLACK-TEC coating is specifically designed for non-ferrous materials (Cut HP-7). Low friction and excellent chip clearance characteristics reduce clogging of the flutes.
- El recubrimiento llamado BLUE-TEC esta patentado, especialmente para las fresas rotativas, dando a la herramienta más vida y un excelente rendimiento en todos los metales. Karnasch BLACK-TEC es un recubrimiento diseñado especialmente para materiales no ferrosos (forma HP-7) Mínima fricción y una excelente evacuación de la viruta es una de sus principales características reduciendo el atasco en el estriado de los dientes.

3 Carbure Micro-Grain
MICRO-GRAIN carbide
Metal Duro MICRO-GRANO



- Seules les meilleures qualités de carbure micro-grain sont utilisées pour les fraises rotatives Karnasch.
- Only the best micrograin carbide grades are used for Karnasch burrs.
- Sólo los mejores calidades de metal duro micro-grano se utilizan para rebabas Karnasch.

4 Brasage 100% testé
100% Braze tested
100% Test control de soldadura



- Le brasage des fraises rotatives est testé à 100% pour la dureté et la sécurité.
- All burrs are 100% braze tested for strength and safety.
- Todas las fresas están controladas al 100% en la soldadura, para su seguridad y fuerza.

Karnaschi™
PROFESSIONAL TOOLS

Regard sur la production de haute technologie
Impressions of the High-Tec production!



Centre de rectification sur CNC
The CNC grinding centre



Le chargement robotisé
The robotic loading



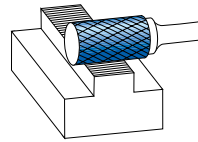
Rectification de précision
Precision grinding



Le procédé de brasage
The brazing process



Contrôle de qualité
Controlling each individual burr



A FORME / SHAPE / Forma

ZYA

- Cylindrique sans coupe en bout
- Cylinder without end cut
- Cilíndrica sin corte frontal

STANDARD CUT TYPES

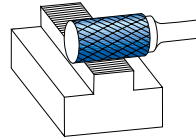


SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SA	STANDARD CUT TYPES				SPECIAL CUT TYPES					
							11.5001	11.5000	11.5002	11.5005	11.5007	11.5003	11.5004	11.6031	11.6041	
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8	
							Code	Code	Code	Code	Code	Code	Code	Code	Code	
1,5	6	3	38		✓	SA41	115001.015		115002.015			115003.015				
2	11	3	38		✓		115001.025		115002.025			115003.025				
2,5	11	3	38		✓	SA42	115001.027									
3	14	3	38		✓	SA43	115001.030	115000.030	115002.030	115005.030	115007.030	115003.030			116031.005	116041.005*
3	14	3	50		✓	SA43L2	115001.035		115002.035			115003.035				
3	14	3	65		✓		115001.040		115002.040			115003.040				
3	14	3	75		✓	SA43L3	115001.045		115002.045			115003.045				
3	14	3	100		✓	SA43L4	115001.050		115002.050			115003.050				
3	12,7	6	50		✓	SA11	115001.052									
4	14	6	50		✓		115001.055		115002.055			115003.055				
5	12,7	3	38		✓	SA53	115001.057									
5	16	6	50		✓	SA14	115001.058									
6	5	3	37	✓		SA51	115001.059									
6	13	3	45	✓			115001.060	115000.060	115002.060	115005.060	115007.060	115003.060				
6	18	6	50		✓	SA1	115001.065	115000.065	115002.065	115005.065	115007.065	115003.065	115004.065	116031.010	116041.010	
6	25	6	50		✓		115001.067									
6	18	6	100	✓			115001.070		115002.070			115003.070				
6	18	6	150	✓		SA1L6	115001.075							116031.015	116041.015	
8	20	6	65	✓		SA2	115001.080	115000.080	115002.080	115005.080	115007.080	115003.080	115004.080			
8	20	6	170	✓		SA2L6	115001.085									
10	13	6	58	✓			115001.087							116031.020	116041.020	
10	20	6	65	✓		SA3	115001.090	115000.090	115002.090	115005.090	115007.090	115003.090	115004.090			
10	20	6	172	✓		SA3L6	115001.095		115002.095			115003.095				
10	25	6	70	✓			115001.100		115002.100		115007.100	115003.100	115004.100			
11	25	6	70	✓		SA4	115001.102									
12	20	6	64	✓			115001.103							116031.025	116041.025	
12	25	6	70	✓		SA5	115001.105	115000.105	115002.105	115005.105		115003.105	115004.105			
12DIN	25	6	70	✓			115001.107				115007.107					
12	25	6	175	✓		SA5L6	115001.110		115002.110			115003.110				
12	25	8	70	✓			115001.115		115002.115			115003.115	115004.115	116031.030*	116041.030*	
16	25	6	70	✓		SA6	115001.120		115002.120	115005.120	115007.120	115003.120	115004.120			
16	25	8	70	✓			115001.125		115002.125	115005.125		115003.125	115004.125			
20	25	6	70	✓		SA7	115001.130			115005.130						
20	25	8	70	✓			115001.135			115005.135						
25	25	6	70	✓		SA9	115001.140			115005.140						
25	25	8	70	✓			115001.145									

* Sur demande | On request | A pedido



A FORME / SHAPE /
Forma

ZYA

- Cylindrique sans coupe en bout
- Cylinder without end cut
- Cilíndrica sin corte frontal

STANDARD CUT TYPES



SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SA	STANDARD CUT TYPES				SPECIAL CUT TYPES					
							11.3001	11.3000	11.3002	11.3005	11.3007	11.3003	11.3004	11.4031	11.4041	
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8	
							Code	Code	Code	Code	Code	Code	Code	Code	Code	
1,5	6	3	38		✓	SA41	113001.015		113002.015			113003.015				
2	11	3	38		✓		113001.025		113002.025			113003.025				
2,5	11	3	38		✓	SA42	113001.027									
3	14	3	38		✓	SA43	113001.030	113000.030	113002.030	113005.030	113007.030	113003.030		114031.005	116041.005*	
3	14	3	50		✓	SA43L2	113001.035		113002.035			113003.035				
3	14	3	65		✓		113001.040		113002.040			113003.040				
3	14	3	75		✓	SA43L3	113001.045		113002.045			113003.045				
3	14	3	100		✓	SA43L4	113001.050		113002.050			113003.050				
3	12,7	6	50		✓	SA11	113001.052									
4	14	6	50		✓		113001.055		113002.055			113003.055				
5	12,7	3	38		✓	SA53	113001.057									
5	16	6	50		✓	SA14	113001.058									
6	5	3	37	✓		SA51	113001.059									
6	13	3	45	✓			113001.060	113000.060	113002.060	113005.060	113007.060	113003.060				
6	18	6	50		✓	SA1	113001.065	113000.065	113002.065	113005.065	113007.065	113003.065	113004.065	114031.010	114041.010	
6	25	6	50		✓		113001.067									
6	18	6	100	✓			113001.070		113002.070			113003.070				
6	18	6	150	✓		SA1L6	113001.075							114031.015	114041.015	
8	20	6	65	✓		SA2	113001.080	113000.080	113002.080	113005.080	113007.080	113003.080	113004.080			
8	20	6	170	✓		SA2L6	113001.085									
10	13	6	58	✓			113001.087							114031.020	114041.020	
10	20	6	65	✓		SA3	113001.090	113000.090	113002.090	113005.090	113007.090	113003.090	113004.090			
10	20	6	172	✓		SA3L6	113001.095		113002.095			113003.095				
10	25	6	70	✓			113001.100		113002.100		113007.100	113003.100	113004.100			
11	25	6	70	✓		SA4	113001.102									
12	20	6	64	✓			113001.103							114031.025	114041.025	
12	25	6	70	✓		SA5	113001.105	113000.105	113002.105	113005.105		113003.105	113004.105			
12DIN	25	6	70	✓			113001.107				113007.107					
12	25	6	175	✓		SA5L6	113001.110		113002.110			113003.110				
12	25	8	70	✓			113001.115		113002.115			113003.115	113004.115	114031.030*	114041.030*	
16	25	6	70	✓		SA6	113001.120		113002.120	113005.120	113007.120	113003.120	113004.120			
16	25	8	70	✓			113001.125		113002.125	113005.125		113003.125	113004.125			
20	25	6	70	✓		SA7	113001.130			113005.130						
20	25	8	70	✓			113001.135			113005.135						
25	25	6	70	✓		SA9	113001.140			113005.140						
25	25	8	70	✓			113001.145									

* Sur demande | On request | A pedido



A FORME / SHAPE / Forma

ZYA

- Cylindrique + rayon
- Cylinder-Radius
- Radio del cilindro

HP-3



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116010.005	3	14	3	38		✓
116010.010	6	18	6	50		✓
116010.015	8	19	6	64	✓	
116010.020	10	19	6	64	✓	
116010.025	12	25	8	70	✓	
116010.030	16	25	6	70	✓	

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114010.005	3	14	3	38		✓
114010.010	6	18	6	50		✓
114010.015	8	19	6	64	✓	
114010.020	10	19	6	64	✓	
114010.025	12	25	8	70	✓	
114010.030	16	25	6	70	✓	

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES
EJEMPLOS DE APLICACIÓN



Le design unique de la fraise rotative cylindrique + rayon transforme la fraise cylindrique conventionnelle en un outil haute technologie.

La fraise rotative cylindrique + rayon rencontre les plus hauts standards manufacturiers pour toutes sortes d'industries, particulièrement l'industrie aéronautique.

Le design du rayon en haut de la forme cylindrique fourni une plus longue durée de vie de l'outil en évitant le bris des dents.

Ce design unique avec la double coupe améliore le contrôle de l'opérateur, réduit la grosseur de copeaux et prévient le bris de pièces coûteuses.

- Caractéristiques et avantages du rayon:
- Améliore la résistance du tranchant au début de la fraise rotative.
 - Fourni un meilleur contrôle.
 - Préviens le creusage au point d'intersection de la pièce travaillée.
 - Produit un rayon sur la pièce travaillée.
 - Réduit le risque d'ébréchure du tranchant au point d'intersection de la pièce travaillée.

The CYLINDER+RADIUS unique design transforms the conventional cylinder burr into a Hightech Tool.

The new development meets the highest manufacturing standards for all kind of industries, especially the aerospace industry.

The Radius design at the top of the Cylinder provides an extended tool life avoiding teeth breakage.

This unique design with its double cut will improve operator control, reduce the size of chips and prevent damage to expensive parts.

- Features and benefits
Radius at the top of the Cylinder results:
- Offers improved flute strength at the start of the burr.
 - The Radius provides better control of the burr.
 - Prevents digging into work piece at the intersecting point.
 - Produces a Cylinder Radius on the work piece.
 - Reduces flute chipping at the intersecting point.

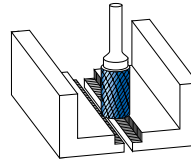
El diseño único RADIO+CILINDRO convierte la fresa rotatoria cilíndrica convencional en una herramienta de alta tecnología.

Este nuevo desarrollo cumple con los más altos estándares de fabricación para todo tipo de aplicaciones en la industria, incluyendo en especial la industria aeroespacial.

El diseño de radio especial en la parte superior del cilindro evita la rotura de los dientes y aumenta sustancialmente la vida útil.

Mediante el diseño de radio:

- ninguna inclinación / deslizamiento de la pieza de trabajo.
 - se evitan daños de herramientas costosas.
- Mediante el dentado cruzado:
- excelente control y orientación durante el proceso de desbarbado.
- Propiedades y ventajas El radio en la punta de la fresadora produce:
- estabilidad de ranuras mejorada por los bordes redondeados.
 - El radio permite un mejor control durante el proceso de molienda.
 - El redondeo impide la inclinación / el deslizamiento hacia la pieza de trabajo.
 - Creación de un 'radio' en la pieza de trabajo
 - El redondeo reduce la rotura del filo de corte de la fresa



B FORME / SHAPE /
Forma

ZYB

Cylindrique avec coupe en bout

Cylinder with end cut

Cilindrica con taglio in testa

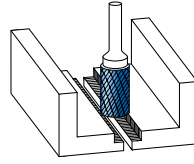
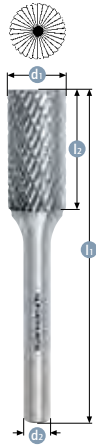
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SB	STANDARD CUT TYPES				SPECIAL CUT TYPES					
							11.5011	11.5010	11.5012	11.5015	11.5017	11.5013	11.5014	11.6032	11.6042	
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8	
							Code	Code	Code	Code	Code	Code	Code	Code	Code	
1,5	6	3	38		✓	SB41	115011.005		115012.005			115013.005				
2	11	3	38		✓		115011.010		115012.010			115013.010				
2,5	11	3	38		✓	SB42	115011.012									
3	14	3	38		✓	SB43	115011.015	15010.015	115012.015	115015.015	115017.015	115013.015		116032.005*	116042.005*	
3	14	3	50		✓	SB43L2	115011.020		115012.020			115013.020				
3	14	3	65		✓		115011.025		115012.025			115013.025				
3	14	3	75		✓	SB43L3	115011.030		115012.030			115013.030				
3	14	3	100		✓	SB43L4	115011.035		115012.035			115013.035				
3	12,7	6	50		✓	SB11	115011.037									
4	14	6	50		✓	SB43	115011.040		115012.040			115013.040				
5	16	6	50		✓	SB14	115011.042									
6	5	3	37	✓			115011.043									
6	13	3	45	✓		SB51	115011.045	115010.045	115012.045	115015.045	115017.045	115013.045				
6	18	6	50		✓		115011.050	115010.050	115012.050	115015.050	115017.050	115013.050	115014.050	116032.010*	116042.010	
6	18	6	75		✓	SB1	115011.055									
6	18	6	100	✓		SB1L4	115011.060		115012.060			115013.060				
6	18	6	150	✓		SB1L6	115011.065									
6	25	6	50		✓	SB1L6	115011.070	115010.070								
8	20	6	65	✓		SB2	115011.075	115010.075	115012.075	115015.075	115017.075	115013.075	115014.075	116032.015*	116042.015	
8	20	6	170	✓		SB2L6	115011.080		115012.080			115013.080				
10	13	6	58	✓			115011.082									
10	20	6	65	✓		SB3	115011.085	115010.085	115012.085	115015.085	115017.085	115013.085	115014.085	116032.020*	116042.020	
10	20	6	172	✓		SB3L6	115011.090		115012.090			115013.090				
10	25	6	70	✓			115011.095									
11	25	6	70	✓		SB4	115011.097									
12	20	6	64	✓			115011.099									
12	25	6	70	✓		SB5	115011.100	115010.100	115012.100	115015.100		115013.100	115014.100	116032.025*	116042.025	
12DIN	25	6	70	✓			115011.103				115017.103					
12	25	6	175	✓		SB5L6	115011.105		115012.105			115013.105				
12	25	8	70	✓			115011.110		115012.110	115015.110		115013.110	115014.110			
16	25	6	70	✓		SB6	115011.115		115012.115	115015.115	115017.115	115013.115	115014.115	116032.030*	116042.030*	
16	25	8	70	✓			115011.120		115012.120	115015.120		115013.120	115014.120			
20	25	6	70	✓		SB7	115011.125			115015.125						
20	25	8	70	✓			115011.130			115015.130						
25	25	6	70	✓		SB9	115011.135			115015.135						
25	25	8	70	✓			115011.140									

* Sur demande | On request | A pedido



B FORME / SHAPE /
Forma

ZYB

Cylindrique avec coupe en bout

Cylinder with end cut

Cilindrica con taglio in testa

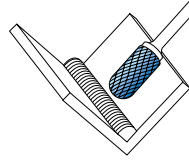
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SB	STANDARD CUT TYPES				SPECIAL CUT TYPES					
							11.3011	11.3010	11.3012	11.3015	11.3017	11.3013	11.3014	11.4032	11.4042	
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8	
							Code	Code	Code	Code	Code	Code	Code	Code	Code	Code
1,5	6	3	38		✓	SB41	113011.005		113012.005			115013.005				
2	11	3	38		✓		113011.010		113012.010			115013.010				
2,5	11	3	38		✓	SB42	113011.012									
3	14	3	38		✓	SB43	113011.015	113010.015	113012.015	113015.015	113017.015	113013.015		114032.005*	114042.005*	
3	14	3	50		✓	SB43L6	113011.020		113012.020			113013.020				
3	14	3	65		✓		113011.025		113012.025			113013.025				
3	14	3	75		✓	SB43L3	113011.030		113012.030			113013.030				
3	14	3	100		✓	SB43L4	113011.035		113012.035			113013.035				
3	12,7	6	50		✓	SB11	113011.037									
4	14	6	50		✓	SB43	113011.040		113012.040			113013.040				
5	16	6	50		✓	SB14	113011.042									
6	5	3	37	✓			113011.043									
6	13	3	45	✓		SB51	113011.045	113010.045	113012.045	113015.045	113017.045	113013.045				
6	18	6	50		✓		113011.050	113010.050	113012.050	113015.050	113017.050	113013.050	113014.050	114032.010*	114042.010	
6	18	6	75		✓	SB1	113011.055									
6	18	6	100	✓		SB1L4	113011.060		113012.060			113013.060				
6	18	6	150	✓		SB1L6	113011.065									
6	25	6	50		✓	SB1L6	113011.070	113010.070								
8	20	6	65	✓		SB2	113011.075	113010.075	113012.075	113015.075	113017.075	113013.075	113014.075	114032.015*	114042.015	
8	20	6	170	✓		SB2L6	113011.080		113012.080			113013.080				
10	13	6	58	✓			113011.082									
10	20	6	65	✓		SB3	113011.085	113010.085	113012.085	113015.085	113017.085	113013.085	113014.085	114032.020*	114042.020	
10	20	6	172	✓		SB3L6	113011.090		113012.090			113013.090				
10	25	6	70	✓			113011.095									
11	25	6	70	✓		SB4	113011.097									
12	20	6	64	✓			113011.099									
12	25	6	70	✓		SB5	113011.100	113010.100	113012.100	113015.100		113013.100	113014.100	114032.025*	114042.025	
12DIN	25	6	70	✓			113011.103				113017.103					
12	25	6	175	✓		SB5L6	113011.105		113012.105			113013.105				
12	25	8	70	✓			113011.110		113012.110	113015.110		113013.110	113014.110			
16	25	6	70	✓		SB6	113011.115		113012.115	113015.115	113017.115	113013.115	113014.115	114032.030*	114042.030*	
16	25	8	70	✓			113011.120		113012.120	113015.120		113013.120	113014.120			
20	25	6	70	✓		SB7	113011.125			113015.125						
20	25	8	70	✓			113011.130			113015.130						
25	25	6	70	✓		SB9	113011.135			113015.135						
25	25	8	70	✓			113011.140									

* Sur demande | On request | A pedido



C FORME / SHAPE / Forma

WRC

- Cylindrique bout rond
- Ball nosed cylinder
- Cilíndrica con radio

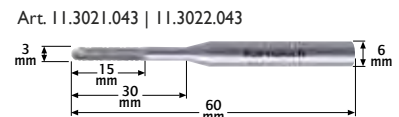
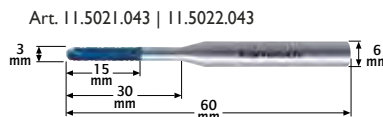
STANDARD CUT TYPES

SPECIAL CUT TYPES

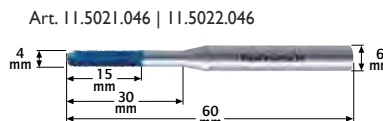
D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SC	STANDARD CUT TYPES				SPECIAL CUT TYPES				
							11.5021	11.5020	11.5022	11.5025	11.5027	11.5023	11.5024	11.6033	11.6043
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8
							Code	Code	Code	Code	Code	Code	Code	Code	Code
2	11	3	38		✓		115021.020		115022.020	115025.020		115023.020			
2,5	11	3	38		✓	SC41	115021.022	115020.022							
3	14	3	38		✓	SC42	115021.025	115020.025	115022.025	115025.025	115027.025	115023.025		116033.005	116043.005*
3	14	3	50		✓	SC42L2	115021.030		115022.030			115023.030			
3	14	3	60		✓	SC42L3	115021.032		115022.032						
3	14	3	75		✓		115021.035		115022.035			115023.035			
3	14	3	100		✓		115021.040		115022.040			115023.040			
3	12,7	6	50		✓	SC11	115021.042								
3	30	6	60		✓		115021.043		115022.043						
4	16	6	50		✓	SC13	115021.045		115022.045			115023.045			
4	30	6	60		✓		115021.046		115022.046						
5	12,7	3	38		✓	SC53	115021.047								
5	16	6	50		✓	SC14	115021.049								
6	12,7	3	44	✓		SC51	115021.050	115020.050	115022.050	115025.050	115027.050	115023.050			
6	18	6	50		✓	SC1	115021.055	115020.055	115022.055	115025.055	115027.055	115023.055	115024.055	116033.010	116043.010
6	18	6	60		✓		115021.056		115022.056						
6	18	6	80		✓		115021.058		115022.058						
6	18	6	100	✓			115021.060		115022.060			115023.060			
6	18	6	150	✓		SC1L6	115021.065		115022.065			115023.065			
6	25	6	50		✓		115021.070		115022.070			115023.070			
8	20	6	65	✓		SC2	115021.075	115020.075	115022.075	115025.075	115027.075	115023.075	115024.075	116033.015	116043.015
8	20	6	170	✓		SC2L6	115021.080		115022.080			115023.080			
10	20	6	65	✓		SC3	115021.085	115020.085	115022.085	115025.085	115027.085	115023.085	115024.085	116033.020	116043.020
10	20	6	170	✓		SC3L6	115021.090		115022.090			115023.090			
10	25	6	70	✓			115021.095		115022.095			115023.095			
11	25	6	70	✓		SC4	115021.097								
12	10	6	54	✓			115021.099								
12	20	6	65	✓			115021.100		115022.100	115025.100		115023.100			
12	25	6	70	✓		SC5	115021.105	115020.105	115022.105	115025.105		115023.105	115024.105	116033.025	116043.025
12DIN	25	6	70	✓			115021.107				115027.107				
12	25	6	175	✓		SC5L6	115021.110		115022.110			115023.110			
12	25	8	70	✓			115021.115		115022.115	115025.115		115023.115	115024.115		
16	25	6	70	✓		SC6	115021.120		115022.120	115025.120	115027.120	115023.120	115024.120	116033.030*	116043.030*
16	25	8	70	✓			115021.125		115022.125	115025.125		115023.125	115024.125		
20	25	6	70	✓		SC7	115021.130			115025.130					
20	25	8	70	✓			115021.135			115025.135					

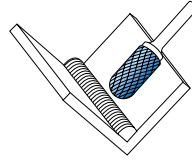
* Sur demande | On request | A pedido

- Fraises spécialement pour serruriers pages 61-63
Burs specially for locksmiths see pages 61-63
Fresas especialmente para servicios de apertura de puertas paginas 61-63



Tranchant de 15mm sur 30mm
Flute of 15mm on 30mm
De 30mm están dentados 15mm





C FORME / SHAPE / Forma

WRC

- Cylindrique bout rond
- Ball nosed cylinder
- Cilíndrica con radio

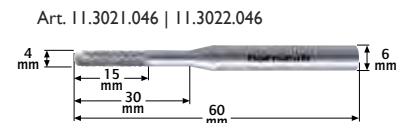
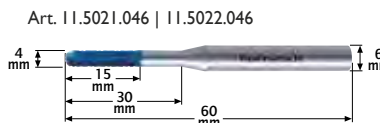
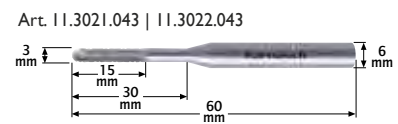
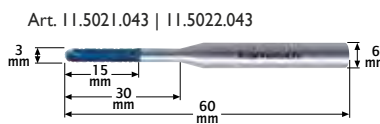
STANDARD CUT TYPES

SPECIAL CUT TYPES

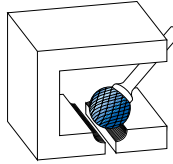
D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SC	STANDARD CUT TYPES				SPECIAL CUT TYPES					
							11.3021	11.3020	11.3022	11.3025	11.3027	11.3023	11.3024	11.4033	11.4043	
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8	
							Code	Code	Code	Code	Code	Code	Code	Code	Code	
2	11	3	38		✓		113021.020		113022.020		113025.020		113023.020			
2,5	11	3	38		✓	SC41	113021.022	113020.022								
3	14	3	38		✓	SC42	113021.025	113020.025	113022.025		113025.025	113027.025	113023.025		114033.005	114043.005*
3	14	3	50		✓	SC42L2	113021.030		113022.030				113023.030			
3	14	3	60		✓	SC42L3	113021.032		113022.032							
3	14	3	75		✓		113021.035		113022.035				113023.035			
3	14	3	100		✓		113021.040		113022.040				113023.040			
3	12,7	6	50		✓	SC11	113021.042									
3	30	6	60		✓		113021.043		113022.043							
4	16	6	50		✓		113021.045		113022.045				113023.045			
4	30	6	60		✓		113021.046		113022.046							
5	12,7	3	38		✓	SC53	113021.047									
5	16	6	50		✓	SC14	113021.049									
6	12,7	3	44	✓		SC51	113021.050	113020.050	113022.050		113025.050	113027.050	113023.050			
6	18	6	50		✓	SC1	113021.055	113020.055	113022.055		113025.055	113027.055	113023.055	113024.055	114033.010	114043.010
6	18	6	60		✓		113021.056		113022.056							
6	18	6	80		✓		113021.058		113022.058							
6	18	6	100	✓			113021.060		113022.060				113023.060			
6	18	6	150	✓		SC1L6	113021.065		113022.065				113023.065			
6	25	6	50		✓		113021.070		113022.070				113023.070			
8	20	6	65	✓		SC2	113021.075	113020.075	113022.075		113025.075	113027.075	113023.075	113024.075	114033.015	114043.015
8	20	6	170	✓		SC2L6	113021.080		113022.080				113023.080			
10	20	6	65	✓		SC3	113021.085	113020.085	113022.085		113025.085	113027.085	113023.085	113024.085	114033.020	114043.020
10	20	6	170	✓		SC3L6	113021.090		113022.090				113023.090			
10	25	6	70	✓			113021.095		113022.095				113023.095			
11	25	6	70	✓		SC4	113021.097									
12	10	6	54	✓			113021.099									
12	20	6	65	✓			113021.100		113022.100				113023.100			
12	25	6	70	✓		SC5	113021.105	113020.105	113022.105		113025.105		113023.105	113024.105	114033.025	114043.025
12DIN	25	6	70	✓			113021.107					113027.107				
12	25	6	175	✓		SC5L6	113021.110		113022.110				113023.110			
12	25	8	70	✓			113021.115		113022.115		113025.115		113023.115	113024.115		
16	25	6	70	✓		SC6	113021.120		113022.120		113025.120	113027.120	113023.120	113024.120	114033.030*	114043.030*
16	25	8	70	✓			113021.125		113022.125		113025.125		113023.125	113024.125		
20	25	6	70	✓		SC7	113021.130				113025.130					
20	25	8	70	✓			113021.135				113025.135					

* Sur demande | On request | A pedido

- Fraises spécialement pour serruriers pages 61-63
Burs specially for locksmiths see pages 61-63
Fresas especialmente para servicios de apertura de puertas paginas 61-63



Tranchant de 15 mm sur 30 mm
Flute of 15 mm on 30 mm
De 30 mm están dentados 15 mm



D FORME / SHAPE /
Forma

KUD

🇫🇷 Sphérique (boule)

🇪🇸 Ball

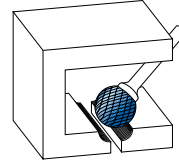
🇪🇸 Esfèria

STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SD	STANDARD CUT TYPES				SPECIAL CUT TYPES					
							11.5031 HP-3 Code	11.5030 HP-2 Code	11.5032 HP-4 Code	11.5035 HP-7 Code	11.5037 HP-1 Code	11.5033 HP-5 Code	11.5034 HP-6 Code	11.6034 HP-9 Code	11.6044 HP-8 Code	
2	1,8	3	38		✓		11.5031.020		11.5032.020	11.5035.020		11.5033.020				
2,5	2,3	3	38		✓	SD41	11.5031.022									
3	2,5	3	38		✓	SD42	11.5031.025	11.5030.025			11.5037.025	11.5033.025		11.6034.005	11.6044.005*	
3	2,5	3	50		✓	SD42L2	11.5031.030					11.5033.030				
3	2,5	3	75		✓	SD42L3	11.5031.035					11.5033.035				
3	2,5	6	50		✓	SD11	11.5031.040					11.5033.040				
4	3,4	3	38		✓		11.5031.045	11.5030.045	11.5032.045	11.5035.045		11.5033.045				
4	3,4	6	50		✓		11.5031.046	11.5030.046								
5	4,7	3	38		✓		11.5031.047	11.5030.047								
5	5	6	50		✓		11.5031.048	11.5030.048		11.5035.050	11.5037.050					
6	5	3	38	✓			11.5031.050	11.5030.050	11.5032.050	11.5035.055	11.5037.055	11.5033.050				
6	4,7	6	50		✓	SD1	11.5031.055	11.5030.055	11.5032.055	11.5035.060	11.5037.060	11.5033.055	11.5034.055	11.6034.010	11.6044.010	
8	6	6	52	✓		SD2	11.5031.060	11.5030.060	11.5032.060			11.5033.060	11.5034.060	11.6034.015	11.6044.015	
8	6	6	180	✓			11.5031.065		11.5032.065			11.5033.065				
10	8	6	54	✓		SD3	11.5031.070	11.5030.070	11.5032.070	11.5035.070	11.5037.070	11.5033.070	11.5034.070	11.6034.020	11.6044.020	
10	8	6	185	✓		SD3L7	11.5031.075		11.5032.075			11.5033.075				
11	9,5	6	55	✓		SD4	11.5031.077									
12	11,4	6	56	✓		SD5	11.5031.080	11.5030.080		11.5035.080		11.5033.080	11.5034.080	11.6034.025	11.6044.025	
12DIN	11	6	56	✓			11.5031.083				11.5037.083					
12	11	8	56	✓			11.5031.085		11.5032.085			11.5033.085	11.5034.085			
12	11	6	162	✓		SD5L6	11.5031.090		11.5032.090			11.5033.090				
16	14	6	60	✓		SD6	11.5031.095		11.5032.095	11.5035.095	11.5037.095	11.5033.095	11.5034.095			
16	14	8	60	✓			11.5031.100		11.5032.100	11.5035.100		11.5033.100	11.5034.100	11.6034.030*	11.6044.030*	
20	16,5	6	62	✓			11.5031.105			11.5035.105						
20	16,5	8	62	✓		SD7	11.5031.110			11.5035.110						
25	22	6	68	✓		SD9	11.5031.115			11.5035.115						
25	22	8	68	✓			11.5031.120			11.5035.120						



D FORME / SHAPE / Forma

KUD

Sphérique (boule)

Ball

Esférica

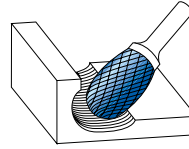
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SD	STANDARD CUT TYPES				SPECIAL CUT TYPES				
							11.3031	11.3030	11.3032	11.3035	11.3037	11.3033	11.3034	11.4034	11.4044
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8
							Code	Code	Code	Code	Code	Code	Code	Code	Code
2	18	3	38		✓		113031.020		113032.020	113035.020		113033.020			
2.5	23	3	38		✓	SD41	113031.022								
3	25	3	38		✓	SD42	113031.025	113030.025			113037.025	113033.025		114034.005	114044.005*
3	25	3	50		✓	SD42L2	113031.030					113033.030			
3	25	3	75		✓	SD42L3	113031.035					113033.035			
3	25	3	50		✓	SD11	113031.040					113033.040			
4	34	6	38		✓	SD14	113031.045	113030.045	113032.045	113035.045		113033.045			
4	34	3	50		✓		113031.046	113030.046							
5	47	6	38		✓		113031.047	113030.047							
5	5	6	50		✓		113031.048	113030.048		113035.050	113037.050				
6	5	3	38	✓			113031.050	113030.050	113032.050	113035.055	113037.055	113033.050			
6	47	3	50		✓	SD1	113031.055	113030.055	113032.055	113035.060	113037.060	113033.055	113034.055	114034.010	114044.010
8	6	6	52	✓		SD2	113031.060	113030.060	113032.060			113033.060	113034.060	114034.015	114044.015
8	6	6	180	✓		SD2L7	113031.065		113032.065			113033.065			
10	8	6	54	✓		SD3	113031.070	113030.070	113032.070	113035.070	113037.070	113033.070	113034.070	114034.020	114044.020
10	8	6	185	✓			113031.075		113032.075			113033.075			
11	95	6	55	✓		SD4	113031.077								
12	11,4	6	56	✓		SD5	113031.080	113030.080		113035.080		113033.080	113034.080	114034.025	114044.025
12DIN	11	6	56	✓			113031.083				113037.083				
12	11	8	56	✓			113031.085		115032.085			113033.085	113034.085		
12	11	6	162	✓		SD5L6	113031.090		115032.090			113033.090			
16	14	6	60	✓		SD6	113031.095		115032.095	113035.095	113037.095	113033.095	113034.095		
16	14	8	60	✓			113031.100		115032.100	113035.100		113033.100	113034.100	114034.030*	114044.030*
20	16,5	6	62	✓			113031.105			113035.105					
20	16,5	8	62	✓		SD7	113031.110			113035.110					
25	22	6	68	✓		SD9	113031.115			113035.115					
25	22	8	68	✓			113031.120			113035.120					

* Sur demande | On request | A pedido



E FORME / SHAPE /
Forma

TRE

- Ovale
- Oval
- Oval

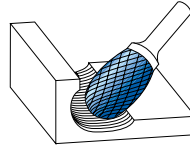
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SE	STANDARD CUT TYPES				SPECIAL CUT TYPES							
							11.5041 HP-3 Code	11.5040 HP-2 Code	11.5042 HP-4 Code	11.5045 HP-7 Code	11.5047 HP-1 Code	11.5043 HP-5 Code	11.5044 HP-6 Code	11.6035 HP-9 Code	11.6045 HP-8 Code			
3	6	3	38		✓	SE41	115041.010	115040.010	115042.010	115045.010	115047.010	115043.010						
3	6	3	50		✓	SE41L2	115041.005								116035.005*	116045.005*		
3	6	3	75		✓	SE41L3	115041.011											
5	7,1	3	38		✓	SE11	115041.012											
6	10	3	42	✓		SE51	115041.015	115040.015	115042.015	115045.015	115047.015	115043.015						
6	10	6	50		✓	SE1	115041.020	115040.020	115042.020	115045.020	115047.020	115043.020	115044.020	116035.010*	116045.010*			
8	15	6	60	✓			115041.025	115040.025	115042.025	115045.025	115047.025	115043.025	115044.025	116035.015	116045.015*			
10	16	6	60	✓		SE3	115041.030	115040.030	115042.030	115045.030	115047.030	115043.030	115044.030	116035.020	116045.020*			
10	16	6	170	✓		SE3L6	115041.032											
12	22	6	67	✓		SE5	115041.035	115040.035	115042.035	115045.035		115043.035	115044.035	116035.025	116045.025*			
12DIN	21	6	66	✓			115041.037				115047.037							
12	22	6	175	✓		SE3L6	115041.038											
12	22	8	67	✓			115041.040		115042.040			115043.040	115044.040					
16	25	6	70	✓			115041.045		115042.045	115045.045	115047.045	115043.045	115044.045	116035.030*	116045.030*			
16	25	8	70	✓		SE6	115041.050		115042.050	115045.050		115043.050	115044.050					
20	25	6	70	✓			115041.055			115045.055								
20	25	8	70	✓			115041.060			115045.060								

* Sur demande | On request | A pedido



E FORME / SHAPE / Forma

TRE

- Ovale
- Oval
- Oval

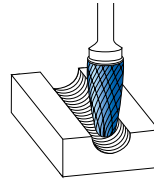
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SE	11.3041	11.3040	11.3042	11.3045	11.3047	11.3043	11.3044	11.4035	11.4045
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8
							Code	Code	Code	Code	Code	Code	Code	Code	Code
3	6	3	38		✓	SE41	113041.010	113040.010	113042.010	113045.010	115047.010	115043.010			
3	6	3	50		✓	SE41L2	113041.005							116035.005*	114045.005*
3	6	3	75		✓	SE41L3	113041.011								
5	7,1	3	38		✓	SE11	113041.012								
6	10	3	42	✓		SE51	113041.015	113040.015	113042.015	113045.015	113047.015	113043.015			
6	10	6	50		✓	SE1	113041.020	113040.020	113042.020	113045.020	113047.020	113043.020	113044.020	114035.010*	114045.010*
8	15	6	60	✓			113041.025	113040.025	113042.025	113045.025	113047.025	113043.025	113044.025	114035.015	114045.015*
10	16	6	60	✓		SE3	113041.030	113040.030	113042.030	113045.030	113047.030	113043.030	113044.030	114035.020	114045.020*
10	16	6	170	✓		SE3L6	113041.032								
12	22	6	67	✓		SE5	113041.035	113040.035	113042.035	113045.035		113043.035	113044.035	114035.025	114045.025*
12DIN	21	6	66	✓			113041.037				113047.037				
12	22	6	175	✓		SE5L6	113041.038								
12	22	8	67	✓			113041.040		113042.040			113043.040	113044.040		
16	25	6	70	✓			113041.045		113042.045	113045.045	113047.045	113043.045	113044.045	114035.030*	114045.030*
16	25	8	70	✓		SE6	113041.050		113042.050	113045.050		113043.050	113044.050		
20	25	6	70	✓			113041.055			113045.055					
20	25	8	70	✓			113041.060			113045.060					

* Sur demande | On request | A pedido



F FORME / SHAPE / Forma

RBF

- Ogive bout rond
- Ball nosed tree
- Ojival

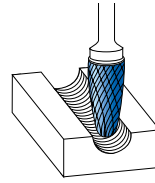
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SF	11.5051	11.5050	11.5052	11.5055	11.5057	11.5053	11.5054	11.6036	11.6046
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8
							Code	Code	Code	Code	Code	Code	Code	Code	Code
3	6	3	38	✓		SF41	115051.007								
3	8	3	38		✓	SF42	115051.010		115052.010			115053.010			
3	14	3	38		✓		115051.015	115050.015	115052.015	115055.015	115057.015	115053.015		116036.005	116046.005*
3	14	3	50		✓		115051.020		115052.020			115053.020			
3	14	3	75		✓		115051.021								
5	127	3	38		✓	SF53	115051.022								
6	12	3	44	✓		SF11	115051.025	115050.025	115052.025	115055.025	115057.025	115053.025			
6	18	6	50		✓	SF1	115051.030	115050.030	115052.030	115055.030	115057.030	115053.030	115054.030	116036.010	116046.010
6	18	6	168	✓		SF1L6	115051.033								
8	20	6	65	✓		SF2	115051.035	115050.035	115052.035	115055.035	115051.035	115053.035	115054.035	116036.015	116046.015
10	20	6	65	✓		SF3	115051.040	115050.040	115052.040	115055.040	115057.040	115053.040	115054.040	116036.020	116046.020
10	20	6	170	✓		SF3L6	115051.045		115052.045			115053.045			
11	25	6	70	✓		SF4	115041.047								
12	20	6	65	✓		SF13	115051.048								
12	25	6	70	✓		SF5	115051.050	115050.050	115052.050	115055.050		115053.050	115054.050	116036.025	116046.025
12DIN	25	6	70	✓			115051.053				115057.053				
12	25	8	70	✓			115051.055		115052.055	115055.055		115053.055	115054.055		
12	25	6	175	✓		SF5L6	115051.060		115052.060			115053.060			
16	25	6	70	✓		SF6	115051.065		115052.065	115055.065	115057.065	115053.065	115054.065	116036.030*	11646.030*
16	25	8	70	✓			115051.070		115052.070	115055.070		115053.070	115054.070		
20	25	6	70	✓		SF7	115051.075			115055.075					
20	25	8	70	✓			115051.080			115055.080					
20	32	6	77	✓			115051.082								
20	38	6	83	✓			115051.085								
20	38	8	83	✓			115051.090								

* Sur demande | On request | A pedido



F FORME / SHAPE /
Forma

RBF

- Ogive bout rond
- Ball nosed tree
- Ojival

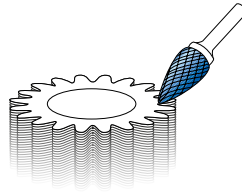
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SF	STANDARD CUT TYPES				SPECIAL CUT TYPES					
							11.3051	11.3050	11.3052	11.3055	11.3057	11.3053	11.3054	11.4036	11.4046	
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8	
							Code	Code	Code	Code	Code	Code	Code	Code	Code	
3	6	3	38	✓		SF41	113051.007									
3	8	3	38		✓	SF42	113051.010			113052.010			113053.010			
3	14	3	38		✓		113051.015	113050.015	113052.015	113055.015	113057.015	113053.015		114036.005	114046.005*	
3	14	3	50		✓		113051.020		113052.020			113053.020				
3	14	3	75		✓		113051.021									
5	12,7	3	38		✓	SF53	113051.022									
6	12	3	44	✓		SF11	113051.025	113050.025	113052.025	113055.025	113057.025	113053.025				
6	18	6	50		✓	SF1	113051.030	113050.030	113052.030	113055.030	113057.030	113053.030	113054.030	114036.010	114046.010	
6	18	6	168	✓		SF1L6	113051.033									
8	20	6	65	✓		SF2	113051.035	113050.035	113052.035	113055.035	113057.035	113053.035	113054.035	114036.015	114046.015	
10	20	6	65	✓		SF3	113051.040	113050.040	113052.040	113055.040	113057.040	113053.040	113054.040	114036.020	114046.020	
10	20	6	170	✓		SF3L6	113051.045		113052.045			113053.045				
11	25	6	70	✓		SF4	113041.047									
12	20	6	65	✓		SF13	113051.048									
12	25	6	70	✓		SF5	113051.050	113050.050	113052.050	113055.050		113053.050	113054.050	114036.025	114046.025	
12DIN	25	6	70	✓			113051.053				113057.053					
12	25	8	70	✓			113051.055		113052.055	113055.055		113053.055	113054.055			
12	25	6	175	✓		SF5L6	113051.060		113052.060			113053.060				
16	25	6	70	✓		SF6	113051.065		113052.065	113055.065	113057.065	113053.065	113054.065	114036.030*	114046.030*	
16	25	8	70	✓			113051.070		113052.070	113055.070		113053.070	113054.070			
20	25	6	70	✓		SF7	113051.075			113055.075						
20	25	8	70	✓			113051.080			113055.080						
20	32	6	77	✓			113051.082									
20	38	6	83	✓			113051.085									
20	38	8	83	✓			113051.090									

* Sur demande | On request | A pedido



G FORME / SHAPE / Forma

SPG

-  Ogive pointue
-  Tree
-  Ojival en punta

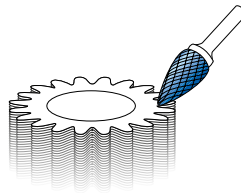
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SG	11.5061	11.5060	11.5062	11.5065	11.5067	11.5063	11.5064	11.6037	11.6047
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8
							Code	Code	Code	Code	Code	Code	Code	Code	Code
3	6	3	38		✓	SG41	115061.010		115062.010			115063.010			
3	10	3	38		✓	SG43	115061.012	115060.012							
3	14	3	38		✓		115061.015	115060.015	115062.015	115065.015	115067.015	115063.015		116037.005*	116047.005*
3	14	3	50		✓		115061.020		115062.020			115063.020			
3	14	3	75		✓		115061.025		115062.025			115063.025			
5	12,7	3	38		✓	SG53	115061.028								
6	12	3	44	✓		SG51	115061.030	115060.030	115062.030	115065.030	115067.030	115063.030			
6	18	6	50		✓	SG1	115061.035	115060.035	115062.035	115065.035	115067.035	115063.035	115064.035	116037.010	116047.010
8	20	6	65	✓		SG2	115061.040	115060.040	115062.040	115065.040	115067.040	115063.040	115064.040	116037.015	116047.015
10	20	6	65	✓		SG3	115061.045	115060.045	115062.045	115065.045	115067.045	115063.045	115064.045	116037.020	116047.020
10	20	6	170	✓		SG3L6	115061.050		115062.050			115063.050			
12	20	6	65	✓		SG13	115061.055		115062.055			115063.055			
12	25	6	70	✓		SG5	115061.060	115060.060	115062.060	115065.060		115063.060	115064.060	116037.025	116047.025
12DIN	25	6	70	✓			115061.063				115067.063				
12	25	8	70	✓			115061.065		115062.065			115063.065	115064.065		
12	25	6	175	✓			115061.070		115062.070			115063.070			
12	30	6	75	✓			115061.075		115062.075			115063.075			
12	30	8	75	✓			115061.080		115062.080			115063.080			
16	25	6	70	✓		SG6	115061.085		115062.085	115065.085	115067.085	115063.085	115064.085	116037.030*	116047.030
16	25	8	70	✓			115061.090		115062.090			115063.090	115064.090		
16	30	6	75	✓			115061.095								
16	30	8	75	✓			115061.100								
20	25	6	70	✓		SG7	115061.105								
20	25	8	70	✓			115061.110								
20	38	6	83	✓			115061.115								
20	38	8	83	✓			115061.120								

* Sur demande | On request | A pedido



G FORME / SHAPE / Forma

SPG

- Ogive pointue
- Tree
- Ojival en punta

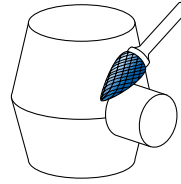
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SG	11.3061	11.3060	11.3062	11.3065	11.3067	11.3063	11.3064	11.4037	11.4047
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8
							Code	Code	Code	Code	Code	Code	Code	Code	Code
3	6	3	38		✓	SG41	113061.010		113062.010			113063.010			
3	10	3	38		✓	SG43	113061.012	113060.012							
3	14	3	38		✓		113061.015	113060.015	113062.015	113065.015	113067.015	113063.015		114037.005*	114047.005*
3	14	3	50		✓		113061.020		113062.020			113063.020			
3	14	3	75		✓		115061.025		113062.025			113063.025			
5	12,7	3	38		✓	SG53	113061.028								
6	12	3	44	✓		SG51	113061.030	113060.030	113062.030	113065.030	113067.030	113063.030			
6	18	6	50		✓	SG1	113061.035	113060.035	113062.035	113065.035	113067.035	113063.035	113064.035	114037.010	114047.010
8	20	6	65	✓		SG2	113061.040	113060.040	113062.040	113065.040	113067.040	113063.040	113064.040	114037.015	114047.015
10	20	6	65	✓		SG3	113061.045	113060.045	113062.045	113065.045	113067.045	113063.045	113064.045	114037.020	114047.020
10	20	6	170	✓		SG3L6	113061.050		113062.050			113063.050			
12	20	6	65	✓		SG13	113061.055		113062.055			113063.055			
12	25	6	70	✓		SG5	113061.060	113060.060	113062.060	113065.060		113063.060	113064.060	114037.025	114047.025
12DIN	25	6	70	✓			115061.063				113067.063				
12	25	8	70	✓			113061.065		113062.065			113063.065	113064.065		
12	25	6	175	✓			113061.070		113062.070			113063.070			
12	30	6	75	✓			113061.075		113062.075			113063.075			
12	30	8	75	✓			113061.080		113062.080			113063.080			
16	25	6	70	✓		SG6	113061.085		113062.085	113065.085	113067.085	113063.085	113064.085	114037.030*	114047.030*
16	25	8	70	✓			113061.090		113062.090			113063.090	113064.090		
16	30	6	75	✓			113061.095								
16	30	8	75	✓			113061.100								
20	25	6	70	✓		SG7	113061.105								
20	25	8	70	✓			113061.110								
20	38	6	83	✓			113061.115								
20	38	8	83	✓			113061.120								

* Sur demande | On request | A pedido



H FORME / SHAPE / Forma

- Flamme
- Flame
- Llama

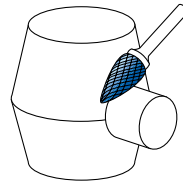
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SH	STANDARD CUT TYPES				SPECIAL CUT TYPES				
							11.5071	11.5070	11.5072	11.5075	11.5077	11.5073	11.5074	11.6038	11.6048
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8
							Code	Code	Code	Code	Code	Code	Code	Code	
3	6	3	38		✓	SH41	115071.005	115070.005	115072.005		115077.005	115073.005			
3	6	3	50		✓	SH41L2	115071.003								
3	6	3	75		✓	SH41L3	115071.006								
5	9,5	3	38		✓		115071.007								
6	10	3	43		✓						115077.009				
6	14	6	50		✓	SH1	115071.010		115072.010		115077.010	115073.010	115074.010		
8	20	6	65	✓		SH2	115071.015	115070.015	115072.015	115075.015	115077.015	115073.015	115074.015	116038.015	116048.015
8	20	6	170	✓			115071.017								
10	20	6	65	✓		SH3	115071.020	115070.020	115072.020	115075.020	115077.020	115073.020	115074.020	116038.020	116048.020*
12	32	6	77	✓		SH5	115071.025	115070.025	115072.025	115075.025		115073.025	115074.025	116038.025	116048.025
12DIN	30	6	75	✓			115071.027				115077.027				
12	32	6	180	✓			115071.028								
12	32	8	77	✓			115071.030		115072.030			115073.030	115074.030		
16	36	6	82	✓		SH6	115071.035		115072.035	115075.035	115077.035	115073.035	115074.035	116038.030*	116048.030*
16	36	8	82	✓			115071.040		115072.040			115073.040	115074.040		
20	41	6	86	✓		SH6	115071.045								
20	41	8	86	✓			115071.050								

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H FORME / SHAPE / Forma

- Flamme
- Flame
- Llama

STANDARD CUT TYPES

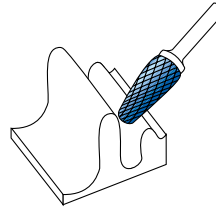


SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SH	STANDARD CUT TYPES				SPECIAL CUT TYPES				
							11.3071	11.3070	11.3072	11.3075	11.3077	11.3073	11.3074	11.4038	11.4048
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8
Code	Code	Code	Code	Code	Code	Code	Code	Code	Code	Code	Code	Code	Code	Code	
3	6	3	38		✓	SH41	113071.005	113070.005	113072.005		113077.005	113073.005			
3	6	3	50		✓	SH41L2	113071.003								
3	6	3	75		✓	SH41L3	113071.006								
5	9.5	3	38		✓		113071.007								
6	10	3	43		✓						113077.009				
6	14	6	50		✓	SH1	113071.010		113072.010		113077.010	113073.010	113074.010		
8	20	6	65	✓		SH2	113071.015	113070.015	113072.015	113075.015	113077.015	113073.015	113074.015	114038.015	114048.015
8	20	6	170	✓			113071.017								
10	20	6	65	✓		SH3	113071.020	113070.020	113072.020	113075.020	113077.020	113073.020	113074.020	114038.020	114048.020*
12	32	6	77	✓		SH5	113071.025	113070.025	113072.025	113075.025		113073.025	113074.025	114038.025	114048.025
12DIN	30	6	75	✓			113071.027				113077.027				
12	32	6	180	✓			113071.028								
12	32	8	77	✓			113071.030		113072.030			113073.030	113074.030		
16	36	6	82	✓		SH6	113071.035		113072.035	113075.035	113077.035	113073.035	113074.035	114038.030*	114048.030*
16	36	8	82	✓			113071.040		113072.040			113073.040	113074.040		
20	41	6	86	✓		SH6	113071.045								
20	41	8	86	✓			113071.050								

* Sur demande | On request | A pedido



L FORME / SHAPE /
Forma

KEL

- Conique bout arrondi
- Ball nosed cone
- Cónica punta redonda

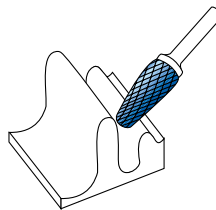
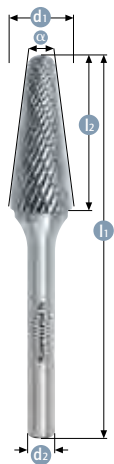
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SL	STANDARD CUT TYPES				SPECIAL CUT TYPES					
							11.5081	11.5080	11.5082	11.5085	11.5087	11.5083	11.5084	11.6039	11.6049	
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8	
							Code	Code	Code	Code	Code	Code	Code	Code	Code	
3	10	3	38		✓		115081.005		115082.005		115083.005					
3	14	3	38		✓	SL41	115081.010	115080.010	115082.010	115085.010	115087.010	115083.010		116039.005*	116049.005*	
3	14	3	50	✓			115081.009	115080.009	115082.009							
3	14	3	75	✓			115081.011									
5	12,7	3	38		✓	SL53	115081.012									
6	16	3	48	✓			115081.015	115080.015	115082.015	115085.015	115087.015	115083.015				
6	18	6	50		✓	SL1	115081.020	115080.020	115082.020	115085.020	115087.020	115083.020	115084.020	116039.010*	116049.010*	
8	25	6	70	✓		SL2	115081.025	115080.025	115082.025	115085.025	115087.025	115083.025	115084.025	116039.015*	116049.015*	
10	20	6	65	✓			115081.030	115080.030	115082.030		115087.030	115083.030				
10	30	6	75	✓		SL3	115081.035		115082.035	115085.035		115083.035	115084.035	116039.020	116049.020	
10	30	6	176	✓			115081.040		115082.040			115083.040				
12	32	6	77	✓		SL4	115081.045	115080.045	115082.045	115085.045		115083.045	115084.045	116039.025	116049.025	
12DIN	25	6	70	✓			115081.047				115087.047					
12	32	8	77	✓			115081.050		115082.050	115085.050		115083.050	115084.050			
12	32	6	182	✓		SL4L6	115081.055		115082.055	115085.055		115083.055				
16	33	6	78	✓		SL6	115081.060		115082.060	115085.060	115087.060	115083.060	115084.060	116039.030*	116049.030*	
16	33	8	78	✓			115081.065		115082.065	115085.065		115083.065	115084.065			
20	41	6	86	✓			115081.070									
20	41	8	86	✓		SL7	115081.075									

* Sur demande | On request | A pedido



L FORME / SHAPE /
Forma

KEL

- Conique bout arrondi
- Ball nosed cone
- Cónica punta redonda

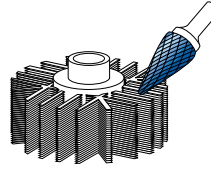
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SL	11.3081	11.3080	11.3082	11.3085	11.3087	11.3083	11.3084	11.4039	11.4049
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8
							Code	Code	Code	Code	Code	Code	Code	Code	Code
3	10	3	38		✓		113081.005		113082.005			113083.005			
3	14	3	38		✓	SL41	113081.010	113080.010	113082.010	113085.010	113087.010	113083.010		114039.005*	114049.005*
3	14	3	50	✓			113081.009								
3	14	3	75	✓			113081.011								
5	12,7	3	38		✓	SL53	113081.012								
6	16	3	48	✓			113081.015	113080.015	113082.015	113085.015	113087.015	113083.015			
6	18	6	50		✓	SL1	113081.020	113080.020	113082.020	113085.020	113087.020	113083.020	113084.020	114039.010*	114049.010*
8	25	6	70	✓		SL2	113081.025	113080.025	113082.025	113085.025	113087.025	113083.025	113084.025	114039.015*	114049.015*
10	20	6	65	✓			113081.030	113080.030	113082.030		113087.030	113083.030			
10	30	6	75	✓		SL3	113081.035		113082.035	113085.035		113083.035	113084.035	114039.020	114049.020
10	30	6	176	✓			113081.040		113082.040			113083.040			
12	32	6	77	✓		SL4	113081.045	113080.045	113082.045	113085.045		113083.045	113084.045	114039.025	114049.025
12DIN	25	6	70	✓			113081.047				113087.047				
12	32	8	77	✓			113081.050		113082.050	113085.050		113083.050	113084.050		
12	32	6	182	✓		SL4L6	113081.055		113082.055	113085.055		113083.055			
16	33	6	78	✓		SL6	113081.060		113082.060	113085.060	113087.060	113083.060	113084.060	114039.030*	114049.030*
16	33	8	78	✓			113081.065		113082.065	113085.065		113083.065	113084.065		
20	41	6	86	✓			113081.070								
20	41	8	86	✓		SL7	113081.075								

* Sur demande | On request | A pedido



M FORME / SHAPE /
Forma

SKM

- Conique bout pointu
- Cone
- Cónica punta recta

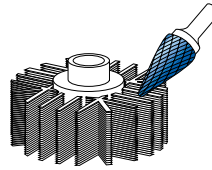
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	α°	BRASÉ BRAZED	VHM SOLID	SM	11.5091	11.5090	11.5092	11.5095	11.5097	11.5093	11.5094	11.6040	11.6050	
								HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8	
								Code	Code	Code	Code	Code	Code	Code	Code	Code	
3	8	3	38	18		✓											
3	11	3	38	14		✓	SM42	115091.015	115090.015	115092.015	115095.015	115097.015	115093.015		116040.005*	116050.005*	
3	15	3	38	10		✓		115091.020		115092.020			115093.020				
6	12	3	48	22	✓			115091.025	115090.025	115092.025	115095.025	115097.025	115093.025				
6	12,7	6	50	14		✓		115091.027									
6	20	6	50	14		✓	SM2	115091.030	115090.030	115092.030	115095.030	115097.030	115093.030		116040.010*	116050.010*	
6	25	6	50	11		✓	SM3	115091.032									
8	18	6	63	13	✓			115091.035		115092.035			115093.035				
10	20	6	65	28	✓		SM4	115091.040	115090.040	115092.040	115095.040	115097.040	115093.040	115094.040	116040.020*	116050.020*	
12	25	6	70	28	✓		SM5	115091.045	115090.045	115092.045	115095.045		115093.045	115094.045	116040.025*	116050.025*	
12DIN	25	6	70	28	✓			115091.047				115097.047					
12	25	8	70	28	✓			115091.050		115092.050			115093.050	115094.050			
16	26	6	74	33	✓		SM6	115091.055		115092.055		115097.055	115093.055	115094.055			
16	26	8	74	33	✓			115091.060		115092.060			115093.060	115094.060			

* Sur demande | On request | A pedido



M FORME / SHAPE /
Forma

SKM

- Conique bout pointu

- Cone

- Cónica punta recta

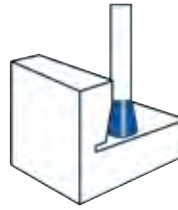
STANDARD CUT TYPES

SPECIAL CUT TYPES



D1	L2	D2	L1	α°	BRASÉ BRAZED	VHM SOLID	SM	11.3091	11.3090	11.3092	11.3095	11.3097	11.3093	11.3094	11.4040	11.4050	
								HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8	
								Code	Code	Code	Code	Code	Code	Code	Code	Code	
3	8	3	38	18		✓		113091.010		113092.010			113093.010	113094.030			
3	11	3	38	14		✓	SM42	113091.015	113090.015	113092.015	113095.015	113097.015	113093.015		114040.005*	114050.005*	
3	15	3	38	10		✓		113091.020		113092.020			113093.020				
6	12	3	48	22	✓			113091.025	113090.025	113092.025	113095.025	113097.025	113093.025				
6	12,7	6	50	14		✓		113091.027									
6	20	6	50	14		✓	SM2	113091.030	113090.030	113092.030	113095.030	113097.030	113093.030		114040.010*	114050.010*	
6	25	6	50	11		✓	SM3	113091.032									
8	18	6	63	13	✓			113091.035		113092.035			113093.035				
10	20	6	65	28	✓		SM4	113091.040	113090.040	113092.040	113095.040	113097.040	113093.040	113094.040	114040.020*	114050.020*	
12	25	6	70	28	✓		SM5	113091.045	113090.045	113092.045	113095.045		113093.045	113094.045	114040.025*	114050.025*	
12DIN	25	6	70	28	✓			113091.047				113097.047					
12	25	8	70	28	✓			113091.050		113092.050			113093.050	113094.050			
16	26	6	74	33	✓		SM6	113091.055		113092.055		113097.055	113093.055	113094.055			
16	26	8	74	33	✓			113091.060		113092.060			113093.060	113094.060			

* Sur demande | On request | A pedido



N FORME / SHAPE /
Forma

WKN

- Conique inversée

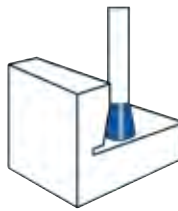
- Inverted cone

- Cónica Invertida

STANDARD CUT TYPES



D1	L2	D2	L1	α°	BRASÉ BRAZED	VHM SOLID	SN	11.5096	11.5099	11.5098
								HP-3	HP-2	HP-4
								Code	Code	Code
3	5	3	38	10		✓	SN42	115096.005	115099.005	
6	7	3	39	10	✓			115096.010	115099.010	
6	8	6	50	10		✓	SN1	115096.015	115099.015	115098.015
10	10	6	55	13	✓			115096.020	115099.020	115098.020
12	13	6	58	30	✓		SN3	115096.025	115099.025	115098.025
12	13	8	58	30	✓			115096.030		
16	19	6	64	18	✓		SN6	115096.035		
16	19	8	64	18	✓			115096.040		
20	16	6	61	30	✓		SN7	115096.045		



N FORME / SHAPE /
Forma

WKN

- Conique inversée

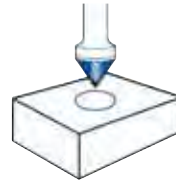
- Inverted cone

- Cónica Invertida

STANDARD CUT TYPES



D1	L2	D2	L1	α°	BRASÉ BRAZED	VHM SOLID	SN	11.3096	11.3099	11.3098
								HP-3	HP-2	HP-4
								Code	Code	Code
3	5	3	38	10		✓	SN42	113096.005	113099.005	
6	7	3	39	10	✓			113096.010	113099.010	
6	8	6	50	10		✓	SN1	113096.015	113099.015	113098.015
10	10	6	55	13	✓			113096.020	113099.020	113098.020
12	13	6	58	30	✓		SN3	113096.025	113099.025	113098.025
12	13	8	58	30	✓			113096.030		
16	19	6	64	18	✓		SN6	113096.035		
16	19	8	64	18	✓			113096.040		
20	16	6	61	30	✓		SN7	113096.045		



J FORME / SHAPE / Forma

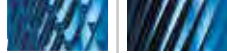
KSJ

Conique 60°

Countersink 60°

Cónica 60°

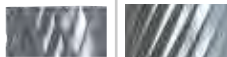
STANDARD CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SJ	11.5101	11.5100
							HP-3	HP-2
							Code	Code
3	3	3	38		✓		115101.005	115100.005
6	6	6	50		✓	SJ42	115101.010	115100.010
10	8	6	56	✓		SJ1	115101.015	115100.015
12	11	6	60	✓		SJ3	115101.020	115100.020
16	15	6	62	✓		SJ5	115101.025	
16	15	8	62	✓		SJ6	115101.030	
20	17	6	65	✓			115101.035	
25	24,5	6	68	✓			115101.040	



STANDARD CUT TYPES



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SJ	11.3101	11.3100
							HP-3	HP-2
							Code	Code
3	3	3	38		✓	SJ42	113101.005	113100.005
6	6	6	50		✓		113101.010	113100.010
10	8	6	56	✓		SJ1	113101.015	113100.015
12	11	6	60	✓		SJ3	113101.020	113100.020
16	15	6	62	✓		SJ5	113101.025	
16	15	8	62	✓		SJ6	113101.030	
20	17	6	65	✓			113101.035	
25	24,5	6	68	✓			113101.040	

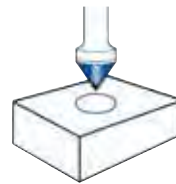
J FORME / SHAPE / Forma

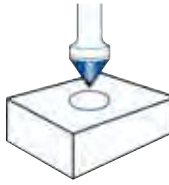
KSJ

Conique 60°

Countersink 60°

Cónica 60°





K FORME / SHAPE /
Forma

KSK

-  Conique 90°
-  Countersink 90°
-  Cónica 90°

STANDARD CUT TYPE



D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SK	11.5111	11.5110
							HP-3	HP-2
							Code	Code
3	3	3	38		✓	SK42	115111.005	115110.005
6	6	6	50		✓		115111.010	115110.010
10	5	6	53	✓		SK3	115111.015	115110.015
12	7	6	55	✓		SK5	115111.020	115110.020
12	7	8	55	✓			115111.025	
16	8	6	57	✓		SK6	115111.030	
16	8	8	57	✓			115111.035	
20	12	6	60	✓			115111.040	
25	12,7	6	60	✓		SK7	115111.045	



STANDARD CUT TYPE

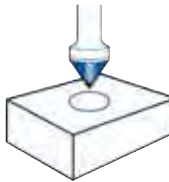


D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SK	11.3111	11.3110
							HP-3	HP-2
							Code	Code
3	3	3	38		✓	SK42	113111.005	113110.005
6	6	6	50		✓		113111.010	113110.010
10	5	6	53	✓		SK3	113111.015	113110.015
12	7	6	55	✓		SK5	113111.020	113110.020
12	7	8	55	✓			113111.025	
16	8	6	57	✓		SK6	113111.030	
16	8	8	57	✓			113111.035	
20	12	6	60	✓			113111.040	
25	12,7	6	60	✓		SK7	113111.045	

K FORME / SHAPE /
Forma

KSK

-  Conique 90°
-  Countersink 90°
-  Cónica 90°



HP-2



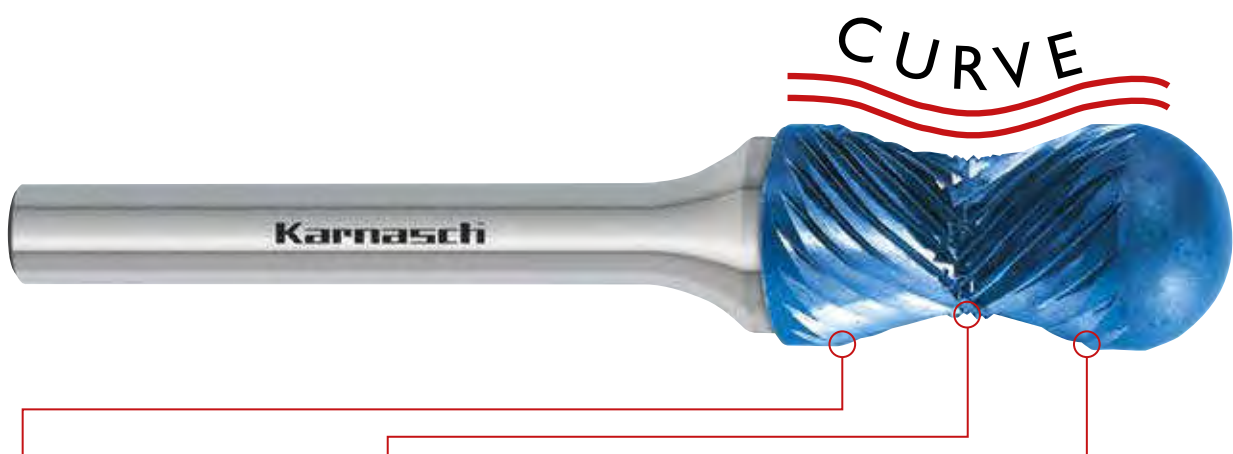
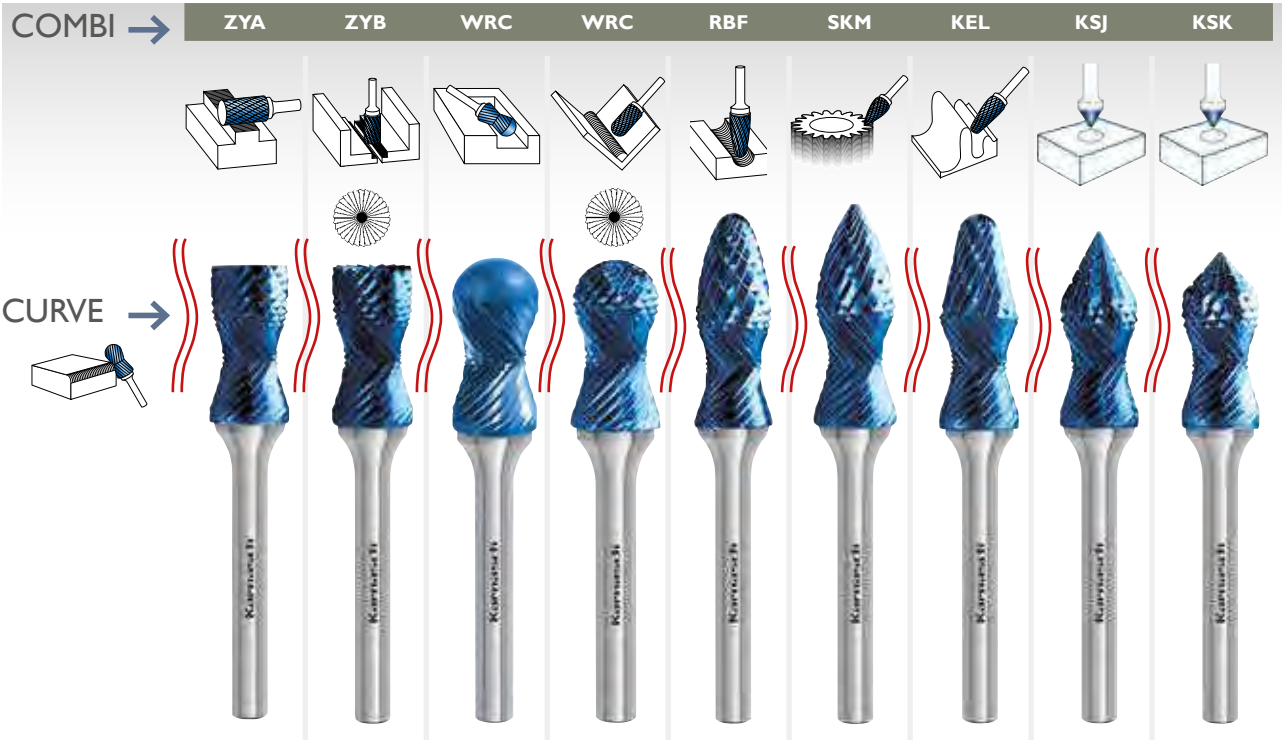
- Forme disque
- RIM shape
- Ranurar



Art.	D1	L2	D2	L1	BRASÉ BRAZED	FORME SHAPE
116011.005	10	1,6	3	34	✓	
116011.010	12	2,6	6	48	✓	
116011.015	25	5,2	8	50	✓	
116011.020	25	6,3	8	51	✓	

Art.	D1	L2	D2	L1	BRASÉ BRAZED	FORME SHAPE
114011.005	10	1,6	3	34	✓	
114011.010	12	2,6	6	48	✓	
114011.015	25	5,2	8	50	✓	
114011.020	25	6,3	8	51	✓	


nouveau
new



- Forme conique SKM
- Cone SKM shape
- Forma cónica SKM


- Point d'intersection de la forme conique (SKM) et de la forme conique inversée (WKN) produit l'unique COMBI+CURVE
- The intersecting points of the countersink (WKN) and cone shapes (SKM) form the unique COMBI+CURVE guiding-rounding-deburring system
- Las intersecciones entre la forma angular (WKN) y la forma de cono (SKM) producen el único sistema de eliminación de rebabas guiado COMBI+CURVA

- Forme conique inversée WKN
- Countersink WKN shape
- Forma angular WKN

 La combinaison des formes les plus utilisées telles cylindrique avec ou sans coupe en bout, cylindrique bout rond, ogive bout rond, ogive pointue, conique bout arrondi, conique 60° et 90° et le système COMBI-CURVE donne les avantages suivants:


- L'outil idéal pour un chanfreinage extrêmement rapide.
- Les arêtes ne sont pas seulement bisautées, mais délicatement arrondies.
- L'outil se centre automatiquement au centre du bord.
- Glisser hors de l'arête est quasiment impossible, ce qui permet un meilleur contrôle et garantit un enlèvement rapide et facile de la matière.

Peut être utilisée sur une grande variété de matériaux tels, fonte, acier < 60 HRC, inox, alliages à base de nickel ou de titane, cuivre, laiton et bronze.

 La combinación de las formas de cabezal más comunes, tales como el cilindro ZYA + ZYB, los laminados WRC, arcos RBF, arcos apuntados SPG, conos redondos KEL, ángulo KSJ + KSK con el único sistema de eliminación de rebabas guiado COMBI+CURVA da lugar a las siguientes ventajas:

- ideal para el redondeo rápido de los bordes.
- Los bordes no son biselados simplemente de forma plana, sino que reciben mediante el sistema de eliminación de rebabas guiado único un redondeo limpio.
- La COMBI+CURVA se centra a sí misma, siempre en el centro del borde.
- Mediante el autocentrado único es casi imposible el deslizamiento o resbalar en los bordes afilados.
- Así, hay un control significativamente mejor, lo que garantiza una retirada de material fácil y rápida.

Aplicable en diferentes materiales como: Hierro fundido, acero < 60 HRC, acero inoxidable (INOX), aleaciones de níquel y titanio, así como cobre, latón y bronce

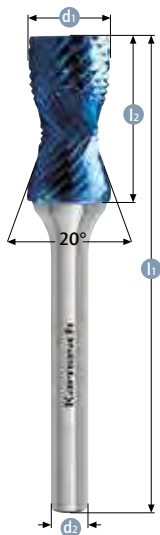
 The combination of the most used head shapes as Cylinder ZYA + ZYB, Ball nosed cylinder WRC, Ball nosed three RBF, Tree SPG, Ball nosed cone KEL, Countersink KSJ + KSK with the unique COMBI+CURVE guiding-rounding-deburring system result the following advantages:




- The Ideal tool for extremely fast chamfering. The edges are not simply bevelled, but by the unique guiding-rounding-deburring system smoothly rounded.
- COMBI+CURVE guiding-rounding-deburring system always centres itself on the centre of the edge.
- Slipping off the edge is almost impossible. This gives best control and guarantees faster and easier removal of material.

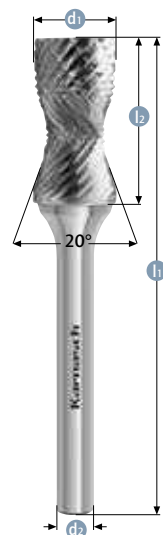
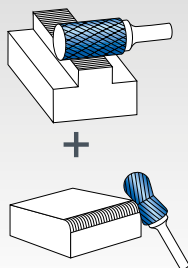
Can be used on a wide variety of material e.g. Cast iron, steel < 60 HRC, stainless steel, nickel-based and titanium alloys, copper, brass and bronze.

Art. 11.6019

Art. 11.4019



-  Courbe + Cylindrique sans coupe en bout
-  Curve + Cylinder without end cut
-  Curve + Cilindrica sin corte frontal

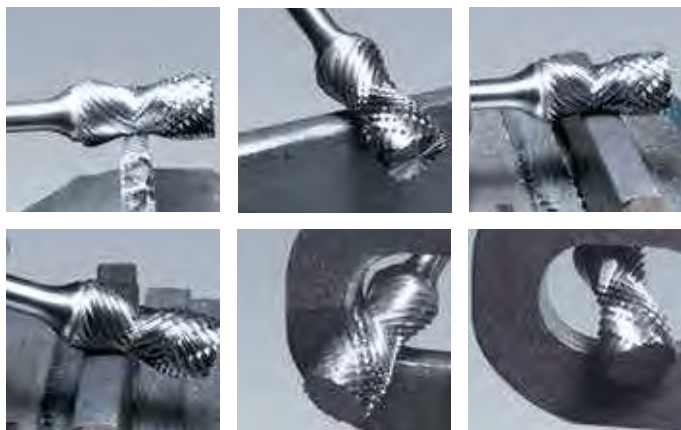


Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116019.100	12	25	6	70	✓	-

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114019.100	12	25	6	70	✓	-

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES · EJEMPLOS DE APLICACIÓN

COMBI + CURVE

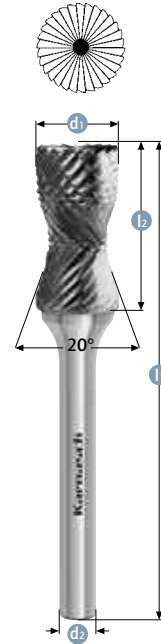
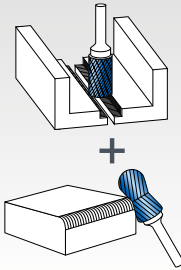


Art. 11.6020

Art. 11.4020



- Courbe + Cylindrique avec coupe en bout
- Curve + Cylinder with end cut
- Curve + Cilindrica con corte frontal



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116020.100	12	25	6	70	✓	-

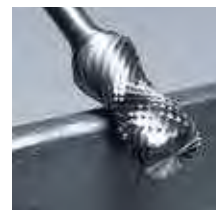
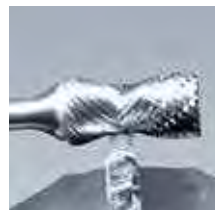
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114020.100	12	25	6	70	✓	-

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES
· EJEMPLOS DE APLICACIÓN

COMBI



CURVE



Art. 11.6021

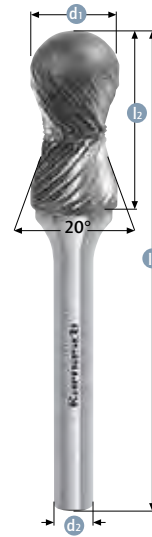
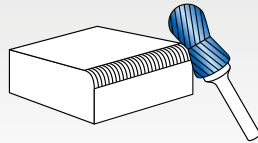
Art. 11.4021



Courbe + Cylindrique bout rond sans coupe en bout

Curve + Ball nosed cylinder without cut end

Curve + Cilíndrica con radio sin corte frontal



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116021.100	12	25	6	70	✓	-

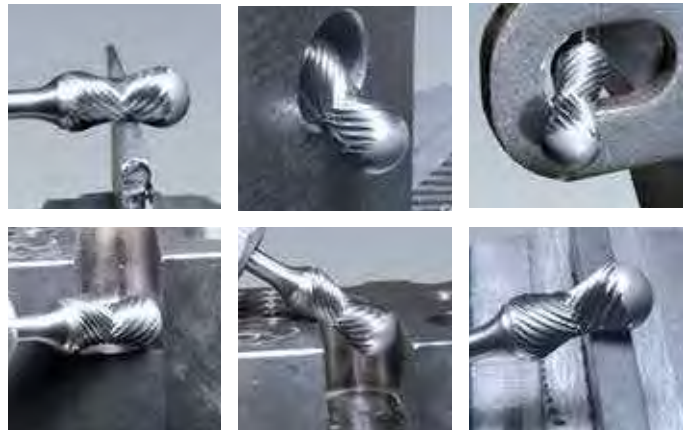
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114021.100	12	25	6	70	✓	-

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES
· EJEMPLOS DE APLICACIÓN

COMBI



CURVE



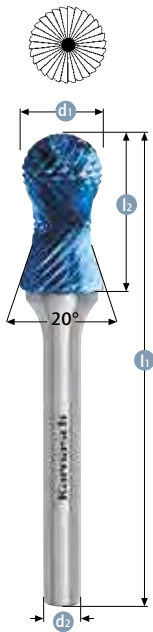
Le rayon en bout de la fraise rotative sert de guide et de support. Ainsi, les dommages à la pièce sont évités.

The radius at the front of the burr serves as a guide and a support. Damage to the workpiece can thus be avoided.

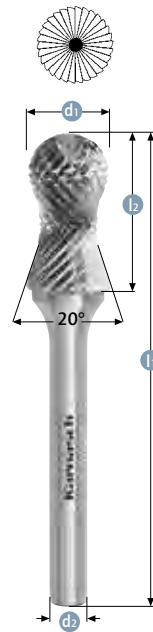
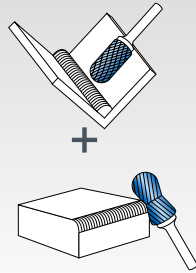
El radio en la punta de la fresa rotatoria sirve como guía y apoyo. Se evitan daños en la pieza de trabajo.

Art. 11.6022

Art. 11.4022



- Courbe + Cylindrique
bout rond avec coupe en bout
- Curve + Ball nosed cylinder
with end cut
- Curve + Cilindrica con radio
con corte frontal



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116022.100	12	25	6	70	✓	-

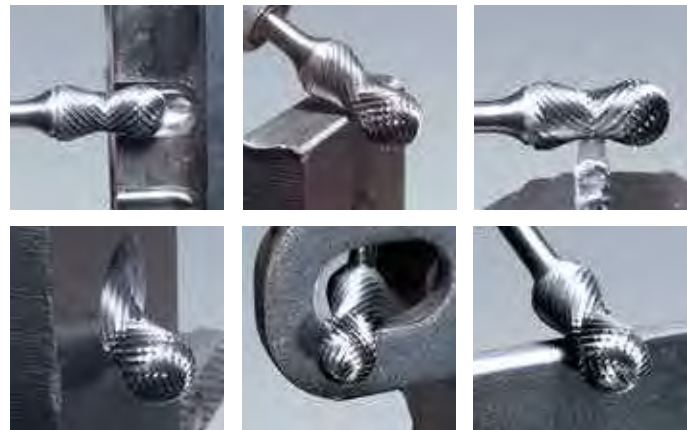
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114022.100	12	25	6	70	✓	-

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES
EJEMPLOS DE APLICACIÓN

COMBI

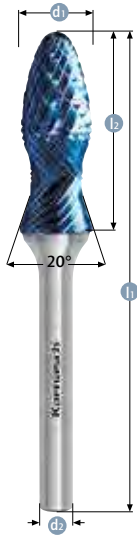





CURVE

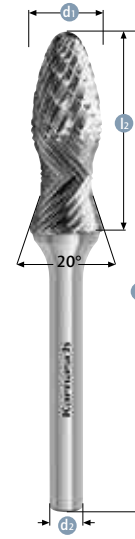
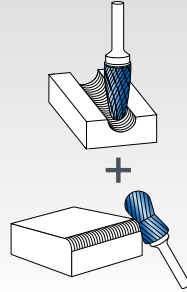


Art. 11.6023

Art. 11.4023



-  Courbe + Ogive bout rond
-  Curve + Ball nosed tree
-  Curve + Ojival



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116023.100	12	35	6	80	✓	-

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114023.100	12	35	6	80	✓	-

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES · EJEMPLOS DE APLICACIÓN

COMBI

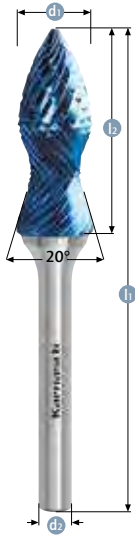


CURVE

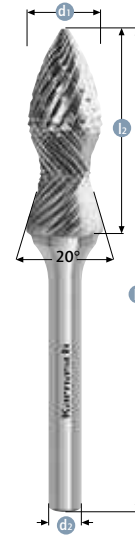
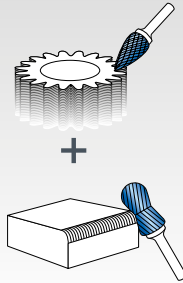


Art. 11.6024

Art. 11.4024



- Courbe + Ogive pointue
- Curve + Tree
- Curve + Ojival en punta



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116024.100	12	35	6	80	✓	-

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114024.100	12	35	6	80	✓	-

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES
· EJEMPLOS DE APLICACIÓN

COMBI






CURVE

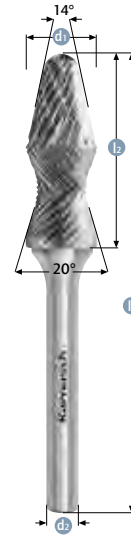
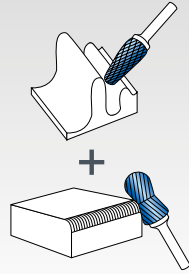


Art. 11.6025

Art. 11.4025



-  Courbe + Conique bout arrondi
-  Curve + Ball nosed cone
-  Curve + Cónica punta redonda



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116025.100	12	35	6	80	✓	-

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114025.100	12	35	6	80	✓	-

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES
· EJEMPLOS DE APLICACIÓN

COMBI

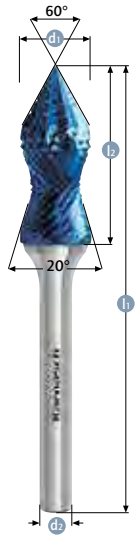


CURVE

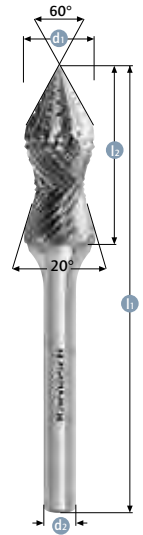


Art. 11.6026

Art. 11.4026



- Courbe + Conique 60°
- Curve + Countersink 60°
- Curve + Cónica 60°



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116026.100	12	28	6	73	✓	-

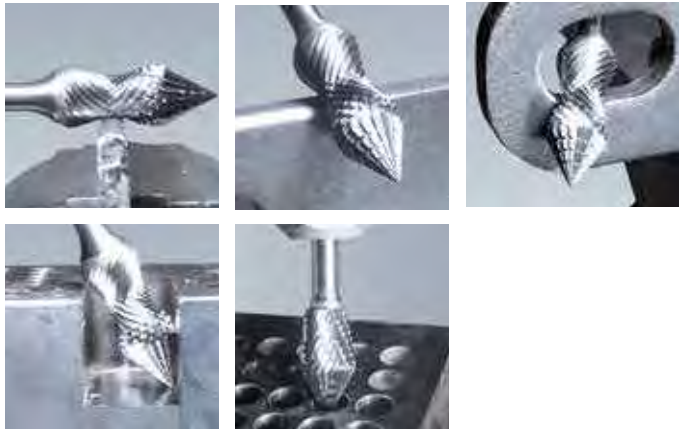
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114026.100	12	28	6	73	✓	-

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES · EJEMPLOS DE APLICACIÓN

COMBI

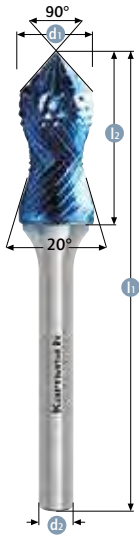





CURVE

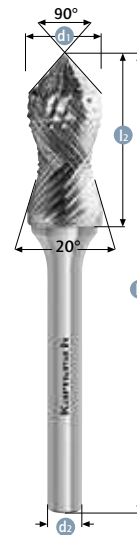
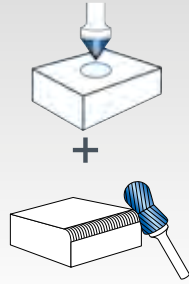


Art. 11.6027

Art. 11.4027



-  Courbe + Conique 90°
-  Curve + Countersink 90°
-  Curve + Cónica 90°



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116027.100	12	31	6	76	✓	-

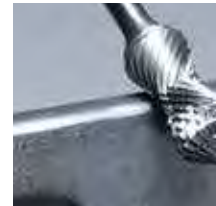
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114027.100	12	31	6	76	✓	-

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES
· EJEMPLOS DE APLICACIÓN

COMBI



CURVE





COMBI →

ZYA	ZYB	WRC	RBF	SPG	KEL
+	+	+	+	+	+
WKN	WKN	WKN	WKN	WKN	WKN



FORME →
FORM



	Cylindrique sans coupe en bout + Conique inversée	Cylindrique avec coupe en bout + Conique inversée	Cylindrique bout rond + Conique inversée	Ogive bout rond + Conique inversée	Ogive pointue + Conique inversée	Conique bout arrondi + Conique inversée
	Cylinder without end cut + inverted cone	Cylinder with end cut + inverted cone	Ball nosed cylinder + inverted cone	Ball nosed tree + inverted cone	Tree + inverted cone	Ball nosed cone + inverted cone
	Cilíndrica sin corte frontal + cónica invertida	Cilíndrica con taglio in testa + cónica invertida	Cilíndrica bout radio + cónica invertida	Ojival + cónica invertida	Ojival en punta + cónica invertida	Cónica punta redonda + cónica invertida

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES · EJEMPLOS DE APLICACIÓN



Description du produit:
La polyvalence des fraises rotatives COMBI+FORM convient à presque toutes les applications. Il existe maintenant un outil multi-usage haute performance pour l'industrie. La COMBI+FORM a été développée pour réduire les temps d'arrêt et couvrir plusieurs applications dans le processus d'enlèvement de matière. Ces nouvelles formes exclusives couvrent tous vos travaux débavurage, chanfreinage et façonnage en une seule application. Cette gamme est idéale pour les pièces complexes où plusieurs formes sont requises. La COMBI-FORM maximisera votre productivité.
Caractéristiques et avantages

- Réduit les temps-d'arrêt.
- Géométrie spéciale de la coupe réalisée par des machines CNC les plus modernes.
- Un carbure dur brut de la plus haute qualité est utilisé pour assurer une performance constante.
- Une fraise rotative polyvalente pouvant être utilisée sur une large gamme de matériaux et procédés, tels fonte, acier <60 HRC, inox, alliages à base de nickel ou de titane, cuivre, laiton et bronze.

Product description:
COMBI+FORM versatility to suit almost any application
Just like any multi-tool in the DIY sector, there is now high performance multipurpose burrs for the industry. The COMBI+FORM line has been developed to reduce downtime and cover multi-application processes for metal removal. These exclusive new shapes will cover your deburring, edging and blending work in one simple burr solution. This range is ideal for complex parts where different shapes are required. The COMBI+FORM will maximise your productivity.
Features and benefits

- Reduced downtime for end user
- Special Tooth Geometry manufactured using the latest CNC machines
- The highest Quality Sintered Tungsten Carbide is used to ensure consistent performance
- A versatile burr to be used on a wide range of materials and processes

Can be used on a wide variety of material e.g. Cast iron, Steel <60 HRC, stainless steel, nickel-based and Titanium alloys, copper, brass and bronze.

Art. **11.6051**

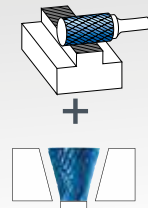
Art. **11.4051**



FORME / SHAPE / Forma

ZYA / WKN

- Cylindrique sans coupe en bout + Conique inversée
- Cylinder without end cut + Inverted cone
- Cilíndrica sin corte frontal + Cónica invertida



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116051.100	12	25	6	70	✓	

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114051.100	12	25	6	70	✓	

Exemples d'utilisation
Application examples
Ejemplos de aplicación



Art. **11.6052**

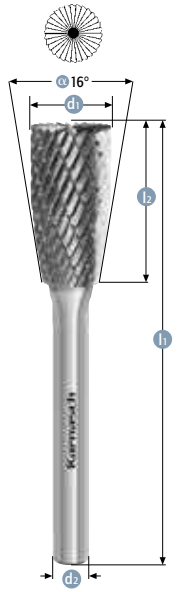
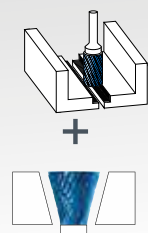
Art. **11.4052**



FORME / SHAPE / Forma

ZYB / WKN

- Cylindrique avec coupe en bout + Conique inversée
- Cylinder with end cut + Inverted cone
- Cilíndrica con taglio in testa + Cónica invertida



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116052.100	12	25	6	70	✓	

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114052.100	12	25	6	70	✓	

Exemples d'utilisation
Application examples
Ejemplos de aplicación



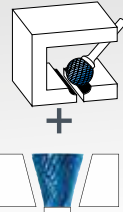
Art. 11.6053



FORME / SHAPE / Forma

WRC / WKN

- Cylindrique bout rond + Conique inversée
- Ball nosed cylinder + Inverted cone
- Cilíndrica bout radio + Cónica invertida



Art. 11.4053



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116053.100	12	20	6	65		

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114053.100	12	20	6	65		

Exemples d'utilisation
Application examples
Ejemplos de aplicación



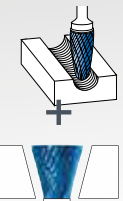
Art. 11.6054



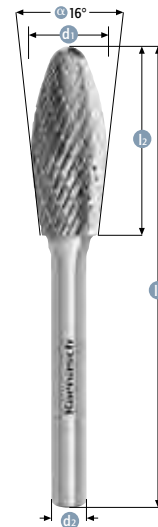
FORME / SHAPE / Forma

RBF / WKN

- Ogive bout rond + Conique inversée
- Ball nosed tree + Inverted cone
- Ojival + Cónica invertida



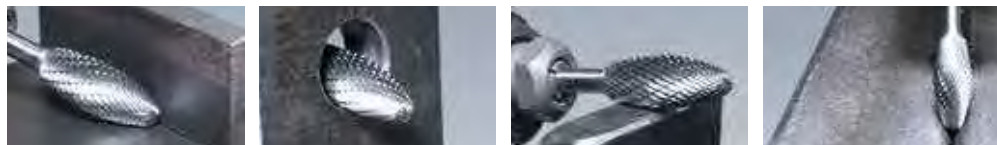
Art. 11.4054



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116054.100	12	32	6	77		

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114054.100	12	32	6	77		

Exemples d'utilisation
Application examples
Ejemplos de aplicación



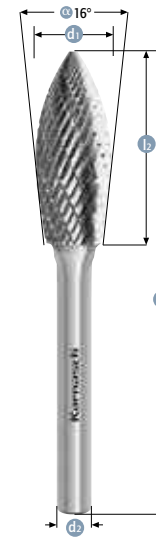
Art. 11.6055



FORME / SHAPE / Forma

SPG / WKN

- Ogive pointue + Conique inversée
- Tree + Inverted cone
- Ojival en punta + Cónica invertida



Art. 11.4055

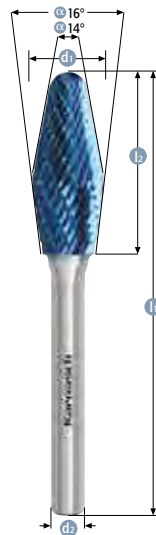
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116055.100	12	32	6	77		

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114055.100	12	32	6	77		

Exemples d'utilisation
Application examples
Ejemplos de aplicación



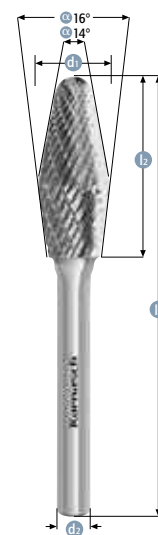
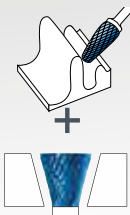
Art. 11.6056



FORME / SHAPE / Forma

KEL / WKN

- Conique bout arrondi + Conique inversée
- Ball nosed cone + Inverted cone
- Cónica punta redonda + Cónica invertida



Art. 11.4056

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116056.100	12	32	6	77		

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114056.100	12	32	6	77		

Exemples d'utilisation
Application examples
Ejemplos de aplicación



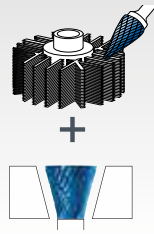
Art. 11.6057



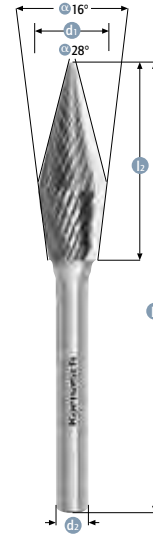
FORME / SHAPE / Forma

SKM / WKN

- Conique bout pointu + Conique inversée
- Cone + Inverted cone
- Cónica punta recta + Cónica invertida



Art. 11.4057



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116057.100	12	35	6	80		

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114057.100	12	35	6	80		

Exemples d'utilisation
Application examples
Ejemplos de aplicación



Art. 11.6058



FORME / SHAPE / Forma

WKN / WKN

- Conique inversée + Conique inversée
- Inverted cone + Inverted cone
- Cónica Invertida + Cónica invertida



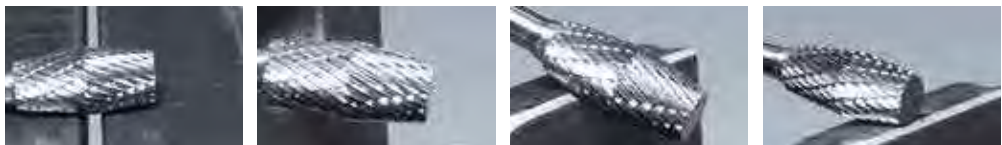
Art. 11.4058



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116058.100	12	25	6	70		

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114058.100	12	25	6	70		

Exemples d'utilisation
Application examples
Ejemplos de aplicación



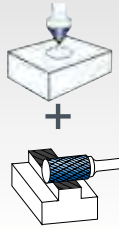
Art. 11.6059



FORM / SHAPE /
Forma

KSJ/
ZYA

- Conique 60° + Cylindrique
- Countersink 60° + Cylinder
- Cónica 60° + Cilindrica



Art. 11.4059



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116059.100	12	25	6	70		

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114059.100	12	25	6	70		

Exemples d'utilisation
Application examples
Ejemplos de aplicación



Art. 11.6060



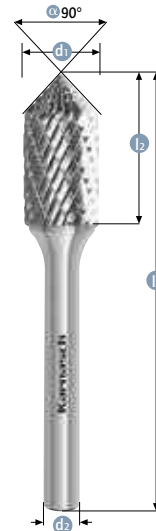
FORME / SHAPE /
Forma

KSK/
ZYA

- Conique 90° + Cylindrique
- Countersink 90° + Cylinder
- Cónica 90° + Cilindrica



Art. 11.4060



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116060.100	12	25	6	70		

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114060.100	12	25	6	70		

Exemples d'utilisation
Application examples
Ejemplos de aplicación



Art. 11.6061



FORME / SHAPE / Forma

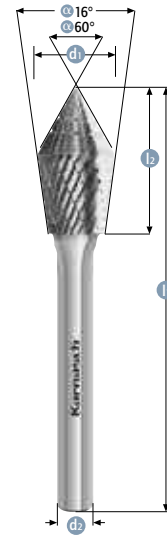
KSJ / WKN

- Conique 60° + Conique inversée
- Countersink 60° + Inverted cone
- Cónica 60° + Cónica invertida



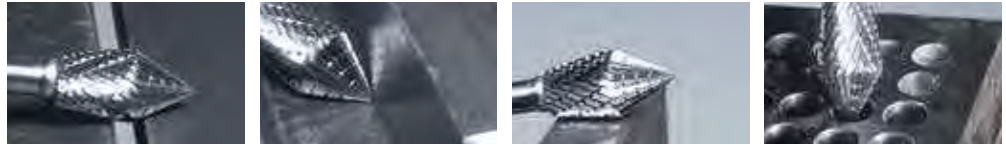
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116061.100	12	23	6	68		

Art. 11.4061



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114061.100	12	23	6	68		

Exemples d'utilisation
Application examples
Ejemplos de aplicación



Art. 11.6062



FORME / SHAPE / Forma

KSK / WKN

- Conique 90° + Conique inversée
- Countersink 90° + Inverted cone
- Cónica 90° + Cónica invertida



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116062.100	12	18	6	64		

Art. 11.4062

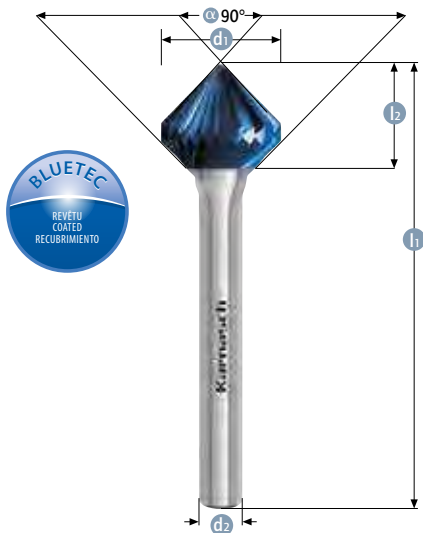


Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114062.100	12	18	6	64		

Exemples d'utilisation
Application examples
Ejemplos de aplicación






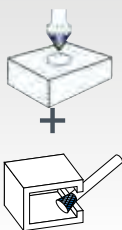
Art. 11.6063



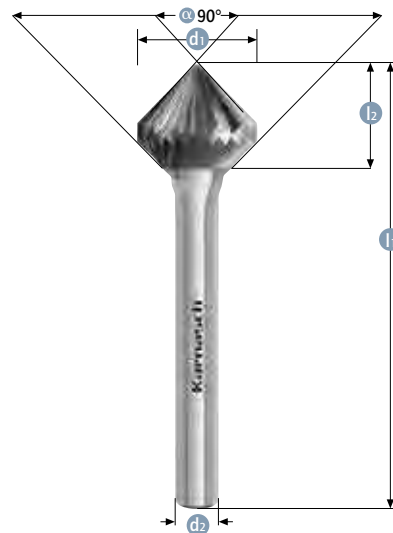
FORME / SHAPE /
Forma

KSK /
KSK

-  Conique 90° + Conique 90°
-  Countersink 90° + Countersink 90°
-  Cónica 90° + Cónica 90°



Art. 11.4063



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116063.100	16	15	6	60		

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114063.100	16	15	6	60		

Exemples d'utilisation
Application examples
Ejemplos de aplicación

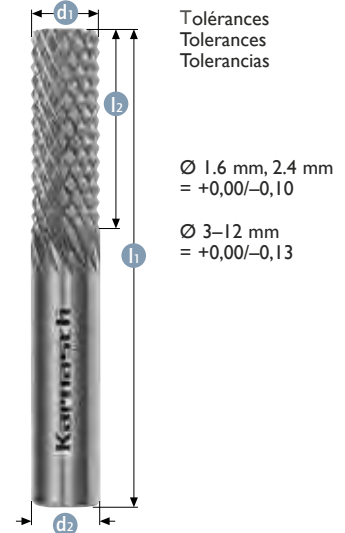


- Art. **11.6001** Art. **11.6002** Art. **11.6003** Art. **11.6004**



GFK, CFK

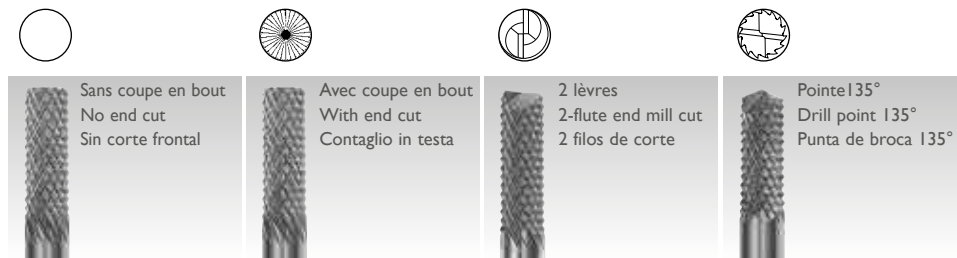
- Fraises pour fibres de verre, GFK, CFK, MMC
- Routers for fiberglass, GFK, CFK, MMC
- Fresa para plástico GFK, CFK, MMC



Ces fraises sont utilisées pour le contournage, rainurage et le forage d'une grande gamme de GFK, CFK, fibre de verre, plastiques durs et également les composites, comme les circuits imprimés et céramique avec fibres de verre, le graphite, le carbone, etc.

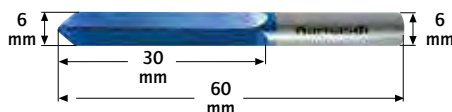
These routers are for contouring, grooving, drilling of a wide range of GFK, CFK, fiberglass reinforced plastics, as well as MMC (Metal Matrix Composites). MMC material such as printed circuit boards, composites such as ceramic with glass fiber, graphite, carbon etc.

Estos pernos de fresado son adecuados para el fresado de contorno, recorte, ranurado y perforación de grandes anchos de plástico reforzado con fibras (fibra de vidrio, GFK, CFK). Además, para MMC (Metal Matrix Composites = metales compuestos abrasivos difíciles de cortar tales como placas de circuitos impresos, compuestos cerámicos con fibra de vidrio, grafito, carbono.



D1	L2	D2	L1	VHM solid	116001	116002	116003	116004
					Art.	Art.	Art.	Art.
1,6	5	3	38	✓	116001.001	116002.001	116003.001	116004.001
2,4	9,5	3	38	✓	116001.003	116002.003	116003.003	116004.003
3	12	3	38	✓	116001.005	116002.005	116003.005	116004.005
4	16	4	50	✓	116001.010	116002.010	116003.010	116004.010
4	16	6	50	✓	116001.012	116002.012	116003.012	116004.012
6	19	6	50	✓	116001.013	116002.013	116003.013	116004.013
6	19	6	63	✓	116001.015	116002.015	116003.015	116004.015
6	25	6	75	✓	116001.017	116002.017	116003.017	116004.017
8	25	8	63	✓	116001.020	116002.020	116003.020	116004.020
10	25	10	63	✓	116001.025	116002.025	116003.025	116004.025
10	25	10	75	✓	116001.027	116002.027	116003.027	116004.027
12	25	12	75	✓	116001.029	116002.029	116003.029	116004.029
12	30	12	75	✓	116001.030	116002.030	116003.030	116004.030

Art. 11.4701



🇫🇷 Fraise de perçage de nouvelle génération en carbure monobloc. Ouvre les cylindres de fermeture en un temps record. Les meilleurs résultats sont obtenus avec les rectifieuses droites. Perçage également avec perceuses électriques et perceuses à accus. On obtient, avec les fraises (pages 62-63) une combinaison d'outils idéale. La fraise de perçage permet le perçage du cylindre en très peu de temps. Généralement, le cylindre peut alors déjà être fermé. Si ce n'est pas le cas, p.ex. dans le cas de sécurités spécifiques de perçages, le perçage est agrandi latéralement à l'aide de la fraise (voir pages 62-63).

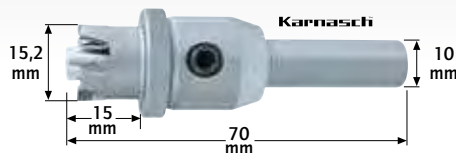
🇪🇸 Fresa perforadora de metal duro y macizo de última generación. Abre cilindros de cierre en tiempo record. Los mejores resultados se obtienen con amoladora recta. Agrandamiento de agujeros también con taladros inalámbricos. Junto con las fresas (páginas 62-63) da como resultado la combinación ideal de herramientas. Con la fresa perforadora se agranda el agujero del cilindro en muy breve tiempo en forma rectilínea. Por lo general, el cilindro de cierre ya debería poder cerrarse. Si no es así, p. ej. en el caso de seguros especiales de protección contra perforaciones, el agujero se amplía lateralmente con una fresa (véase la páginas 62-63).

🇺🇸 Solid carbide drill of the newest generation. Opens locking cylinders in record time. Best results are achieved with straight grinders. Also drilling with power drills/battery drills. Together with burrs (pages 62-63), the ideal tool combination is achieved. With the drill, the cylinder is drilled in a straight line in the shortest possible time. Usually, the locking cylinder can already be closed now. If not, e.g., in case of special drill prevention, the borehole is sideways expanded with a burr (see pages 62-63).

Art. 11.4702

TRÉPANS T.C.T. POUR CYLINDRE DE FERMETURE ABLOY PROTEC
T.C.T. HOLESAWS FOR ABLOY PROTEC LOCKING CYLINDERS

SIERRAS CIRCULARES DE CARBURO PARA CILINDROS DE CIERRE ABLOY PROTEC



🇫🇷 À utiliser en combinaison avec une perceuse/perceuse puissante à accus. Cette scie à guichet permet de pénétrer dans la plaque frontale située devant le coeur de ce cylindre de fermeture grande sécurité puis d'en extraire le coeur.
Caractéristiques de l'outil:

- 4 dents carbure Ø 15,2
- Guidage de pointe sur ressort (6,8 mm) pour le centrage du canal de fermeture
- Butée de profondeur

🇪🇸 Para utilizar con un taladro / taladro inalámbrico fuerte. Con esta sierra perforadora es posible traspasar la placa frontal templada, de ese cilindro de alta seguridad, la cual se encuentra delante del núcleo, para poder extraer a continuación el núcleo.
Características de la herramienta:

- 4 x dientes sierras circulares de carburo Ø 15,2
- Guiado amortiguado de espiga (6,8 mm) para centrado en el canal de cierre
- Tope de profundidad

🇺🇸 To be used with a drilling machine / strong battery drill. With this holesaw it is possible to penetrate the hardened front plate of this special high security locking cylinder that sits in front of the core and then to retrieve the core. Properties of the tool:

- 4 x T.C.T. teeth Ø 15.2
- Sprung burr guide (6.8 mm) for centring in the locking channel
- Depth stop

Art. 11.5021

Art. 11.5022

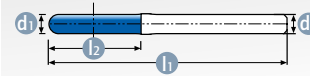
Art. 11.5025






C FORME / SHAPE /
Forma

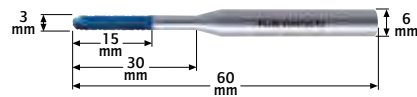
WRC

- Cylindrique bout rond
- Ball nosed cylinder
- Cilíndrica con radio

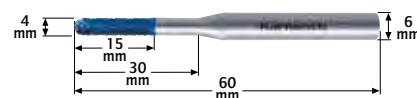


Art.	D1	L2	D2	L1	PERFORATION
115021.030	3,0	14	3	50	 <p>HP-3 La plus utilisée coupe universelle pour acier < 60 HRC</p> <p>The most widely used universal cutting style for steel < 60 HRC</p>
115021.032	3,0	14	3	60	
115021.035	3,0	14	3	75	
115021.040	3,0	14	3	100	
115021.043	3,0	30*	6	60	
115021.046	4,0	30*	6	60	
115021.055	6,0	18	6	50	
115021.056	6,0	18	6	60	
115021.058	6,0	18	6	80	
115021.060	6,0	18	6	100	
115021.065	6,0	18	6	150	
115022.030	3,0	14	3	50	 <p>HP-4 Coupe extra-fine pour acier dur jusqu'à 70 HRC</p> <p>Extra fine cross cutting style for hard steel up to 70 HRC</p>
115022.032	3,0	14	3	60	
115022.035	3,0	14	3	75	
115022.040	3,0	14	3	100	
115022.043	3,0	30*	6	60	
115022.046	4,0	30*	6	60	
115022.055	6,0	18	6	50	
115022.056	6,0	18	6	60	
115022.058	6,0	18	6	80	
115022.060	6,0	18	6	100	
115022.065	6,0	18	6	150	
115025.055	6,0	18	6	50	 <p>HP-7 Pour usinage grossier et enlèvement important des alliages d'aluminium</p> <p>For coarse cutting and highest material removal of aluminium alloys</p>

Art. 11.5021.043 / 11.5022.043



Art. 11.5021.046 / 11.5022.046



* Tranchant de 15mm sur 30mm | Flute of 15 mm on 30 mm | De ello 15 mm dentados

- * La réduction d'une fraise de 6 mm à Ø 3 mm ou à Ø 4 mm permet de réduire le temps de travail d'environ la moitié, moins de matière devant être coupée.
 - L'axe de 6 mm est nettement plus résistant au bris que les axes de Ø 3 mm ou de Ø 4 mm
 - Les Ø 3 mm, Ø 4 mm peuvent être usinés avec la même pince de serrage que le Ø 6 mm
 - Le tirant du cœur ne devrait pas être détruit grâce au faible diamètre de la tête de fraiseage.


- * Por reducciones de una fresa de 6 mm a Ø 3 mm o Ø 4 mm se reduce el tiempo de trabajo en aprox. la mitad, dado que debe desprenderse menos material.
 - Debido al mango de 6 mm es considerablemente menos sensible a roturas que el mango completo de Ø 3 mm o Ø 4 mm
 - En el caso de Ø 3 mm, Ø 4 mm puede trabajarse con el mismo mandril de pinza de Ø 6 mm
 - Por lo general no necesita destrozarse el cajón sacamachos, debido al reducido diámetro de cabeza de fresa

- * By tapering of a 6 mm burr to Ø 3 mm or Ø 4 mm working time is reduced by about half, because less material needs to be machined.
 - Because of its 6 mm shank, significantly less susceptible to breakage than continuous Ø 3 mm or Ø 4 mm shank
 - At Ø 3 mm, Ø 4 mm the same collet can be used for Ø 6 mm
 - Because of the limited diameter of the burr head, the core drawing tray may not be disturbed

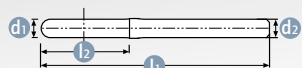
C FORME / SHAPE /
Forma

WRC

 Cylindrique bout rond

 Ball nosed cylinder




 Cilíndrica con radio

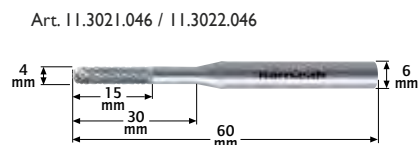
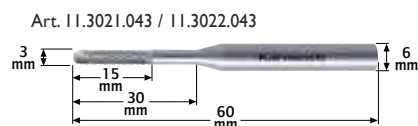


Art. **11.3021**


Art. **11.3022**

Art. **11.3025**


Art.	D1	L2	D2	L1	PERFORATION
113021.030	3,0	14	3	50	 <p>HP-3 La plus utilisée coupe universelle pour acier < 60 HRC</p> <p>The most widely used universal cutting style for steel < 60 HRC</p>
113021.032	3,0	14	3	60	
113021.035	3,0	14	3	75	
113021.040	3,0	14	3	100	
113021.043	3,0	30*	6	60	
113021.046	4,0	30*	6	60	
113021.055	6,0	18	6	50	
113021.056	6,0	18	6	60	
113021.058	6,0	18	6	80	
113021.060	6,0	18	6	100	
113021.065	6,0	18	6	150	
113022.030	3,0	14	3	50	 <p>HP-4 Coupe extra-fine pour acier dur jusqu'à 70 HRC</p> <p>Extra fine cross cutting style for hard steel up to 70 HRC</p>
113022.032	3,0	14	3	60	
113022.035	3,0	14	3	75	
113022.040	3,0	14	3	100	
113022.043	3,0	30*	6	60	
113022.046	4,0	30*	6	60	
113022.055	6,0	18	6	50	
113022.056	6,0	18	6	60	
113022.058	6,0	18	6	80	
113022.060	6,0	18	6	100	
113022.065	6,0	18	6	150	
113025.055	6,0	18	6	50	 <p>HP-7 Pour usinage grossier et enlèvement important des alliages d'aluminium</p> <p>For coarse cutting and highest material removal of aluminium alloys</p>




* Tranchant de 15mm sur 30mm | Flute of 15 mm on 30 mm | De ello 15 mm dentados

 * La réduction d'une fraise de 6 mm à Ø 3 mm ou à Ø 4 mm permet de réduire le temps de travail d'environ la moitié, moins de matière devant être coupée.

- L'axe de 6 mm est nettement plus résistant au bris que les axes de Ø 3mm ou de Ø 4 mm
- Les Ø 3 mm, Ø 4 mm peuvent être usinés avec la même pince de serrage que le Ø 6 mm
- Le tirant du coeur ne devrait pas être détruit grâce au faible diamètre de la tête de fraiseage.

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 * By tapering of a 6 mm burr to Ø 3 mm or Ø 4 mm working time is reduced by about half, because less material needs to be machined.

- Because of its 6 mm shank, significantly less susceptible to breakage than continuous Ø 3 mm or Ø 4 mm shank
- At Ø 3 mm, Ø 4 mm the same collet can be used for Ø 6 mm
- Because of the limited diameter of the burr head, the core drawing tray may not be disturbed

Application: Mécanique de précision, joaillerie, fabrication de moteur, fabrication d'outils.

Pour utilisation: Acier inoxydable, cuivre et alliages de cuivre, alliages de zinc pour le moulage sous pression, céramique souple, alliages de titane.

Vitesse recommandée: +/- 70 000 tr/min

Applications: Precision engineering, jewellery industry, turbine manufacture, tool manufacture.

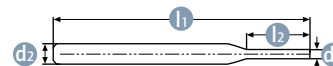
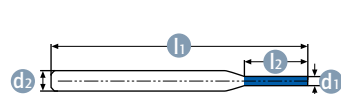
For use on: Stainless steel, copper and copper alloys, zinc pressure die castings, soft ceramics, titanium alloys.

Recommended operating speed: +/- 70,000 RPM

Aplicaciones: Ingeniería de precisión, Industria de joyería, fabricación de turbinas, fabricación de herramientas.

Materiales a trabajar: Aceros inoxidables, cobre, aleaciones de cobre, zinc, piezas de fundición, aleaciones de titanio, terrazo, alabastos, etc.

Para operaciones con velocidad recomendada de: +/- 70 000 rpm



Art.	D1	L2	D2	L1	FORME SHAPE	DIN 8033		Art.	D1	L2	D2	L1	FORME SHAPE	DIN 8033	
115006.005	1	4	3	38	A	ZYA		113006.005	1	4	3	38	A	ZYA	
115006.010	1,5	4	3	38	A	ZYA		113006.010	1,5	4	3	38	A	ZYA	
115006.020	2	4	3	38	A	ZYA		113006.020	2	4	3	38	A	ZYA	
115026.005	1	4	3	38	C	WRC		113026.005	1	4	3	38	C	WRC	
115026.010	1,5	4	3	38	C	WRC		113026.010	1,5	4	3	38	C	WRC	
115026.015	2	4	3	38	C	WRC		113026.015	2	4	3	38	C	WRC	
115036.005	1	1	3	38	D	KUD		113036.005	1	1	3	38	D	KUD	
115036.010	1,5	1	3	38	D	KUD		113036.010	1,5	1	3	38	D	KUD	
115036.015	2	2	3	38	D	KUD		113036.015	2	2	3	38	D	KUD	
115046.005	1,5	4	3	38	E	TRE		113046.005	1,5	4	3	38	E	TRE	
115056.005	1,5	4	3	38	F	RBF		113056.005	1,5	4	3	38	F	RBF	
115066.005	1,5	4	3	38	G	SPG		113066.005	1,5	4	3	38	G	SPG	
115196.005	1,5	4	3	38	M	SKM		113196.005	1,5	4	3	38	M	SKM	

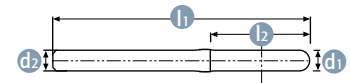
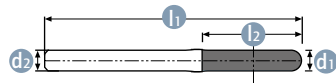
MINI-FRAISES POUR ALUMINIUM 2,0 / 3,0 MM
 MINI-BURRS FOR ALUMINIUM 2,0 / 3,0 MM
 MINI-FRESAS PARA ALUMINIO 2,0 / 3,0 MM

MINI-ALU

Application: Mécanique de précision, fabrication d'outils.
 Pour utilisation: Alliages d'aluminium, métaux légers, cuivre et alliages de cuivre, plastiques.
 Vitesse recommandée: +/- 70 000 tr/min

Campos de aplicación: Mecánica de precisión, fabricación de herramientas.
 Materiales a trabajar: Aleaciones de aluminio, metales ligeros, metales no ferrosos, plásticos.
 Velocidad recomendada: +/- 70 000 rpm

Applications: Precision engineering, tool manufacture.
 For use on: Aluminium alloys, light metals, copper and copper alloys, plastics.
 Recommended operating speed: +/- 70,000 RPM



Art.	D1	L2	D2	L1	FORME SHAPE	DIN 8033		Art.	D1	L2	D2	L1	FORME SHAPE	DIN 8033	
115005.030	3	14	3	38	A	ZYA		113005.030	3	14	3	38	A	ZYA	
115015.015	3	14	3	38	B	ZYB		113015.015	3	14	3	38	B	ZYB	
115025.020	2	11	3	38	C	WRC		113025.020	2	11	3	38	C	WRC	
115025.025	3	14	3	38	C	WRC		113025.025	3	14	3	38	C	WRC	
115035.020	2	1,75	3	38	D	KUD		113035.020	2	1,75	3	38	D	KUD	
115035.025	3	2,7	3	38	D	KUD		113035.025	3	2,7	3	38	D	KUD	
115045.010	3	6	3	38	E	TRE		113045.010	3	6	3	38	E	TRE	
115055.015	3	14	3	38	F	RBF		113055.015	3	14	3	38	F	RBF	
115065.015	3	14	3	38	G	SPG		113065.015	3	14	3	38	G	SPG	
115085.010	3	14	3	38	L	KEL		113085.010	3	14	3	38	L	KEL	
115095.015	3	11	3	38	M	SKM		113095.015	3	11	3	38	M	SKM	

- FR** Denture hélicoïdale alternée extrêmement robuste:
- Résistance aux chocs (bris de dents, écaillages et bris de têtes réduits).
 - Excellent contrôle et silencieux.
 - Performance de coupe de moyenne à élevée
 - Spécifique pour les super alliages les plus difficiles et les aciers inoxydables comme, Titane, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc.

Exemples d'applications: l'usinage d'ailettes de turbines d'avion, de turbines à gaz.

- ES** El corte cruzado extremadamente robusto da como resultado:
- Insensibilidad a los golpes (se minimizan roturas de dientes, desprendimientos y roturas de cabeza).
 - Excelente control y suavidad de marcha.
 - Media a alta capacidad de desprendimiento de viruta.
 - Especial para super aleaciones + aceros inoxidable extrmadamente difíciles, como: titanio, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc.

Ejemplo de aplicación: mecanizado de álabes de turbina de avión, turbinas de gas.

- EN** Extremely robust cross cutting style gives:
- Impact resistance (tooth breakages, chipping, head breakages are minimised).
 - Excellent control and quiet running.
 - Medium to high cutting action
 - Especially for the most difficult super alloys + stainless steel, such as: Titanium, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc.

Application example: Working aeroplane turbine loops, gas turbines.

Super alliages / Super alloys HP-I



Coupe
Cut
Dentado



Art.	D1	L2	D2	L1	FORME SHAPE	DIN 8033	Image	Art.	D1	L2	D2	L1	FORME SHAPE	DIN 8033	Image
115007.030	3	14	3	38	A	ZYA		113007.030	3	14	3	38	A	ZYA	
115007.060	6	12	3	44	A	ZYA		113007.060	6	12	3	44	A	ZYA	
115017.015	3	14	3	38	B	ZYB		113017.015	3	14	3	38	B	ZYB	
115017.045	6	12	3	44	B	ZYB		113017.045	6	12	3	44	B	ZYB	
115027.025	3	14	3	38	C	WRC		113027.025	3	14	3	38	C	WRC	
115027.050	6	12	3	44	C	WRC		113027.050	6	12	3	44	C	WRC	
115037.025	3	2,7	3	38	D	KUD		113037.025	3	2,7	3	38	D	KUD	
115037.050	6	5,7	3	38	D	KUD		113037.050	6	5,7	3	38	D	KUD	
115047.010	3	6,0	3	38	E	TRE		113047.010	3	6,0	3	38	E	TRE	
115047.015	6	10	3	42	E	TRE		113047.015	6	10	3	42	E	TRE	
115057.015	3	14	3	38	F	RBF		113057.015	3	14	3	38	F	RBF	
115057.025	6	12	3	44	F	RBF		113057.025	6	12	3	44	F	RBF	
115067.015	3	14	3	38	G	SPG		113067.015	3	14	3	38	G	SPG	
115067.030	6	12	3	44	G	SPG		113067.030	6	12	3	44	G	SPG	
115077.005	3	6	3	38	H	-		113077.005	3	6	3	38	H	-	
115077.009	6	10	3	43	H	-		113077.009	6	10	3	43	H	-	
115087.010	3	14	3	38	L	KEL		113087.010	3	14	3	38	L	KEL	
115087.015	6	16	3	48	L	KEL		113087.015	6	16	3	48	L	KEL	
115097.015	3	11	3	38	M	SKM		113097.015	3	11	3	38	M	SKM	
115097.025	6	12	3	48	M	SKM		113097.025	6	12	3	48	M	SKM	

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES
· EJEMPLOS DE APLICACIÓN

nouveau
new



🇫🇷 Réparation des pneus

Fraises rotatives pour la réparation précise des dommages aux pneus radiaux ou à carcasse diagonale.

Appropriées pour la réparation des pneus d'auto, camion, véhicules agricoles ou de construction.

La géométrie de coupe spécifiquement ajustée permet un traitement net et professionnel de la réparation à effectuer.

Procédé – Traitement de la réparation

De l'intérieur, déterminer la course du trou avec un poinçon. Ceci mesure la grandeur du dommage sur l'intérieur et l'extérieur du pneu (max 6mm).

Traiter et nettoyer la course du trou avec la fraise rotative correspondante, de l'intérieur vers l'extérieur et vice versa.

Il est important de pénétrer la course du trou sans l'élargir, que les câbles d'acier soient intacts et d'éviter l'élargissement du matériau.

S'il y a des dommages tels la rouille ou l'élargissement du matériau, le pneu doit être inspecté à nouveau et voir la possibilité d'utiliser des produits de réparation préfabriqués.

🇬🇧 Tyre repair

Rotating mills for precise damage processing at radial and diagonal tyres.

Suitable for repairs to car tyres, truck tyres, tyres for agricultural and construction vehicles.

The specifically adjusted cutting geometry permits clean and professional processing of the hole channel.

Procedure – Processing the hole channel

The course of the hole channel from the inside out is to be determined with a pricking awl. This measures the damage size on the inside and the outside of the tyre (max. 6 mm).

The hole channel is first processed and cleaned with a matching rotating mill from the inside outwards and then from the outside inwards.

For this, it must be particularly observed that the damage channel is penetrated precisely without enlarging the damage, that intact cord ropes are not damaged and that expansion/loosening of the surrounding tissue is avoided.

If further damage such as rust formation or loosening is found, the tyre must be inspected again for the possibility of repair with prefabricated repair elements.

🇪🇸 Reparación de neumáticos

Fresa rotatoria para la reparación precisa de daños en neumáticos radiales y diagonales.

Adecuada para reparaciones de neumáticos de automóviles, camiones, vehículos agrícolas o de la construcción.

La geometría de corte especialmente adaptada permite un mecanizado limpio y profesional del canal hueco.

Procedimiento – Mecanizado del canal hueco

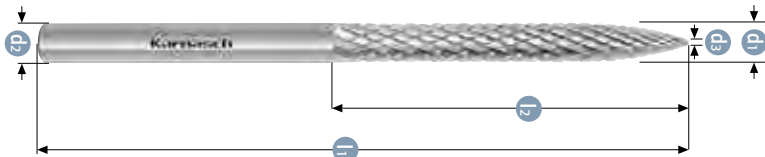
Con un punzón se determina el curso del canal hueco desde dentro hacia fuera. Así se calculan los daños en el interior y exterior del neumático (máx. 6 mm).

El canal hueco se limpia y mecaniza con una fresa rotatoria adecuada primero desde dentro hacia fuera y luego desde fuera hacia dentro.

Es especialmente importante asegurarse de que se penetra exactamente en el canal dañado sin aumentar los daños, no se dañan las cuerdas intactas y se evita la expansión / desprendimiento de los tejidos circundantes.

Si entonces se encuentran otros daños mayores, como formación de óxido o disoluciones, hay que volver a examinar el neumático para comprobar la posibilidad de reparación con otros cuerpos prefabricados.

Art. **11.4070**



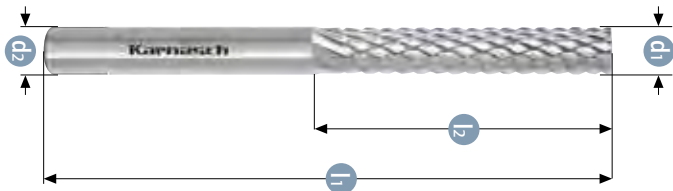
Conçu pour:
Suitable for:
Adecuado para:

Vitesse de rotation:
Rotational speed:
Velocidad:

max. 2500 RPM

Art.	D1	D3	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114070.100	3	0,4	25	3	50		✓

Art. **11.4071**



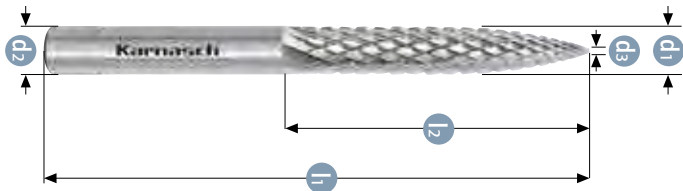
Conçu pour:
Suitable for:
Adecuado para:

Vitesse de rotation:
Rotational speed:
Velocidad:

max. 2500 RPM

Art.	D1	D3	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114071.100	6	-	35	6	65		✓

Art. **11.4072**



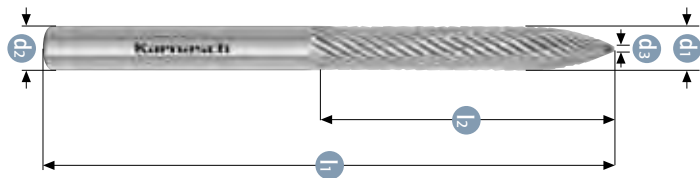
Conçu pour:
Suitable for:
Adecuado para:

Vitesse de rotation:
Rotational speed:
Velocidad:

max. 2500 RPM

Art.	D1	D3	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114072.100	6	0,5	36	6	65		✓

Art. **11.4073**



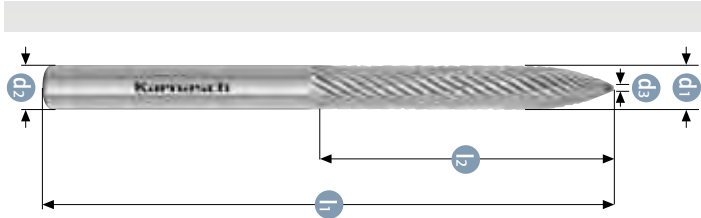
Conçu pour:
Suitable for:
Adecuado para:

Vitesse de rotation:
Rotational speed:
Velocidad:

max. 2500 RPM

Art.	D1	D3	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114073.100	8	1	50	8	110		✓

Art. 11.4074



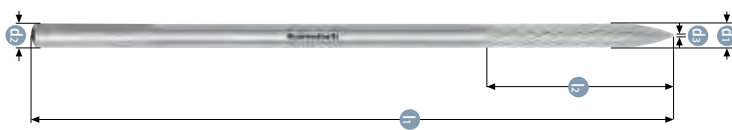
Conçu pour:
Suitable for:
Adecuado para:



Vitesse de rotation:
Rotational speed: max. 2500 RPM
Velocidad:

Art.	D1	D3	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114074.100	10	0,75	50	10	110	✓	✓

Art. 11.4075



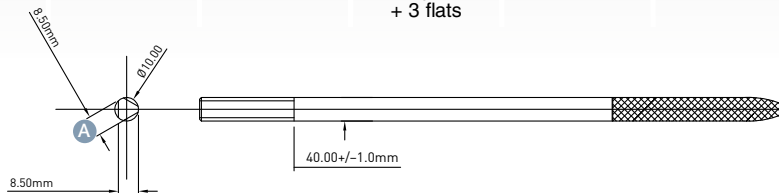
Conçu pour:
Suitable for:
Adecuado para:



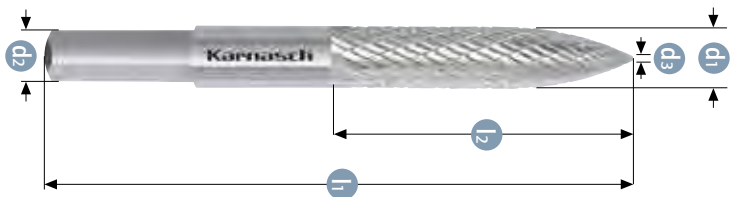
Vitesse de rotation:
Rotational speed: max. 2500 RPM
Velocidad:

Art.	D1	D3	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114075.100	10	0,75	75	10	250	✓	✓

+ 3 plats
+ 3 flats



Art. 11.4076



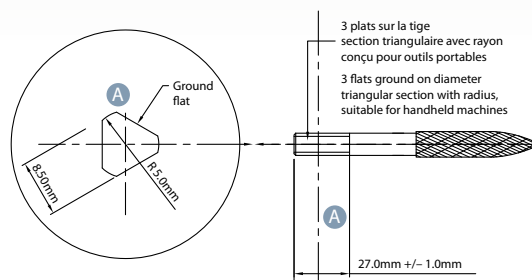
Conçu pour:
Suitable for:
Adecuado para:



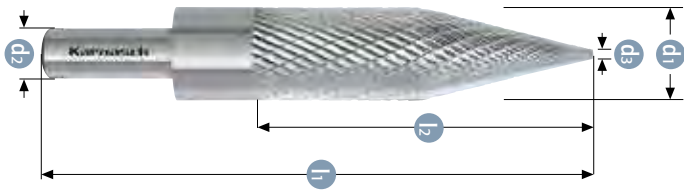
Vitesse de rotation:
Rotational speed: max. 2500 RPM
Velocidad:

Art.	D1	D3	L2	D2 + A	L1	BRASÉ BRAZED	VHM SOLID
114076.100	12	0,8	55	10	110	✓	✓

+ 3 plats
+ 3 flats



Art. **11.4077**

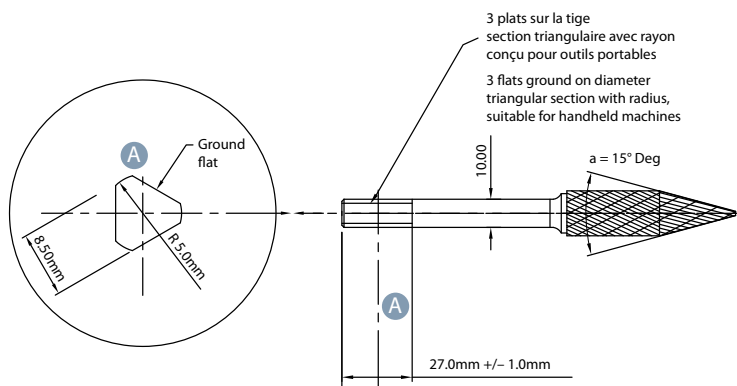


Conçu pour:
Suitable for:
Adecuado para:

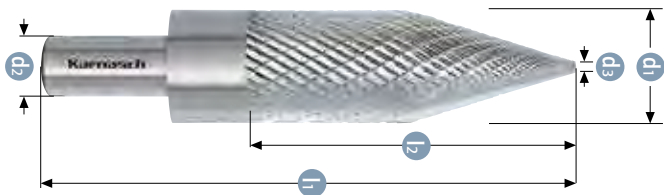
Vitesse de rotation:
Rotational speed:
Velocidad: max. 2500 RPM

Art.	D1	D3	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114077.100	16	1,5	60	10	140	✓	

+ 3 plats
+ 3 flats



Art. **11.4078**

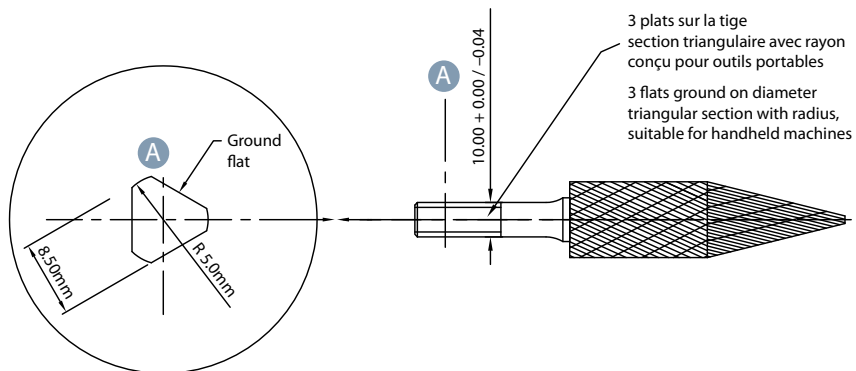


Conçu pour:
Suitable for:
Adecuado para:

Vitesse de rotation:
Rotational speed:
Velocidad: max. 2500 RPM

Art.	D1	D3	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114078.100	22	2,2	80	10	125	✓	

+ 3 plats
+ 3 flats



Art. | 11.503 I

Conçu pour:
Suitable for:
Adecuado para:



Vitesse de rotation:
Rotational speed:
Velocidad:

max. 2500 RPM

Art. | 11.303 I



D FORME / SHAPE / Forma **KUD**

- Boule
- Ball
- Esférica



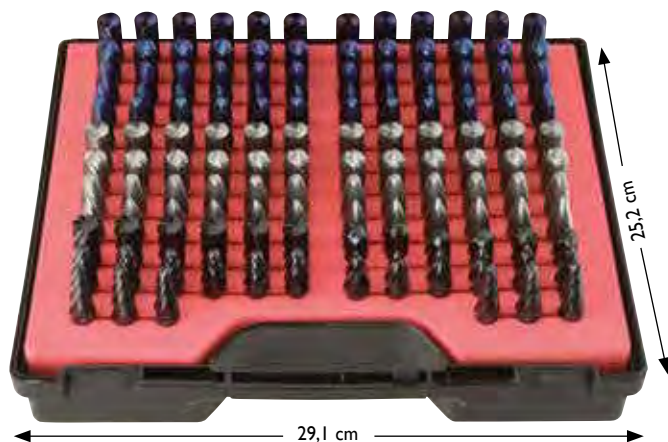
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
115031.105	20	16,5	6	62	✓	

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
113031.105	20	16,5	6	62	✓	

ENSEMBLES · PRÉSENTOIRS
SETS · DISPLAYS



- VOUS SOUHAITEZ EN CHOISIR VOUS MÊME LE CONTENU?**
Pas de problème! Contactez-nous et nous composerons le coffret ou le présentoir de votre choix.
- WOULD YOU LIKE TO SELECT YOUR OWN CONTENTS?**
No problem! Contact us and we can create your individual set or display!
- ¿USTED PREFERE REEMPLAZAR LOS ACCESORIOS EN FORMA AUTÓNOMA?**
¡Ningún problema! Póngase en contacto con nosotros, gustosamente le haremos una oferta para su set o display individualmente compuesto.



Couvercle amovible.
Devient un présentoir.

Removable cover.
Becomes a Display.

Tapa extraíble. Por lo
que también puede
ser un expositor de
mesa.



Coffret présentoir. Peut contenir 138
pièces.

Plastic case and display. Can be equipped
with 138 pieces.

Estuche de plástico y expositor vacíos. Para
equipar usted mismo hasta 138 piezas.

🇫🇷 Coffret-présentoir en plastique robuste, idéal pour le chantier.

Les fraises rotatives sont protégées des chocs grâce au plastique résistant et à l'ajustement serré à l'intérieur du coffret.

Il peut contenir 138 fraises rotatives avec tige 6 ou 8 mm d'une longueur n'excédant pas 86 mm et servir de présentoir en retirant le couvercle amovible.

Demandez-nous pour les modèles les plus populaires!

Sur commande d'un coffret plein, celui-ci vous est offert gratuitement. Vous ne payez que le contenu.

🇬🇧 Robust plastic case with carry handle and display in one.

Ideal for hard use on the construction site. All rotary burrs secured from the outside by impact-resilient plastic. All rotary burrs secured from the inside by tight fit in a precisely fitting bore. The heads cannot touch.

Can be equipped with 138 rotary mills. It is also suitable as table display (lid removable) with our most popular rotary mills.

Choose rotary burrs with a 6 or 8 mm shaft from our overall rotary burrs range. The overall length (L1) of the rotary burr should not exceed 86 mm. We will gladly advise you about the most common rotary burrs.

When ordering a fully equipped case (138 pieces), the case is enclosed for free. You only need to pay for the contents.

🇪🇸 Estuche de plástico robusto con asa de transporte y exposición en uno.

Ideal para el duro uso integral en el sector de la construcción. Todas las fresas rotativas aseguradas desde el exterior por plástico resistente a los impactos. Todas las fresas rotativas aseguradas desde el interior por el ajuste en un orificio a medida. Las cabezas no pueden tropezarse unas con otras.

Equipar hasta 138 piezas de fresa rotativa. Por ello también es adecuada como expositor de mesa (tapa removible) o almacenamiento de sus fresas más comunes.

Elija entre nuestra gama completa de fresas rotativas con vástago de 6 u 8 mm. La longitud total (L1) de la fresa rotativa no debe exceder los 86 mm. Le podemos asesorar sobre las fresas rotativas más comunes.

Si encarga un estuche lleno (138 piezas) el estuche es gratuito. Usted sólo paga el contenido.

Art. 11.4853

Art. 11.4853 U



Présentoir verrouillable Ø 6, 8, 10, 12 mm,
Tige 6 mm (40 pièces)

Lockable display Ø 6, 8, 10, 12 mm,
Shank 6 mm (40 pieces)

Display cerrado con llave Ø 6, 8, 10,
12 mm, Mango 6 mm (40 piezas)



Universelle / Universal HP-3



Coupe
Cut
Dentado



Art.	D1	L2	D2	L1
115011.050	6	18	6	50
115011.075	8	20	6	65
115011.085	10	20	6	65
115011.100	12	25	6	70
115021.055	6	18	6	50
115021.075	8	20	6	65
115021.085	10	20	6	65
115021.105	12	25	6	70
115051.030	6	18	6	50
115051.035	8	20	6	65
115051.040	10	20	6	65
115051.050	12	25	6	70
115061.035	6	18	6	50
115061.040	8	20	6	65
115061.045	10	20	6	65
115061.060	12	25	6	70
115081.020	6	18	6	50
115081.025	8	25	6	50
115081.035	10	30	6	75
115081.045	12	32	6	77

Forme Shape	DIN 8033	Contenu Contents Contenuti
B	ZYB	2x Cylindrique avec coupe en bout Cylinder with end cut Cilíndrica con corte Frontal
C	WRC	2x Cylindrique bout rond Ball nosed cylinder Cilíndrica con radio
F	RBF	2x Ogive bout rond Ball nosed tree Ojival
G	SPG	2x Ogive pointue Tree Ojival en punta
L	KEL	2x Conique bout arrondi Ball nosed cone Cónica punta redonda

Art.	D1	L2	D2	L1
113011.050	6	18	6	50
113011.075	8	20	6	65
113011.085	10	20	6	65
113011.100	12	25	6	70
113021.055	6	18	6	50
113021.075	8	20	6	65
113021.085	10	20	6	65
113021.105	12	25	6	70
113051.030	6	18	6	50
113051.035	8	20	6	65
113051.040	10	20	6	65
113051.050	12	25	6	70
113061.035	6	18	6	50
113061.040	8	20	6	65
113061.045	10	20	6	65
113061.060	12	25	6	70
113081.020	6	18	6	50
113081.025	8	25	6	50
113081.035	10	30	6	75
113081.045	12	32	6	77

☛ Souhaitez-vous un présentoir de mini-fraises rotatives? Pas de problème! Sélectionnez les avec des tiges de 6 mm. Important: La longueur totale ne doit pas excéder 86 mm.

☛ ¿Desea otro contenido de mini-fresas? ¡Ningún problema! Seleccione los mangos de 6,0 mm en el programa de productos. Observe el largo máximo de 86 mm.

☛ Would you like a display of mini-burrs? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

Art. 11.4855

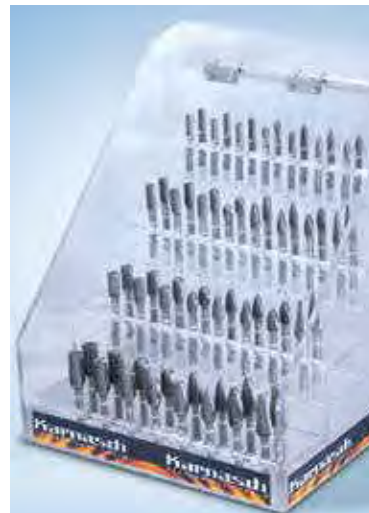
Art. 11.4855 U



Présentoir verrouillable Ø 6, 8, 10, 12 mm,
Tige 6 mm (64 pièces)

Lockable display Ø 6, 8, 10, 12 mm,
Shank 6 mm (64 pieces)

Display cerrado con llave Ø 6, 8, 10,
12 mm, Mango 6 mm (64 piezas)



Universelle / Universal HP-3



Coupe
Cut
Dentado



Art.	D1	L2	D2	L1
115001.065	6	18	6	50
115001.080	8	20	6	65
115001.090	10	20	6	65
115001.105	12	25	6	70
115011.050	6	18	6	50
115011.075	8	20	6	65
115011.085	10	20	6	65
115011.100	12	25	6	70
115021.055	6	18	6	50
115021.075	8	20	6	65
115021.085	10	20	6	65
115021.105	12	25	6	70
115041.020	6	10	6	50
115041.025	8	15	6	60
115041.030	10	16	6	60
115041.035	12	22	6	67
115051.030	6	18	6	50
115051.035	8	20	6	65
115051.040	10	20	6	65
115051.050	12	25	6	70
115061.035	6	18	6	50
115061.040	8	20	6	65
115061.045	10	20	6	65
115061.060	12	25	6	70
115071.010	6	14	6	50
115071.015	8	20	6	65
115071.020	10	20	6	65
115071.025	12	32	6	77
115081.020	6	18	6	50
115081.025	8	25	6	70
115081.035	10	30	6	75
115081.045	12	32	6	77

Forme Shape	DIN 8033	Contenu Contents Contenuti
A	ZYA	2x Cylindrique sans coupe en bout Cylinder without end cut Cilíndrica sin corte frontal
B	ZYB	2x Cylindrique avec coupe en bout Cylinder with end cut Cilíndrica con corte Frontal
C	WRC	2x Cylindrique bout rond Ball nosed cylinder Cilíndrica con radio
E	TRE	2x Ovale Oval Oval
F	RBF	2x Ogive bout rond Ball nosed tree Ojival
G	SPG	2x Ogive pointue Tree Ojival en punta
H	-	2x Flamme Flame Llama
L	KEL	2x Conique bout arrondi Ball nosed cone Cónica punta redonda

Art.	D1	L2	D2	L1
113001.065	6	18	6	50
113001.080	8	20	6	65
113001.090	10	20	6	65
113001.105	12	25	6	70
113011.050	6	18	6	50
113011.075	8	20	6	65
113011.085	10	20	6	65
113011.100	12	25	6	70
113021.055	6	18	6	50
113021.075	8	20	6	65
113021.085	10	20	6	65
113021.105	12	25	6	70
113041.020	6	10	6	50
113041.025	8	15	6	60
113041.030	10	16	6	60
113041.035	12	22	6	67
113051.030	6	18	6	50
113051.035	8	20	6	65
113051.040	10	20	6	65
113051.050	12	25	6	70
113061.035	6	18	6	50
113061.040	8	20	6	65
113061.045	10	20	6	65
113061.060	12	25	6	70
113071.010	6	14	6	50
113071.015	8	20	6	65
113071.020	10	20	6	65
113071.025	12	32	6	77
113081.020	6	18	6	50
113081.025	8	25	6	70
113081.035	10	30	6	75
113081.045	12	32	6	77

☛ Souhaitez-vous un présentoir de mini-fraises rotatives? Pas de problème! Sélectionnez les avec des tiges de 6 mm. Important: La longueur totale ne doit pas excéder 86 mm.

☛ ¿Desea otro contenido de mini-fresas? ¡Ningún problema! Seleccione los mangos de 6,0 mm en el programa de productos. Observe el largo máximo de 86 mm.

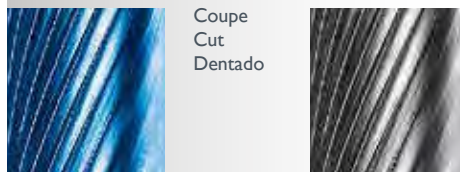
☛ Would you like a display of mini-burrs? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

Art. | 11.4805

Art. | 11.4805 U



Universelle / Universal HP-3



Art.	D1	L2	D2	L1
115006.005	1	4	3	38
115006.010	1,5	4	3	38
115026.005	1	4	3	38
115026.010	1,5	4	3	38
115036.005	1	1	3	38
115036.010	1,5	1	3	38
115046.005	1,5	4	3	38
115056.005	1,5	4	3	38
115066.005	1,5	4	3	38
115196.005	1,5	4	3	38

Forme Shape	DIN 8033	Contenu Contents Contenuti
A	ZYA	1x Cylindrique sans coupe en bout Cylinder without end cut
A	ZYA	1x Cylindrique sans coupe en bout Cylinder without end cut
C	WRC	1x Cylindrique bout rond Ball nosed cylinder
C	WRC	1x Cylindrique bout rond Ball nosed cylinder
D	KUD	1x Boule Ball
D	KUD	1x Boule Ball
E	TRE	1x Ovale Oval
F	RBF	1x Ogive bout rond Ball nosed tree
G	SPG	1x Ogive pointue Tree
M	SKM	1x Conique bout pointu Cone

Art.	D1	L2	D2	L1
113006.005	1	4	3	38
113006.010	1,5	4	3	38
113026.005	1	4	3	38
113026.010	1,5	4	3	38
113036.005	1	1	3	38
113036.010	1,5	1	3	38
113046.005	1,5	4	3	38
113056.005	1,5	4	3	38
113066.005	1,5	4	3	38
113196.005	1,5	4	3	38

Vous souhaitez un autre contenu de mini-fraises? Pas de problème!
 Choisissez dans la gamme offerte (page 64), le contenu que vous souhaitez.

¿Desea otro contenido de mini-fresas? ¡Ningún problema! Seleccione su conjunto requerido en el programa de mini-fresas que se encuentra en la página 64.

Would you like a different content? No problem!
 Select the content you want from the complete list of mini-burr products on page 64.

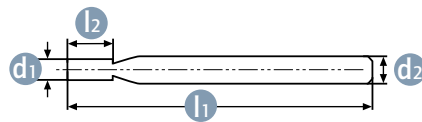
Art. 11.4820

Art. 11.4820 U



MINI

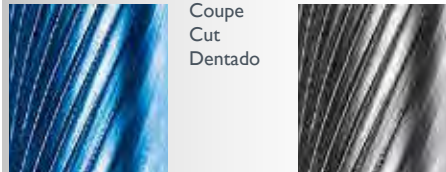
- 50 pièces
- 50 piezas
- 50 pieces



MINI



Universelle / Universal HP-3



Art.	D1	L2	D2	L1
115006.005	1	4	3	38
115006.010	1,5	4	3	38
115006.020	2	4	3	38
115026.005	1	4	3	38
115026.010	1,5	1	3	38
115026.015	2	1	3	38
115036.005	1	4	3	38
115036.010	1,5	4	3	38
115036.015	2	4	3	38
115046.005	1,5	4	3	38
115056.005	1,5	4	3	38
115066.005	1,5	4	3	38
115196.005	1,5	4	3	38

Forme Shape	DIN 8033	Contenu Contents Contenti
	ZYA	5x Cylindrique sans coupe en bout Cylinder without end cut
	ZYA	5x Cylindrique sans coupe en bout Cylinder without end cut
	ZYA	3x Cylindrique sans coupe en bout Cylinder without end cut
	WRC	5x Cylindrique bout rond Ball nosed cylinder
	WRC	5x Cylindrique bout rond Ball nosed cylinder
	WRC	3x Cylindrique bout rond Ball nosed cylinder
	KUD	5x Boule Ball
	KUD	5x Boule Ball
	KUD	2x Boule Ball
	TRE	3x Ovale Oval
	RBF	3x Ogive bout rond Ball nosed tree
	SPG	3x Ogive pointue Tree
	SKM	3x Conique bout pointu Cone

Art.	D1	L2	D2	L1
113006.005	1	4	3	38
113006.010	1,5	4	3	38
113006.020	2	4	3	38
113026.005	1	4	3	38
113026.010	1,5	1	3	38
113026.015	2	1	3	38
113036.005	1	4	3	38
113036.010	1,5	4	3	38
113036.015	2	4	3	38
113046.005	1,5	4	3	38
113056.005	1,5	4	3	38
113066.005	1,5	4	3	38
113196.005	1,5	4	3	38

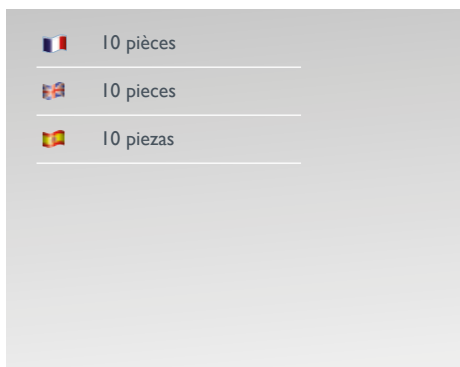
Vous souhaitez un autre contenu de mini-fraises? Pas de problème!
 Choisissez dans la gamme offerte (page 64), le contenu que vous souhaitez.

¿Desea otro contenido de mini-fresas? ¡Ningún problema! Seleccione su conjunto requerido en el programa de mini-fresas que se encuentra en la página 64.

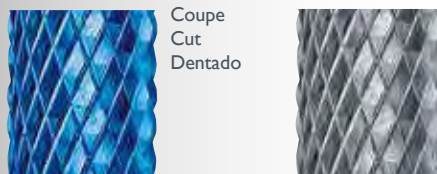
Would you like a different content of mini-burrs? No problem! Select the content you want from the complete list of mini-burr products on page 64.

Art. | 11.4904

Art. | 11.4904 U



Universelle / Universal HP-3



Art.	D1	L2	D2	L1
115001.030	3	14	3	38
115011.015	3	14	3	38
115021.025	3	14	3	38
115031.025	3	2,7	3	38
115041.010	3	6	3	38
115051.015	3	14	3	38
115061.015	3	14	3	38
115071.005	3	6	3	38
115081.010	3	14	3	38
115091.015	3	11	3	38

Forme Shape	DIN 8033	Contenu Contents Contenuti
A	ZYA	1x Cylindrique sans coupe en bout Cylinder without end cut
B	ZYB	1x Cylindrique avec coupe en bout Cylinder with end cut
C	WRC	1x Cylindrique bout rond Ball nosed cylinder
D	KUD	1x Boule Ball
E	TRE	1x Ovale Oval
F	RBF	1x Ogive bout rond Ball nosed tree
G	SPG	1x Ogive pointue Tree
H	-	1x Flamme Flame
L	KEL	1x Conique bout arrondi Ball nosed cone
M	SKM	1x Conique bout pointu Cone

Art.	D1	L2	D2	L1
113001.030	3	14	3	38
113011.015	3	14	3	38
113021.025	3	14	3	38
113031.025	3	2,7	3	38
113041.010	3	6	3	38
113051.015	3	14	3	38
113061.015	3	14	3	38
113071.005	3	6	3	38
113081.010	3	14	3	38
113091.015	3	11	3	38

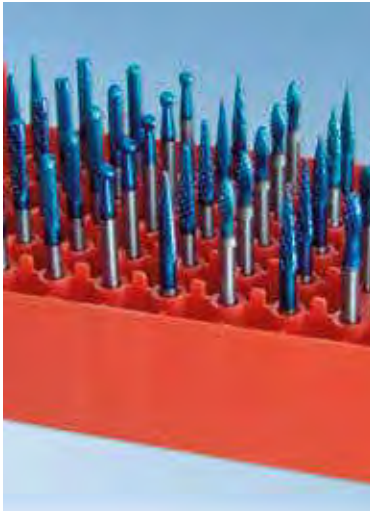
Vous souhaitez un autre contenu? Pas de problème!
 Sélectionnez les avec les tiges 3mm. Important: la longueur totale ne doit pas dépasser 38mm

¿Desea otro contenido? ¡Ningún problema! Seleccione los mangos de 3,0 mm en el programa de productos. Observe el largo máximo de 38 mm.

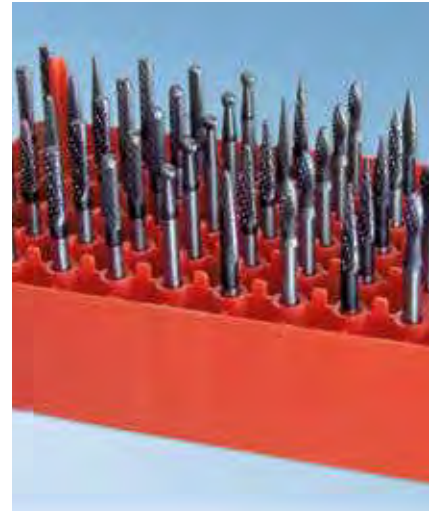
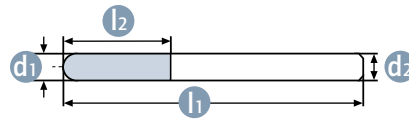
Would you like a different content? No problem! Select 3.0 mm shafts from the complete list of products. Note that the maximum length is 38 mm.

Art. 11.4837

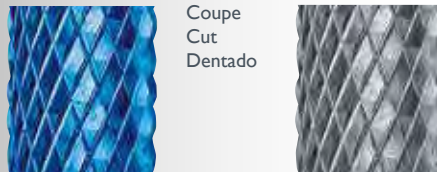
Art. 11.4837 U



- 50 pièces
- 50 piezas
- 50 piezas



Universelle / Universal HP-3



Art.	D1	L2	D2	L1
115001.030	3	14	3	38
115011.015	3	14	3	38
115021.025	3	14	3	38
115031.025	3	2,7	3	38
115041.010	3	6	3	38
115051.015	3	14	3	38
115061.015	3	14	3	38
115071.005	3	6	3	38
115081.010	3	14	3	38
115091.015	3	11	3	38

Forme Shape	DIN 8033	Contenu Contents Contenuti
A	ZYA	5x Cylindrique sans coupe en bout Cylinder without end cut
B	ZYB	5x Cylindrique avec coupe en bout Cylinder with end cut
C	WRC	5x Cylindrique bout rond Ball nosed cylinder
D	KUD	5x Boule Ball
E	TRE	5x Ovale Oval
F	RBF	5x Ogive bout rond Ball nosed tree
G	SPG	5x Ogive pointue Tree
H	-	5x Flamme Flame
L	KEL	5x Conique bout arrondi Ball nosed cone
M	SKM	5x Conique bout pointu Cone

Art.	D1	L2	D2	L1
113001.030	3	14	3	38
113011.015	3	14	3	38
113021.025	3	14	3	38
113031.025	3	2,7	3	38
113041.010	3	6	3	38
113051.015	3	14	3	38
113061.015	3	14	3	38
113071.005	3	6	3	38
113081.010	3	14	3	38
113091.015	3	11	3	38

Souhaitez un autre contenu? Pas de problème! Sélectionnez les avec des tiges 3mm. Important: la longueur totale ne doit pas dépasser 38 mm.

¿Desea otro contenido? ¡Ningún problema! Seleccione los mangos de 3,0 mm en el programa de productos. Observe el largo máximo de 38 mm.

Would you like a different content? No problem! Select 3.0 mm shafts from the complete list of products. Note that the maximum length is 38 mm.

ENSEMBLES DE FRAISES Ø 10 MM, TIGE 6 MM
 BURR KITS Ø 10 MM, SHANK 6 MM
 KITS DE FRESAS Ø 10 MM, MANGO DE 6 MM

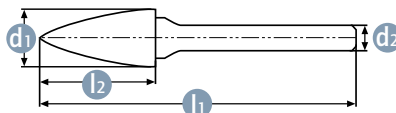
Karnaschi™

Art. 11.4918

Art. 11.4918 U



5 pièces
 5 piezas
 5 piezas



Universelle / Universal HP-3



Art.	D1	L2	D2	L1
115011.085	10	20	6	65
115021.085	10	20	6	65
115051.040	10	20	6	65
115061.045	10	20	6	65
115081.035	10	20	6	75

Forme Shape	DIN 8033	Contenu Contents Contenuti
B	ZYB	1x Cylindrique avec coupe en bout Cylinder with end cut
C	WRC	1x Cylindrique bout rond Ball nosed cylinder
F	RBF	1x Ogive bout rond Ball nosed tree
G	SPG	1x Ogive pointue Tree
L	KEL	1x Conique bout arrondi Ball nosed cone

Art.	D1	L2	D2	L1
113011.085	10	20	6	65
113021.085	10	20	6	65
113051.040	10	20	6	65
113061.045	10	20	6	65
113081.035	10	20	6	75

Vous souhaitez un autre contenu? Pas de problème! Choisissez dans le programme d'ensemble des tiges de 6,0 mm, respectez pour cela la longueur maximale de 86 mm.

¿Desea otro contenido? ¡Ningún problema! Seleccione los mangos de 6,0 mm en el programa de productos. Observe el largo máximo de 86 mm.

Would you like different content? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

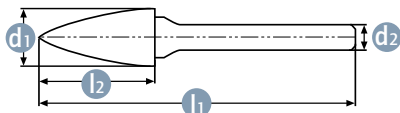
Art. 11.4926



5 pièces

5 piezas

5 piezas



Art. 11.4926 U



Universelle / Universal HP-3



Coupe
Cut
Dentado



Art.	D1	L2	D2	L1
115011.100	12	25	6	70
115021.105	12	25	6	70
115051.050	12	25	6	70
115061.060	12	25	6	70
115081.045	12	25	6	77

Forme Shape	DIN 8033	Contenu Contents Contenuti
	ZYB	1x Cylindrique avec coupe en bout Cylinder with end cut
	WRC	1x Cylindrique bout rond Ball nosed cylinder
	RBF	1x Ogive bout rond Ball nosed tree
	SPG	1x Ogive pointue Tree
	KEL	1x Conique bout arrondi Ball nosed cone

Art.	D1	L2	D2	L1
113011.100	12	25	6	70
113021.105	12	25	6	70
113051.050	12	25	6	70
113061.060	12	25	6	70
113081.045	12	25	6	77

Vous souhaitez un autre contenu? Pas de problème! Choisissez dans le programme d'ensemble des tiges de 6,0 mm, respectez pour cela la longueur maximale de 86 mm

¿Desea otro contenido? ¡Ningún problema! Seleccione los mangos de 6,0 mm en el programa de productos. Observe el largo máximo de 86 mm.

Would you like a different content? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

ENSEMBLES DE FRAISES Ø 10 + 12 MM, TIGE 6 MM
 BURR KITS Ø 10 + 12 MM, SHANK 6 MM
 KITS DE FRESAS Ø 10 + 12 MM, MANGO DE 6 MM

Karnasch™

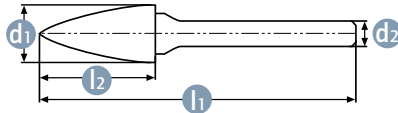
Art. 11.4934



10 pièces

10 pieces

10 piezas



Art. 11.4934 U



Universelle / Universal HP-3



Coupe
Cut
Dentado



Art.	D1	L2	D2	L1
115011.085	10	20	6	65
115021.085	10	20	6	65
115051.040	10	20	6	65
115061.045	10	20	6	65
115081.035	10	30	6	75
115011.100	12	25	6	70
115021.105	12	25	6	70
115051.050	12	25	6	70
115061.060	12	25	6	70
115081.045	12	32	6	77

Forme Shape	DIN 8033	Contenu Contents Contenuti
B	ZYB	1x Cylindrique avec coupe en bout Cylinder with end cut
C	WRC	1x Cylindrique bout rond Ball nosed cylinder
F	RBF	1x Ogive bout rond Ball nosed tree
G	SPG	1x Ogive pointue Tree
L	KEL	1x Conique bout arrondi Ball nosed cone

Art.	D1	L2	D2	L1
113011.085	10	20	6	65
113021.085	10	20	6	65
113051.040	10	20	6	65
113061.045	10	20	6	65
113081.035	10	30	6	75
113011.100	12	25	6	70
113021.105	12	25	6	70
113051.050	12	25	6	70
113061.060	12	25	6	70
113081.045	12	32	6	77

Vous souhaitez un autre contenu? Pas de problème! Choisissez dans le programme d'ensemble des tiges de 6,0 mm, respectez pour cela la longueur maximale de 86 mm

¿Desea otro contenido? ¡Ningún problema! Seleccione los mangos de 6,0 mm en el programa de productos. Observe el largo máximo de 86 mm.

Would you like a different content? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

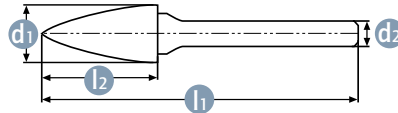
Art. 11.4942



10 pièces

10 piezas

10 piezas



Art. 11.4942 U



Universelle / Universal HP-3



Coupe
Cut
Dentado



Art.	D1	L2	D2	L1
115001.105	12	25	6	70
115011.100	12	25	6	70
115021.105	12	25	6	70
115031.080	12	11,4	6	65
115041.035	12	22	6	67
115051.050	12	25	6	70
115061.060	12	25	6	70
115071.025	12	32	6	77
115081.045	12	32	6	77
115091.045	12	25	6	70

Forme Shape	DIN 8033	Contenu Contents Contenuti
A	ZYA	1x Cylindrique sans coupe en bout Cylinder without end cut
B	ZYB	1x Cylindrique avec coupe en bout Cylinder with end cut
C	WRC	1x Cylindrique bout rond Ball nosed cylinder
D	KUD	1x Boule Ball
E	TRE	1x Ovale Oval
F	RBF	1x Ogive bout rond Ball nosed tree
G	SPG	1x Ogive pointue Tree
H	-	1x Flamme Flame
L	KEL	1x Conique bout arrondi Ball nosed cone
M	SKM	1x Conique bout pointu Cone

Art.	D1	L2	D2	L1
113001.105	12	25	6	70
113011.100	12	25	6	70
113021.105	12	25	6	70
113031.080	12	11,4	6	65
113041.035	12	22	6	67
113051.050	12	25	6	70
113061.060	12	25	6	70
113071.025	12	32	6	77
113081.045	12	32	6	77
113091.045	12	25	6	70

Vous souhaitez un autre contenu ? Pas de problème ! Choisissez dans le programmé ensemble des tiges de 6,0 mm. Longueur maximale de 86 mm

Would you like a different content? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

¿Desea otro contenido? ¡Ningún problema! Seleccione los mangos de 6,0 mm en el programa de productos. Observe el largo máximo de 86 mm.

ENSEMBLES DE FRAISES NORMALISÉES DIN 12 MM, TIGE 6 MM
 DIN STANDARD BURR KITS 12 MM, SHANK 6 MM
 KITS DE FRESAS NORMALIZADAS SEGÚN DIN DE 12 MM, MANGO 6 MM

Art. | 11.4907

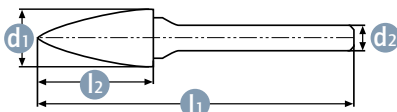
DIN



5 pièces

5 pieces

5 piezas



DIN

Art. | 11.4907 U



Universelle / Universal HP-3



Coupe
Cut
Dentado

Art.	D1	L2	D2	L1
115011.103	12,0 DIN	25	6	70
115021.107	12,0 DIN	25	6	70
115051.053	12,0 DIN	25	6	70
115061.063	12,0 DIN	25	6	70
115081.047	12,0 DIN	25	6	70

Forme Shape	DIN 8033	Contenu Contents Contenuti
B	ZYB	1x Cylindrique avec coupe en bout Cylinder with end cut
C	WRC	1x Cylindrique bout rond Ball nosed cylinder
F	RBF	1x Ogive bout rond Ball nosed tree
G	SPG	1x Ogive pointue Tree
L	KEL	1x Conique bout arrondi Ball nosed cone

Art.	D1	L2	D2	L1
113011.103	12,0 DIN	25	6	70
113021.107	12,0 DIN	25	6	70
113051.053	12,0 DIN	25	6	70
113061.063	12,0 DIN	25	6	70
113081.047	12,0 DIN	25	6	70

Vous souhaitez un autre contenu? Pas de problème! Choisissez dans le programme d'ensemble des tiges de 6,0 longueur maximale de 86 mm.

¿Desea otro contenido? ¡Ningún problema! Seleccione los mangos de 6,0 mm en el programa de productos. Observe el largo máximo de 86 mm.

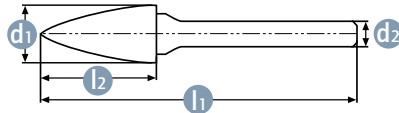
Would you like a different content? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

Art. 11.4911

DIN



- 10 pièces
- 10 piezas
- 10 pieces



DIN

Art. 11.4911 U



Art.	D1	L2	D2	L1	Forme Shape	DIN 8033	Contenu Contents Contenuti	Art.	D1	L2	D2	L1
115001.107	12,0 DIN	25	6	70	A	ZYA	1x Cylindrique sans coupe en bout Cylinder without end cut	113001.107	12,0 DIN	25	6	70
115011.103	12,0 DIN	25	6	70	B	ZYB	1x Cylindrique avec coupe en bout Cylinder with end cut	113011.103	12,0 DIN	25	6	70
115021.107	12,0 DIN	25	6	70	C	WRC	1x Cylindrique bout rond Ball nosed cylinder	113021.107	12,0 DIN	25	6	70
115031.083	12,0 DIN	11,4	6	65	D	KUD	1x Boule Ball	113031.083	12,0 DIN	11,4	6	65
115041.037	12,0 DIN	22	6	66	E	TRE	1x Ovale Oval	113041.037	12,0 DIN	22	6	66
115051.053	12,0 DIN	25	6	70	F	RBF	1x Ogive bout rond Ball nosed tree	113051.053	12,0 DIN	25	6	70
115061.063	12,0 DIN	25	6	70	G	SPG	1x Ogive pointue Tree	113061.063	12,0 DIN	25	6	70
115071.027	12,0 DIN	32	6	70	H	-	1x Flamme Flame	113071.027	12,0 DIN	32	6	70
115081.047	12,0 DIN	32	6	70	L	KEL	1x Conique bout arrondi Ball nosed cone	113081.047	12,0 DIN	32	6	70
115091.047	12,0 DIN	25	6	70	M	SKM	1x Conique bout pointu Cone	113091.047	12,0 DIN	25	6	70

Vous souhaitez un autre contenu? Pas de problème! Choisissez dans le programme d'ensemble des goupilles de 6,0 mm. Respectez pour cela la longueur maximale de 86 mm

¿Desea otro contenido? ¡Ningún problema! Seleccione los mangos de 6,0 mm en el programa de productos. Observe el largo máximo de 86 mm.

Would you like a different content? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

RECOMMANDATIONS D'UTILISATION
RECOMMENDATIONS FOR USE
RECOMENDACIONES DE USO

Karnasch™



- Il faudra peut-être modifier les vitesses indiquées pour optimiser les performances de fonctionnement.
- Pour les matériaux plus durs, utiliser des vitesses plus lentes.
- Pour les bavures plus petites, utiliser des vitesses plus rapides.
- Pour les bavures particulièrement longues (> 150mm de long), utiliser des vitesses plus lentes.
- Durant l'utilisation, déplacer constamment l'outil en appliquant une légère pression.
- Une utilisation en dessous de la vitesse optimale favorisera la formation d'éclats.
- Une utilisation au-dessus de la vitesse optimale entraînera une usure des dents.
- En cas de surchauffe de l'outil, la brasage risque de fondre provoquant le détachement de la tête.
- L'emploi d'outils et de douilles de serrage usés risque de provoquer la formation d'éclats.
- Ne pas enfoncer la fraise de plus d'un tiers de sa périphérie.

- Puede que sea necesario ajustar las velocidades indicadas para obtener un óptimo rendimiento.
- Los materiales más duros necesitan velocidades más lentas.
- Las fresas más pequeñas necesitan velocidades más rápidas.
- Las fresas de serie extra largas (>150mm serie larga) necesitan velocidades más lentas.
Aplique un movimiento constante y una ligera presión al utilizarla.
El funcionamiento debajo de la velocidad óptima provocará astillas.
El funcionamiento por encima de la velocidad óptima provocará el desgaste del diente
- El permitir que la herramienta se caliente demasiado puede hacer que la unión se derrita y separe el cabezal del eje.
- Al utilizar herramientas y pinzas portapiezas desgastadas se provocarán astillas.
- No hunda la fresa más de un tercio de su periferia.

- It may be necessary to adjust the speeds shown to achieve optimum performance.
- Harder materials require slower speeds.
- Smaller burrs require faster speeds.
- Extra long burrs (>150mm long) require slower speeds.
- Apply constant movement and light pressure when in use.
- Running below the optimum speed will encourage chipping.
- Running above the optimum speed will cause tooth wear.
- Allowing the tool to become too hot may cause the braze to melt and detach the head from the shank.
- Using tools and collets that have become worn will encourage chipping.
- Do not sink the burr for more than one third of its periphery.

RECOMMANDATIONS DE SÉCURITÉ · SAFETY RECOMMENDATIONS
· RECOMENDACIONES DE SEGURIDAD



Portez une protection auditive
Wear ear protection
Protección auditiva



Portez des gants protecteurs
Wear protective gloves
Guantes protectores



Portez un masque protecteur
Wear protective mask
Mascara protectora





Lisez les instructions
Read instructions
Lea las instrucciones




Portez des lunettes de sécurité
Wear safety glasses
Gafas de Seguridad

VITESSES DE ROTATION RECOMMANDÉES EN MIN⁻¹ RECOMMENDED OPERATING SPEEDS IN MIN⁻¹ VELOCIDADES RECOMENDADAS EN MIN⁻¹

 Les vitesses de rotation recommandées sont indiquées pour les longueurs de tige standard de 45 mm à passage maximal de 10 mm. Vitesse de rotation maximale pour les tiges très longues, de plus de 45 mm = 15000 min⁻¹

 The recommended speeds are based on standard shank length of 45 mm with maximum overhang 10 mm. Maximum operating speed for extra long shanks over 45 mm = 15000 min⁻¹

 Las velocidades recomendadas valen para longitud estándar de mango 45 mm con parte sobresaliente máxima de 10 mm. Velocidad máxima para mangos extra largos por encima de 45 mm = 15000 min⁻¹

	Ø 1 mm	Ø 3 mm	Ø 6 mm	Ø 10 mm	Ø 12 mm	Ø 16 mm	Ø 20 mm	Ø 25 mm
Steel Acier Acero	70.000	60.000	45.000	30.000	22.000	18.000	15.000	10.000
	100.000	80.000	60.000	40.000	30.000	0.000	17.000	13.000
Hardened steel Acier trempé Acero cementado	70.000	60.000	30.000	19.000	15.000	12.000	10.000	7.000
	90.000	80.000	45.000	30.000	22.000	18.000	15.000	11.000
Stainless steel Acier inoxydable Acero inoxidable	70.000	60.000	30.000	19.000	15.000	12.000	10.000	7.000
	90.000	80.000	45.000	30.000	22.000	18.000	15.000	11.000
Cast iron Fonte Hierro fundido	60.000	45.000	22.000	15.000	11.000	9.000	8.000	6.000
	100.000	80.000	60.000	40.000	30.000	20.000	17.000	13.000
Titanium Titane Titanio	70.000	60.000	30.000	19.000	15.000	12.000	10.000	7.000
	90.000	80.000	45.000	30.000	22.000	18.000	15.000	11.000
Aluminium, Plastics Aluminium, Plastiques Aluminio, Plásticos	70.000	60.000	15.000	10.000	7.000	6.000	5.000	4.000
	100.000	80.000	60.000	50.000	30.000	20.000	17.000	13.000
Copper, brass, bronze Cuivre, laiton, bronze Cobre, latón, bronce	60.000	45.000	22.000	15.000	11.000	9.000	8.000	6.000
	100.000	80.000	60.000	40.000	30.000	20.000	17.000	13.000
Glass fibre reinforced plastics, plaster fire prevention boards, CFRP Graphite Matières plastiques renforcées de fibres de verre, GKF, CFK Graphite Plásticos reforzados con fibra de vidrio, GKF, CFK Grafito	45.000	35.000	27.000	18.000	11.000	7.000	5.000	3.000
	68.000	50.000	48.000	35.000	28.000	18.000	14.000	10.000
Specially for difficult super alloys, Stainless steel, such as titanium, Inconel, Hastelloy, Waspaloy, Duplex, Amanox etc. Spécifique pour les superalliages les plus difficiles. Les aciers inoxydables, comme le titane, l'inconel, le hastelloy, le waspaloy, le duplex, l'amanox, etc. Especial para superaleaciones difíciles Aceros inoxidable, como titanio, Inconel, Hastelloy, Waspaloy, Duplex, Amanox etc.	70.000	60.000	30.000	19.000	15.000	12.000	10.000	7.000
	90.000	80.000	45.000	30.000	22.000	18.000	15.000	11.000
	Maximum 120.000	Maximum 100.000	Maximum 65.000	Maximum 55.000	Maximum 35.000	Maximum 25.000	Maximum 20.000	Maximum 15.000
	Maximum 110.000	Maximum 10.000	Maximum 65.000	Maximum 55.000	Maximum 35.000	Maximum 25.000	Maximum 20.000	Maximum 15.000
	Maximum 120.000	Maximum 100.000	Maximum 65.000	Maximum 55.000	Maximum 35.000	Maximum 25.000	Maximum 20.000	Maximum 15.000
	Maximum 110.000	Maximum 100.000	Maximum 65.000	Maximum 55.000	Maximum 35.000	Maximum 25.000	Maximum 20.000	Maximum 15.000
	Maximum 110.000	Maximum 100.000	Maximum 65.000	Maximum 55.000	Maximum 35.000	Maximum 25.000	Maximum 20.000	Maximum 15.000

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