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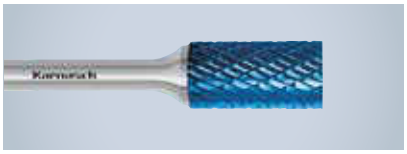
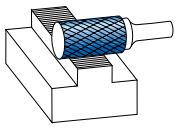
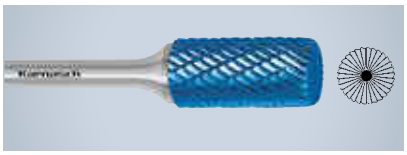
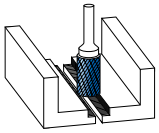
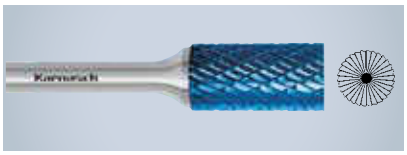
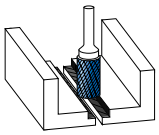
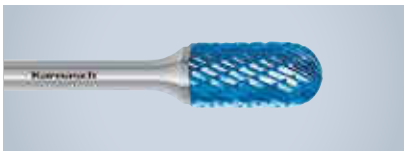
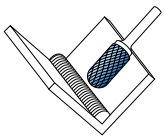
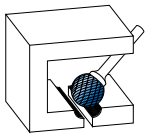
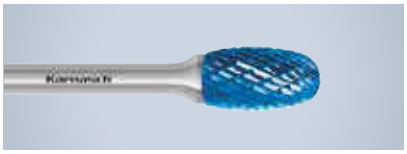
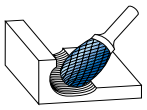
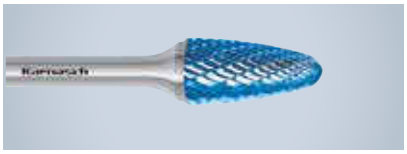
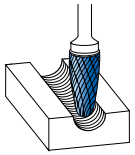
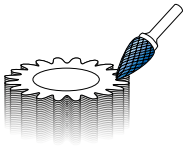
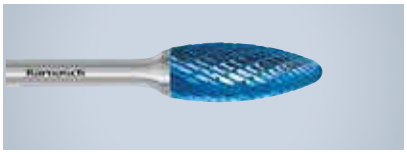
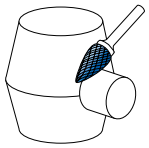
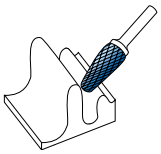
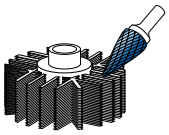
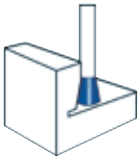
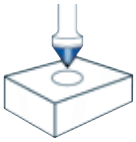
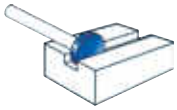
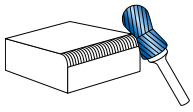
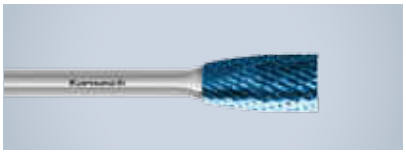
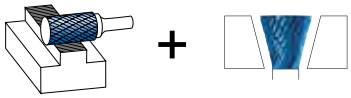
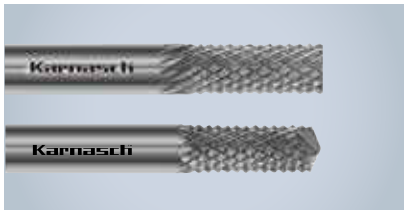
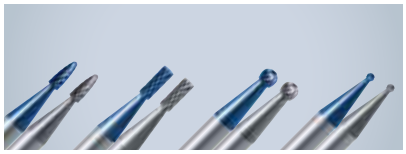
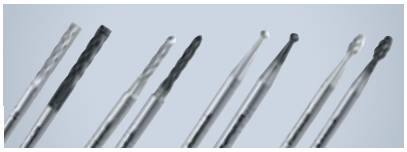
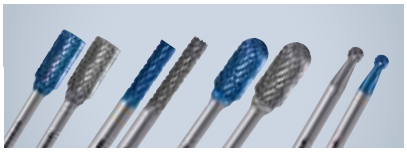
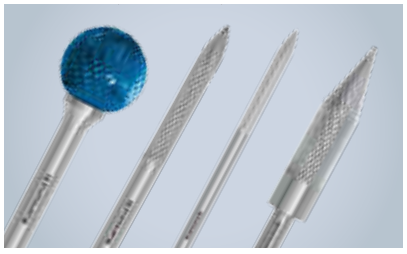
Forme | Shape | Forme		Exemples d'utilisation Application example Ejempo de aplicacion	DIN 8032	Karnasch Code	Pages du catalogue Catalog pages Páginas de catálogo
	Cylindrique sans coupe en bout Cylindrical without end cut Cilíndrica sin corte frontal		ZYA	**A**	16-17
	Cylindrique + rayon Cylinder + 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 example Ejemplo de aplicacion	DIN 8032	Karnasch Code	Pages du catalogue Catalog pages Páginas de catálogo
	Conique bout pointu Cone Cónica punta recta		SKM	**M**	35-36
	Conique renversée Inverted cone Cónica Invertida		WKN	**N**	37
	Conique 60° Countersink 60° Cónica 60°		KSJ	**J**	38
	Conique 90° Countersink 90° Cónica 90°		KSK	**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 Ejempo de aplicacion	DIN 8032	Karnasch Code	Pages du catalogue Catalog pages Páginas de catálogo
	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			64
	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			65
	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			66
	Réparation des pneus Tyre repair Reparación de neumáticos			67-71
	Présentoirs (avec fermeture à clef) Displays (lockable) Fresas rotativas en display			72-74
	Fraises rotative en coffrets Burr kits Fresas rotativas en estuches			75-84
	Recommandations d'utilisation de sécurité et vitesses de rotation Recommendations for use, safety and operating speeds Recommandaciones de uso, de seguridad y velocidades			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 ferrousmaterials 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 alcorte 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/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 matière	450–600
	Trempé, traité thermiquement supérieur à 1200 N/mm² (> 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 élevé 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/mm2 (< 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/mm2 (> 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 templar, 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 basto con elevado arranque	450–600
	Aceros templados, mejorados a partirde 1200 N/mm2 (> 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 férrocos	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 transmi-siones 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

MASCOUTECH

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/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 matière	450–600
	Trempé, traité thermiquement supérieur à 1200 N/mm² (> 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 élevé 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)
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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 templar, 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 basto con elevado arranque	450–600
	Aceros templados, mejorados a partirde 1200 N/mm2 (> 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 férrocos	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 élevé 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 treatedsteels 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 templar, 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 férrocos	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

MASCOUTECH

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/CKF).

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'aluminum, 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 élevé 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 = minimo arranque	900 - 1100
	Metales no férricos bduros	Bronce, titanio y aleaciones de aluminio duro (alto contenido en Si)	Arranque de material basto = elevado arranque	600 - 1100
			Arranque de material fino = minimo 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 = minimo arranque	500 - 1100

HP-I

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 highcutting 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 suavidadde marcha Media a alta capacidad de desprendimiento de viruta. Especial para supera leaciones + aceros inoxidables 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/mm² (<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/mm² (>38 HRC)	Aciers à outils, aciers trempés, acier alliés, aciers moulés		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/mm2 (<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/mm2 (>38HRC)	tool steels, tempering steels, alloyed steels, cast steels		250-350
Cast iron	Grey cast iron, white cast iron	Cast-iron with flake graphite EN-GJL (GG), with nodular graphite cast ironEN-GJS (GGG), white anneales 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 inoxidables y resistentes a los ácidos	Aceros austeniticos y ferriticos	Arranque de virutas basto = con alto a medio arranque	250-350
Acero y fundición de acero	Aceros sin templar,no mejorados hasta1200 N/mm2 (<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 templadosmejorados a partir 1200 N/mm2 (>38HRC)	Aceros herramientas, acerosmejorados, aceros sin alear yfundición de acero		250-350
Fundición	Hierro fundido gris y hierro fundido blanco	Hierro fundido con grafito laminar EN-GJL (GG), con grafito esférico/fundicón 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

MASCOUTECH

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 matéraux 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/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 la 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 la matière	450–600
Métaux non ferreux	Durs	Bronze, titane/alliages de titane, alliages d'aluminium durs (teneur élevé 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 treatedsteels 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 templar, 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 partirde 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 férrocos	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 héliocoidales 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/mm² (< 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/mm² (> 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/mm2 (< 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/mm2 (> 38HRC)	tool steels, tempering steels, alloyed steels, cast steels		250 - 350
Non-Ferrous metals	High-temperature resistant materiales	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 anneales 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/mm2 (< 38HRC)	Aceros construcción, aceros al carbono, aceros herramientas, aceros sin alear, aceros cementación fundición de acero	Arranque de virutas basto = elevado arranquede material con carga por choque	250 - 600
	Aceros templados mejorados a partir 1200 N/mm2 (> 38HRC)	Aceros herramientas, aceros mejorados, aceros sin alear y fundición de acero		250 - 350
Metales no férricos	Materiales refractarios a altas temperaturas	Aleaciones de niquel 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/fundicón 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

MASCOUTECH

HP-9

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)
Acier inoxydable (INOX)	Aciers résistant aux acides et à la corrosion	Aciers inoxydables austénitique et ferritique	Usinage grossier avec enlèvement important de matière Usinage fin avec enlèvement faible de matière	450 - 600

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

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

HP-8

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 evacu ción de virutas. Ninguna decoloración en la pieza de trabajo por calentamiento.

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 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)
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)
Acero y fundición de acero	Aceros sin templar,no mejorados hasta 1200 N/mm2 (< 38HRC)	Aceros construcción, aceros al carbono, aceros herramientas, aceros sin alear, 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 alear y fundición de acero		

1

Tranchant optimisé + finition parfaite (comme un mirroir)
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 áltamente 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 longivité de l'outils 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 friccción 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.

Karnasch™
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

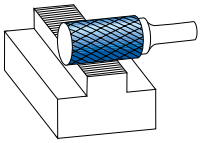
Rectification de précision
Precision grinding

Le procédé de brasage
The brazing process

Contrôle de qualité
Controlling each individual burr

BLACKTEC REVÊTU COATED RECUBRIMIENTO

BLUETEC REVÊTU COATED RECUBRIMIENTO

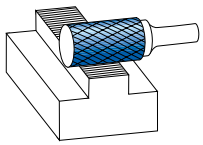


A FORME / SHAPE / Forma — **ZYA**

- 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	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		115002035			115003.035			
3	14	3	65		✓		115001.040		115002040			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	✓			11.5001.087							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

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		113002035			113003.035			
3	14	3	65		✓		113001.040		113002040			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

BLUETEC
REVÊTU
COATED
RECUBRIMIENTO

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 dispendieuses.
Caractéristiques et avantages du rayon :
- Améliore la résistance du tranchant au début de la fraise rotative.
- Fourni un meilleur contrôle.
- Prévient 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 bur.
- 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.

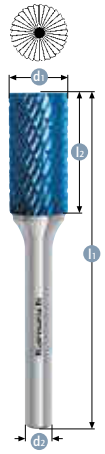
El diseño único RADIO+CILINDRO convierte la fresa rotatoria cilíndrica convencional en una herramienta de alta tecnología.

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.

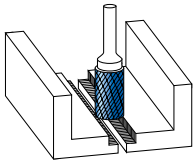
Mediante el diseño de radio:
- ninguna inclinación / deslizamiento de la pieza de trabajo.
- se evitan daños de herramientas costosas. Mediante el dentado cruzado:
- excelente control y orientación durante el proceso de desbarbado.

Propiedades y ventajas El radio en la punta de la fresadora produce:
- estabilidad de ranuras mejorada por los bo des redondeados.
- El radio permite un mejor control durante el proceso de molienda.
- El redondeo impide la inclinación / el desli amiento 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



BLACKTEC REVÊTU COATED RECUBRIMIENTO

BLUETEC REVÊTU COATED RECUBRIMIENTO

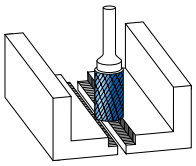


B FORME / SHAPE / Forma — **ZYB**

- 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	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**

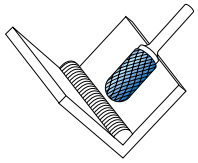
- Cylindrique avec coupe en bout
- Cylinder with end cut
- Cilindrica con taglio in testa

							STANDARD CUT TYPES				SPECIAL CUT TYPES				
D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SB	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
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

BLACKTEC REVÊTU COATED RECUBRIMIENTO

BLUETEC REVÊTU COATED RECUBRIMIENTO



C FORME / SHAPE / Forma

WRC

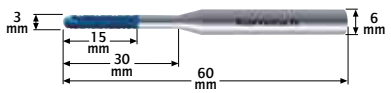
- Cylindrique bout rond
- Ball nosed cylinder
- Cilíndrica con radio

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					

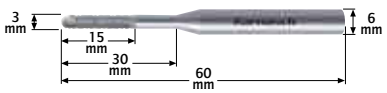
* Sur demande | On request | A pedido

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

Art. 11.5021.043 | 11.5022.043

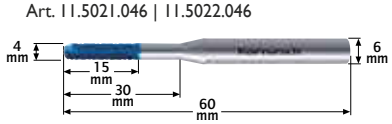


Art. 11.3021.043 | 11.3022.043

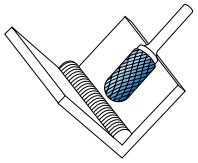


Tranchant de 15mm sur 30mm
Flute of 15mm on 30mm
De 30mm están dentados 15mm

Art. 11.5021.046 | 11.5022.046



Art. 11.3021.046 | 11.3022.046



C FORME / SHAPE / Forma

WRC

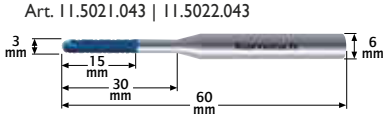
- Cylindrique bout rond
- Ball nosed cylinder
- Cilíndrica con radio

							STANDARD CUT TYPES				SPECIAL CUT TYPES				
D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SC	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	113025.100		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					

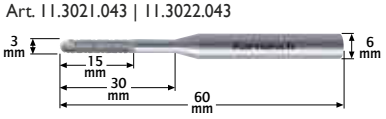
* Sur demande | On request | A pedido

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

Art. 11.5021.043 | 11.5022.043



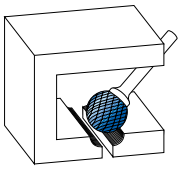
Art. 11.3021.043 | 11.3022.043



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

Art. 11.5021.046 | 11.5022.046

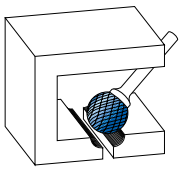
Art. 11.3021.046 | 11.3022.046



D FORME / SHAPE / Forma — KUD

- Sphérique (boule)
- Ball
- Esféria

D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SD	STANDARD CUT TYPES				SPECIAL CUT TYPES				
							11.5031	11.5030	11.5032	11.5035	11.5037	11.5033	11.5034	11.6034	11.6044
							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	1,8	3	38		✓		115031.020		115032.020	115035.020		115033.020			
2,5	2,3	3	38		✓	SD41	115031.022								
3	2,5	3	38		✓	SD42	115031.025	115030.025			115037.025	115033.025		116034.005	116044.005*
3	2,5	3	50		✓	SD42L2	115031.030					115033.030			
3	2,5	3	75		✓	SD42L3	115031.035					115033.035			
3	2,5	6	50		✓	SD11	115031.040					115033.040			
4	3,4	3	38		✓		115031.045	115030.045	115032.045	115035.045		115033.045			
4	3,4	6	50		✓		115031.046	115030.046							
5	4,7	3	38		✓		115031.047	115030.047							
5	5	6	50		✓		115031.048	115030.048		115035.050	115037.050				
6	5	3	38	✓			115031.050	115030.050	115032.050	115035.055	115037.055	115033.050			
6	4,7	6	50		✓	SD1	115031.055	115030.055	115032.055	115035.060	115037.060	115033.055	115034.055	116034.010	116044.010
8	6	6	52	✓		SD2	115031.060	115030.060	115032.060			115033.060	115034.060	116034.015	116044.015
8	6	6	180	✓			115031.065		115032.065			115033.065			
10	8	6	54	✓		SD3	115031.070	115030.070	115032.070	115035.070	115037.070	115033.070	115034.070	116034.020	116044.020
10	8	6	185	✓		SD3L7	115031.075		115032.075			115033.075			
11	9,5	6	55	✓		SD4	115031.077								
12	11,4	6	56	✓		SD5	115031.080	115030.080		115035.080		115033.080	115034.080	116034.025	116044.025
12DIN	11	6	56	✓			115031.083				115037.083				
12	11	8	56	✓			115031.085		115032.085			115033.085	115034.085		
12	11	6	162	✓		SD5L6	115031.090		115032.090			115033.090			
16	14	6	60	✓		SD6	115031.095		115032.095	115035.095	115037.095	115033.095	115034.095		
16	14	8	60	✓			115031.100		115032.100	115035.100		115033.100	115034.100	116034.030*	116044.030*
20	16,5	6	62	✓			115031.105			115035.105					
20	16,5	8	62	✓		SD7	115031.110			115035.110					
25	22	6	68	✓		SD9	115031.115			115035.115					
25	22	8	68	✓			115031.120			115035.120					



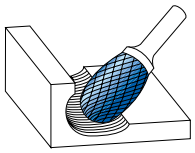
D FORME / SHAPE / Forma

KUD

- Sphérique (boule)
- Ball
- Esféria

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	1,8	3	38		✔		113031.020		113032.020	113035.020		113033.020			
2,5	2,3	3	38		✔	SD41	113031.022								
3	2,5	3	38		✔	SD42	113031.025	113030.025			113037.025	113033.025		114034.005	114044.005*
3	2,5	3	50		✔	SD42L2	113031.030					113033.030			
3	2,5	3	75		✔	SD42L3	113031.035					113033.035			
3	2,5	3	50		✔	SD11	113031.040					113033.040			
4	3,4	6	38		✔	SD14	113031.045	113030.045	113032.045	113035.045		113033.045			
4	3,4	3	50		✔		113031.046	113030.046							
5	4,7	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	4,7	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	9,5	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

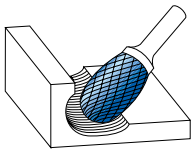


E FORME / SHAPE / Forma — **TRE**

- Ovale
- Oval
- Oval

							STANDARD CUT TYPES				SPECIAL CUT TYPES				
D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SE	11.5041	11.5040	11.5042	11.5045	11.5047	11.5043	11.5044	11.6035	11.6045
							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	**115041.010**	**115040.010**	**115042.010**	**115045.010**	**115047.010**	**11.5043.010**			
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**	**11.5043.015**			
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



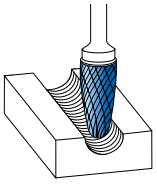
E FORME / SHAPE / Forma

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**	**11.5043.010**			
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**	**11.3043.015**			
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

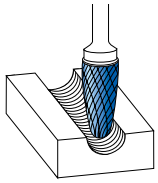


F FORME / SHAPE / Forma — **RBF**

- 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	12,7	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	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								

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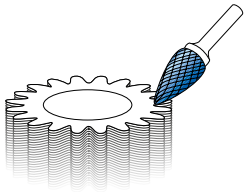
BLUETEC REVÊTU COATED RECUBRIMIENTO

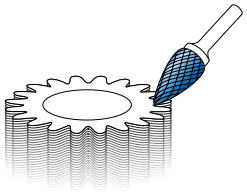


G FORME / SHAPE / Forma — **SPG**

- 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**

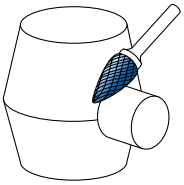
- Ogive pointue
- Tree
- Ojival en punta

							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

BLACKTEC REVÊTU COATED RECUBRIMIENTO

BLUETEC REVÊTU COATED RECUBRIMIENTO

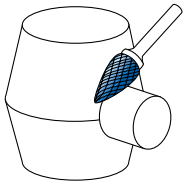


H FORME / SHAPE / Forma

- Flamme
- Flame
- Llama

							STANDARD CUT TYPES				SPECIAL CUT TYPES				
D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SH	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	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**								

* Sur demande | On request | A pedido

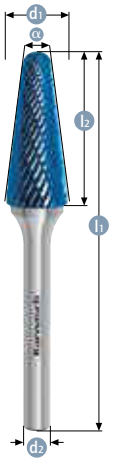


H FORME / SHAPE / Forma

- Flamme
- Flame
- Llama

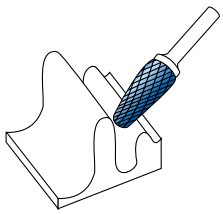
D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SH	STANDARD CUT TYPES				SPECIAL CUT TYPES				
							11.3071	11.3070	11.3072	11.3075	11.3077	11.3073	11.3074	11.4038	11.4048
							HP-3	HP-2	HP-4	HP-7	HP-1	HP-5	HP-6	HP-9	HP-8
							Code	Code	Code	Code	Code	Code	Code	Code	Code
3	6	3	38		✔	SH41	**113071.005**	**113070.005**	**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



BLACKTEC REVÊTU COATED RECUBRIMIENTO

BLUETEC REVÊTU COATED RECUBRIMIENTO

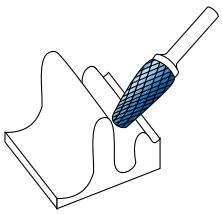


L FORME / SHAPE / Forma — **KEL**

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

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



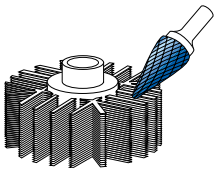
L FORME / SHAPE / Forma

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

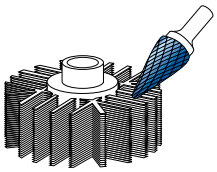


M FORME / SHAPE / Forma **SKM**

- Conique bout pointu
- Cone
- Cónica punta recta

D1	L2	D2	L1	α°	BRASÉ BRAZED	VHM SOLID	SM	STANDARD CUT TYPES				SPECIAL CUT TYPES				
								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		✔		**115091.010**		**115092.010**			**115093.010**	**115094.030**		
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



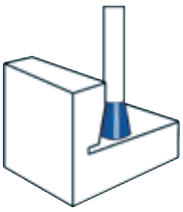
M FORME / SHAPE / Forma

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

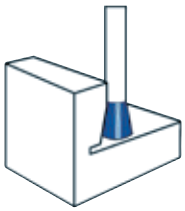


N FORME / SHAPE / Forma — WKN

- 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

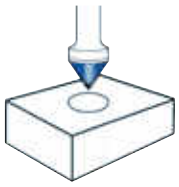
- Conique inversée
- Inverted cone
- Cónica Invertida

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**		

BLACKTEC REVÊTU COATED RECUBRIMIENTO

BLUETEC REVÊTU COATED RECUBRIMIENTO



J FORME / SHAPE / Forma — **KSJ**

- Conique 60°
- Countersink 60°
- Cónica 60°

STANDARD CUT TYPES

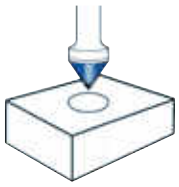
D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SJ	11.5101	11.5100
							HP-3	HP-2
							Code	Code
3	3	3	38		✔		**115101.005**	**115100.005**
6	6	6	50		✔	SJ42	**115101.010**	**115100.010**
10	8	6	56	✔		SJ1	**115101.015**	**115100.015**
12	11	6	60	✔		SJ3	**115101.020**	**115100.020**
16	15	6	62	✔		SJ5	**115101.025**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

J FORME / SHAPE / Forma — **KSJ**

- Conique 60°
- Countersink 60°
- Cónica 60°

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**	



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 HP-3 Code	11.5110 HP-2 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**	

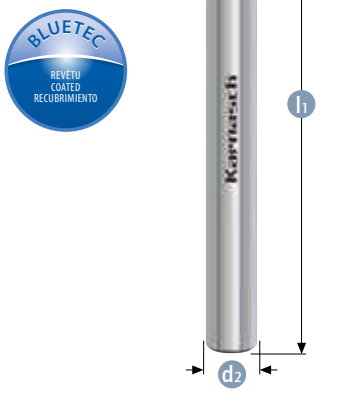
K FORME / SHAPE / Forma — **KSK**

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

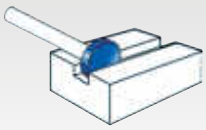
STANDARD CUT TYPE

D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID	SK	11.3111 HP-3 Code	11.3110 HP-2 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**	

HP-2



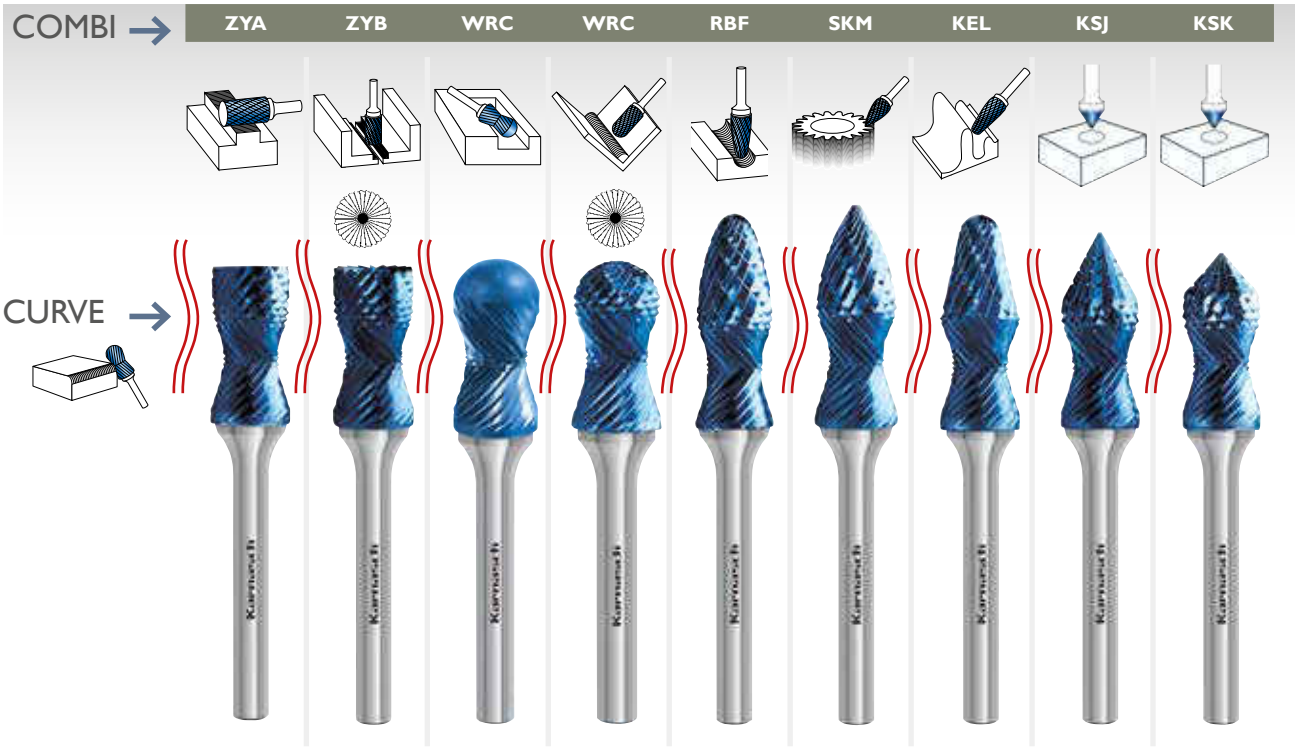
- Forme disque
- RIM shape
- Ranurar



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	✔	90°
116011.020	**25**	6,3	8	51	✔	Radius

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	✔	90°
114011.020	**25**	6,3	8	51	✔	Radius

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 donnes 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:

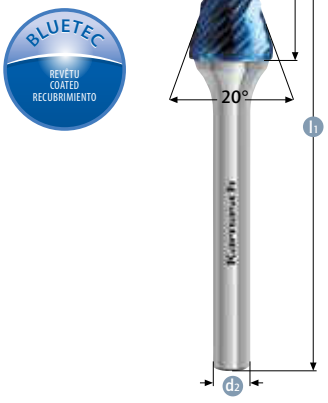
- The Ideal tool for extremly fast chamfering. The edges are not simply bevelled, but by the unique guiding-rounding-deburring system smoothly rounded.
- COMBI+CURVE guiding-rounding-deburring system always centres itself on the centre of the edge.
- Slipping off the edge is almost impossible. This gives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

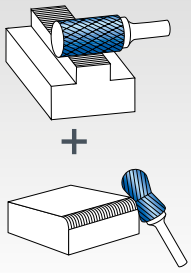
Can be used on a wide variety of material e.g. Cast iron, steel < 60 HRC, stainless steel, nickel-based and titanium alloys, copper, brass and bronze.

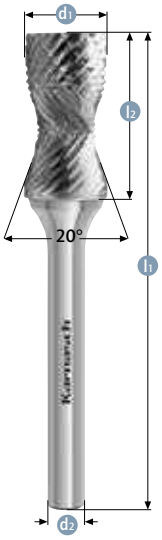
Art. | 11.6019

Art. | 11.4019

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





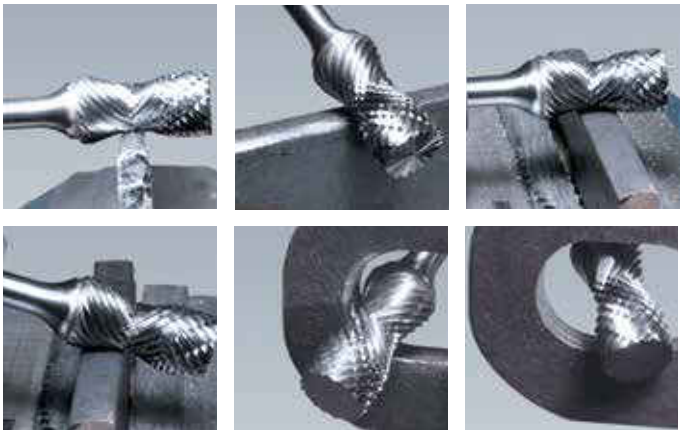


Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116019.100	**12**	25	6	70	✔	–

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114019.100	**12**	25	6	70	✔	–

EXEMPLES D'UTILISATION · APPLICATION EXAMPLES · EJEMPLOS DE APLICACIÓN

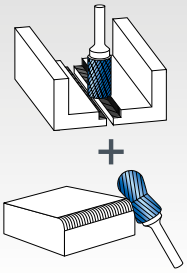
COMBI + CURVE

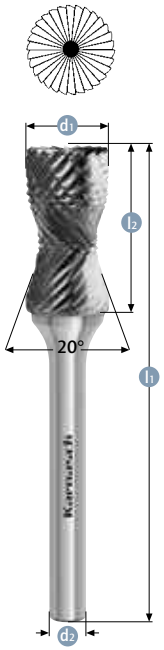


Art. | 11.6020

Art. | 11.4020

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





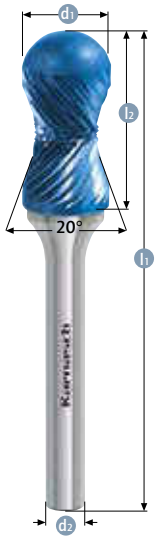
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116020.100	**12**	25	6	70	✔	–

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

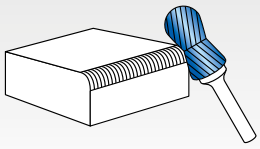
Art. | 11.6021



Courbe + Cylindrique bout rond sans coupe en bout

Curve + Ball nosed cylinder without cut end

Curve + Cilindrica con radio sin corte frontal



Art. | 11.4021

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'UTLISATION · 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.

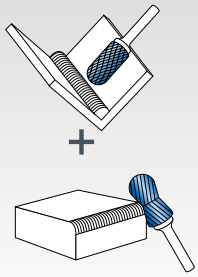
Art. | 11.6022

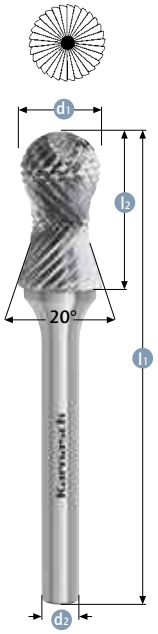
Art. | 11.4022

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	✔	–

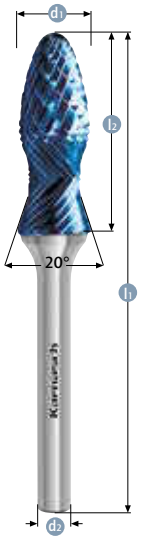
EXEMPLES D'UTLISATION · APPLICATION EXAMPLES EJEMPLOS DE APLICACIÓN

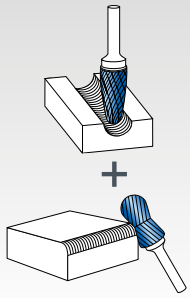
COMBI + CURVE

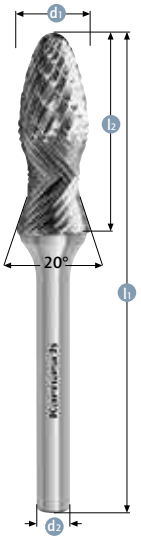
Art. | 11.6023

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	✔	–

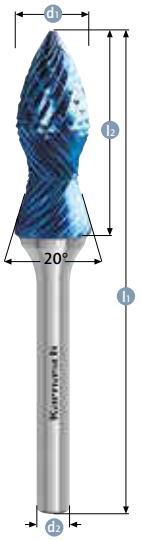
EXEMPLES D'UTILISATION · APPLICATION EXAMPLES · EJEMPLOS DE APLICACIÓN

COMBI + CURVE

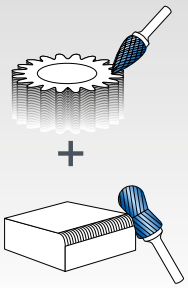
Art. | 11.6024

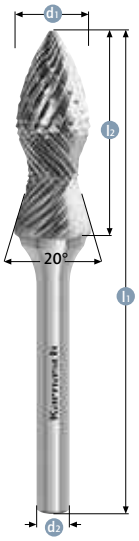
Art. | 11.4024

BLUETEC
REVETU
COATED
RECUBRIMIENTO



- 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	✔	–

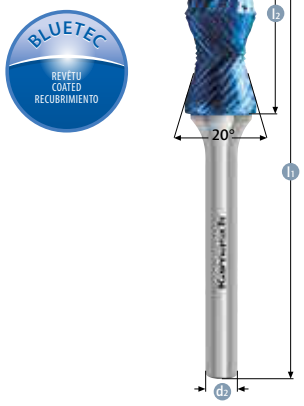
EXEMPLES D'UTILISATION · APPLICATION EXAMPLES · EJEMPLOS DE APLICACIÓN

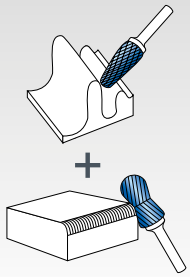
COMBI + CURVE

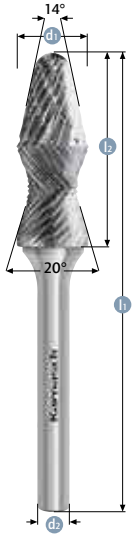
Art. | 11.6025

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	✔	–

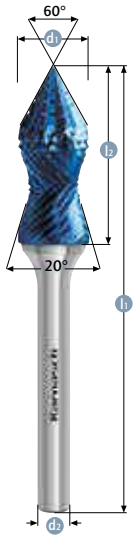
EXEMPLES D'UTILISATION · APPLICATION EXAMPLES · EJEMPLOS DE APLICACIÓN

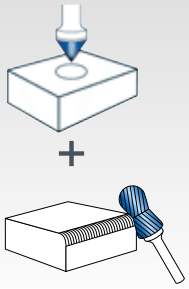
COMBI + CURVE

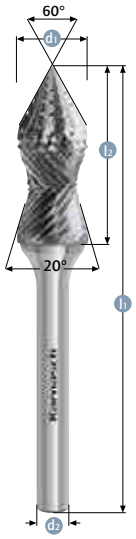
Art. | 11.6026

Art. | 11.4026

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







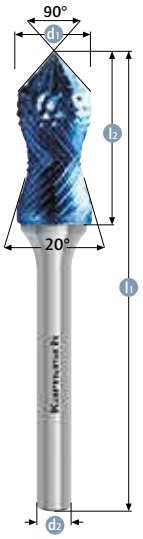
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116026.100	**12**	28	6	73	✔	–

Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114026.100	**12**	28	6	73	✔	–

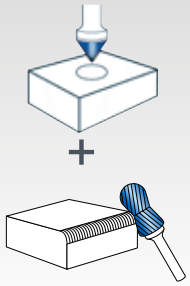
EXEMPLES D'UTILISATION · APPLICATION EXAMPLES · EJEMPLOS DE APLICACIÓN

COMBI + CURVE

Art. | 11.6027

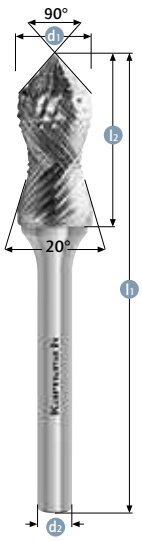


- Courbe + Conique 90°
- Curve + Countersink 90°
- Curve + Cónica 90°



Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116027.100	**12**	31	6	76	✔	–

Art. | 11.4027



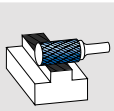
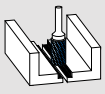
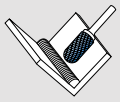
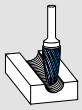
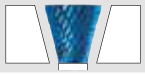
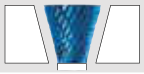
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114027.100	**12**	31	6	76	✔	–

EXEMPLES D'UTLISATION · APPLICATION EXAMPLES · EJEMPLOS DE APLICACIÓN

COMBI + CURVE

nouveau
new

COMBI →

ZYA	ZYB	WRC	RBF	SPG	KEL
					
+	+	+	+	+	+
WKN	WKN	WKN	WKN	WKN	WKN
					
+					
FORME FORM →						
	α 16°	α 16°	α 16°	α 16°	α 16°	α 16° α 14°
🇫🇷	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	Cilindrica con taglio in testa + cónica invertida	Cilindrica 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 ou 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 burrsfor 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

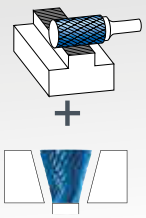
Can be used on a wide variety of material e.g. Cast iron, Steel <60 HRC, stainless steel, nickel-based and Titanium alloys, copper, brass and bronze.

Art. **11.6051**

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. **11.4051**

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

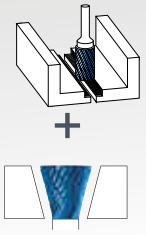
Exemples d'utilisation
Application examples
Ejemplos de aplicación

Art. **11.6052**

FORME / SHAPE / Forma

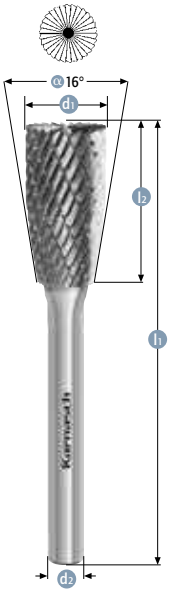
ZYB / WKN

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



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

Art. **11.4052**



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

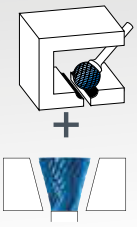
Exemples d'utilisation
Application examples
Ejemplos de aplicación

Art. **11.6053**

FORME / SHAPE / Forma

WRC / WKN

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



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

Art. **11.4053**

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

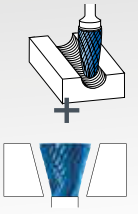
Exemples d'utilisation
Application examples
Ejemplos de aplicación

Art. **11.6054**

FORME / SHAPE / Forma

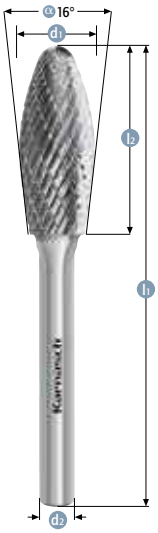
RBF / WKN

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



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

Art. **11.4054**



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

Art. **11.4055**

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**

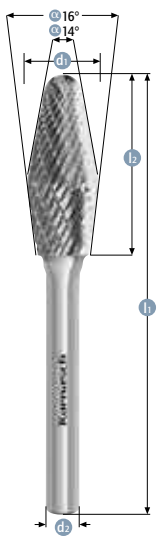
FORME / SHAPE / Forma

KEL / WKN

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

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

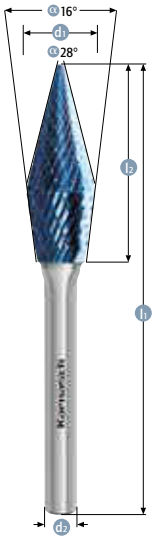
Art. **11.4056**



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

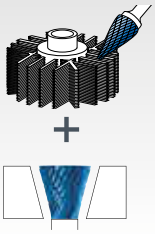
Exemples d'utilisation
Application examples
Ejemplos de aplicación

Art. **11.6057**



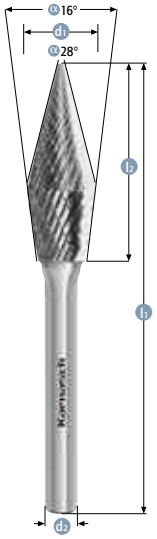
FORME / SHAPE / Forma — SKM / WKN

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



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

Art. **11.4057**



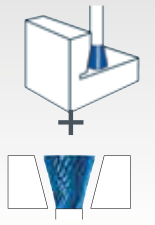
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114057.100	**12**	35	6	80		

Exemples d'utilisation
Application examples
Ejemplos de aplicación

Art. **11.6058**

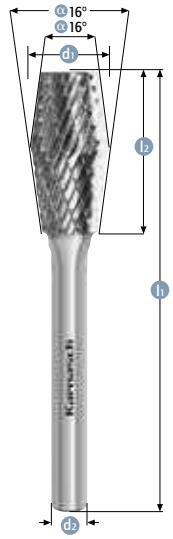
FORME / SHAPE / Forma — WKN / WKN

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



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

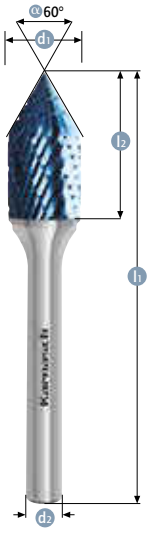
Art. **11.4058**



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

Exemples d'utilisation
Application examples
Ejemplos de aplicación

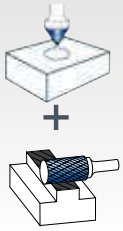
Art. **11.6059**



FORM / SHAPE / Forma

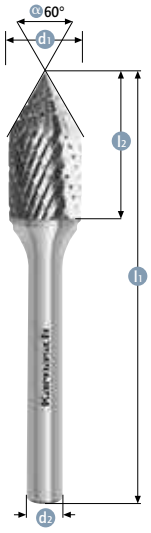
KSJ / ZYA

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



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

Art. **11.4059**



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

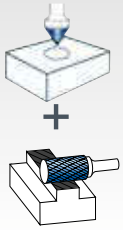
Exemples d'utilisation
Application examples
Ejemplos de aplicación

Art. **11.6060**

FORME / SHAPE / Forma

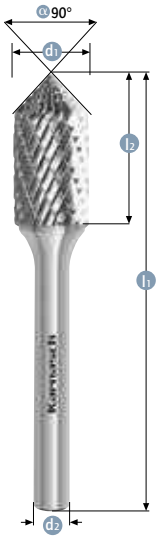
KSK / ZYA

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



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

Art. **11.4060**



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

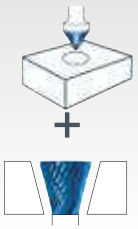
Exemples d'utilisation
Application examples
Ejemplos de aplicación

Art. **11.6061**

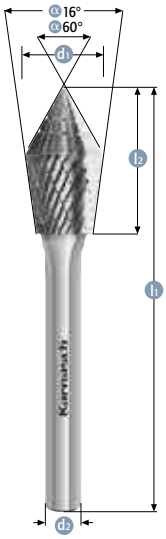
FORME / SHAPE / Forma

KSJ / WKN

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



Art. **11.4061**



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

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

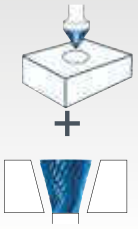
Exemples d'utilisation
Application examples
Ejemplos de aplicación

Art. **11.6062**

FORME / SHAPE / Forma

KSK / WKN

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



Art. **11.4062**

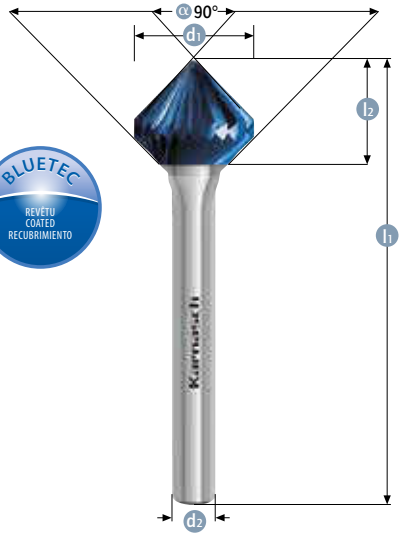
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
116062.100	**12**	18	6	64		

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

Exemples d'utilisation
Application examples
Ejemplos de aplicación

Karnasch

Art. | 11.6063

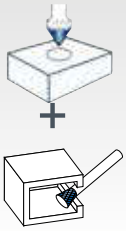


BLUETEC
REVÊTU
COATED
RECUBRIMIENTO

FORME / SHAPE / Forma

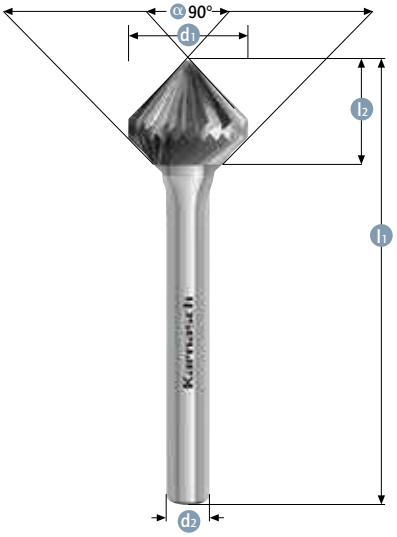
KSK / KSK

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



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

Art. | 11.4063



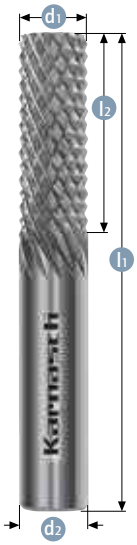
Art.	D1	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114063.100	**16**	15	6	60		

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



Tolérances
Tolerances
Tolerancias

Ø 1.6 mm, 2.4 mm
= +0,00/–0,10

Ø 3–12 mm
= +0,00/–0,13

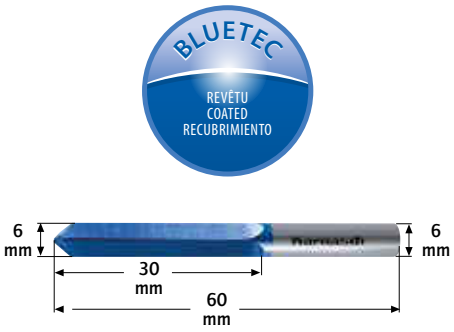
Ces fraises sont utilisées pour le contournage, rainurage et le forage d'une grande gamme de GFK, CFK, fibre de verre, plastiques durs et également les composites, comme les circuits imprimés et céramique avec fibres de verre, le graphite, le carbone, etc.

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 Art.	116002 Art.	116003 Art.	116004 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).

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).

Fresa perforadora de metal duro y macizo de última generación. Abre cilin dros 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).

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

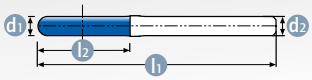
To be used with a drilling machine / strong battery drill. With this holesaw it is possible to penetrate the hardened front plate of this special high security locking cylinder that sits in front of the core and then to retrieve the core. Properties of the tool :
- 4 x T.C.T. teeth Ø 15.2
- Sprung burr guide (6.8 mm) for centring in the locking channel
- Depth stop

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 × 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

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	
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	
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	

HP-3
La plus utilisée
coupe universelle
pour acier < 60 HRC

The most widely used
universal cutting style
for steel < 60 HRC

HP-4
Coupe extra-fine
pour acier dur
jusqu'à 70 HRC

Extra fine cross cutting style
for hard steel up to 70 HRC

HP-7
Pour usinage grossier
et enlèvement important des
alliages d'aluminium

For coarse cutting and
highest material removal
of aluminium alloys

Art. 11.5021.043 / 11.5022.043

BLUETEC
REVETU
COATED
RECUBRIMIENTO

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 coeur ne devrait pas être détruit grâce au faible diamètre de la tête de fraisage.

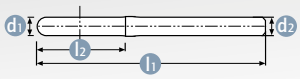
* By tapering of a 6 mm burr to Ø 3 mm or Ø 4 mm working time is reduced by about half, because less material needs to be machined.
- Because of its 6 mm shank, significantly less susceptible to breakage than continuous Ø 3 mm or Ø 4 mm shank
- At Ø 3 mm, Ø 4 mm the same collet can be used for Ø 6 mm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

* 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

Karnasch

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	
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	
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	

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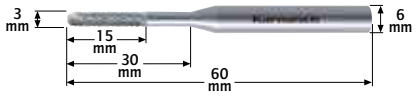
Pour usinage grossier
et enlèvement important des
alliages d'aluminium

For coarse cutting and
highest material removal
of aluminium alloys

Art. 11.3021.043 / 11.3022.043



Art. 11.3021.046 / 11.3022.046

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

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- 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

MASCOUTECH

MINI-FRAISES ROTATIVES AVEC COUPE UNIVERSELLE
MINI-BURRS IN UNIVERSAL CUTTING STYLE
MINI-FRESAS CON TIPO DE CORTE UNIVERSAL

MINI-UNI

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

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

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

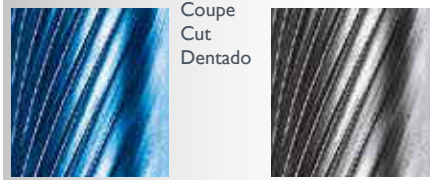
Para operaciones con velocidad recomendada de: +/- 70 000 rpm

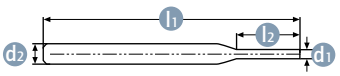
Applications: Precision engineering, jewellery industry, turbine manufacture, tool manufacture.

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

Recommended operating speed: +/- 70,000 RPM

Universelle / Universal HP-3





Art.	D1	L2	D2	L1	FORME SHAPE	DIN 8033	
115006.005	1	4	3	38	A	ZYA	
115006.010	1,5	4	3	38	A	ZYA	
115006.020	2	4	3	38	A	ZYA	
115026.005	1	4	3	38	C	WRC	
115026.010	1,5	4	3	38	C	WRC	
115026.015	2	4	3	38	C	WRC	
115036.005	1	1	3	38	D	KUD	
115036.010	1,5	1	3	38	D	KUD	
115036.015	2	2	3	38	D	KUD	
115046.005	1,5	4	3	38	E	TRE	
115056.005	1,5	4	3	38	F	RBF	
115066.005	1,5	4	3	38	G	SPG	
115196.005	1,5	4	3	38	M	SKM	

Art.	D1	L2	D2	L1	FORME SHAPE	DIN 8033	
113006.005	1	4	3	38	A	ZYA	
113006.010	1,5	4	3	38	A	ZYA	
113006.020	2	4	3	38	A	ZYA	
113026.005	1	4	3	38	C	WRC	
113026.010	1,5	4	3	38	C	WRC	
113026.015	2	4	3	38	C	WRC	
113036.005	1	1	3	38	D	KUD	
113036.010	1,5	1	3	38	D	KUD	
113036.015	2	2	3	38	D	KUD	
113046.005	1,5	4	3	38	E	TRE	
113056.005	1,5	4	3	38	F	RBF	
113066.005	1,5	4	3	38	G	SPG	
113196.005	1,5	4	3	38	M	SKM	

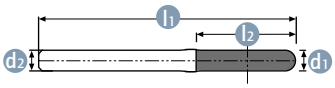
MINI-FRAISES POUR ALUMINIUM 2,0 / 3,0 MM
MINI-BURRS FOR ALUMINIUM 2,0 / 3,0 MM
MINI-FRESAS PARA ALUMINIO 2,0 / 3,0 MM

Karnasch

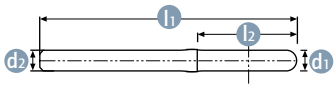
MINI-ALU

Application:	Mécanique de précision, farication d'outils.	Campos de aplicación:	Mecánica de precisión, fabricación de herramientas.
Pour utilisation:	Alliages d'aluminium, métaux légers, cuivre et alliages de cuivre, plastiques.	Materiales a trabajar:	Aleaciones de aluminio, metales ligeros, metales no ferrosos, plásticos.
Vitesse recommandée:	+/- 70 000 tr/min	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



Aluminium HP-7



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

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

FRAISES ROTATIVES Ø 3+6 MM, TIGE 3MM POUR SUPER ALLIAGES
BURRS Ø 3+6 MM, SHANK 3 MM FOR SUPER ALLOYS
FRESAS Ø 3+6 MM, MANGO 3 MM PARA SUPER ALEACIONES

MINI-UNI

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'aillettes de turbines d'avion, de turbines à gaz.

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.

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 supera leaciones + aceros inoxidables extrmadamente difíciles, como : titanio, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc.

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

Super alliages / Super alloys HP-I

Art.	D1	L2	D2	L1	FORME SHAPE	DIN 8033	
115007.030	3	14	3	38	A	ZYA	
115007.060	6	12	3	44			
115017.015	3	14	3	38	B	ZYB	
115017.045	6	12	3	44			
115027.025	3	14	3	38	C	WRC	
115027.050	6	12	3	44			
115037.025	3	2,7	3	38	D	KUD	
115037.050	6	5,7	3	38			
115047.010	3	6,0	3	38	E	TRE	
115047.015	6	10	3	42			
115057.015	3	14	3	38	F	RBF	
115057.025	6	12	3	44			
115067.015	3	14	3	38	G	SPG	
115067.030	6	12	3	44			
115077.005	3	6	3	38	H	–	
115077.009	6	10	3	43			
115087.010	3	14	3	38	L	KEL	
115087.015	6	16	3	48			
115097.015	3	11	3	38	M	SKM	
115097.025	6	12	3	48			

Art.	D1	L2	D2	L1	FORME SHAPE	DIN 8033	
113007.030	3	14	3	38	A	ZYA	
113007.060	6	12	3	44			
113017.015	3	14	3	38	B	ZYB	
113017.045	6	12	3	44			
113027.025	3	14	3	38	C	WRC	
113027.050	6	12	3	44			
113037.025	3	2,7	3	38	D	KUD	
113037.050	6	5,7	3	38			
113047.010	3	6,0	3	38	E	TRE	
113047.015	6	10	3	42			
113057.015	3	14	3	38	F	RBF	
113057.025	6	12	3	44			
113067.015	3	14	3	38	G	SPG	
113067.030	6	12	3	44			
113077.005	3	6	3	38	H	–	
113077.009	6	10	3	43			
113087.010	3	14	3	38	L	KEL	
113087.015	6	16	3	48			
113097.015	3	11	3	38	M	SKM	
113097.025	6	12	3	48			

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

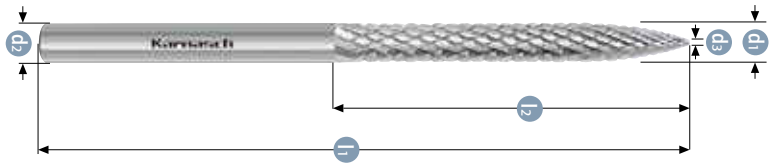
Con un punzón se determina el curso del canal hueco desde dentro hacia fuera. Así se calculan los daños en el interior y exterior del neumático (máx. 6 mm).

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**

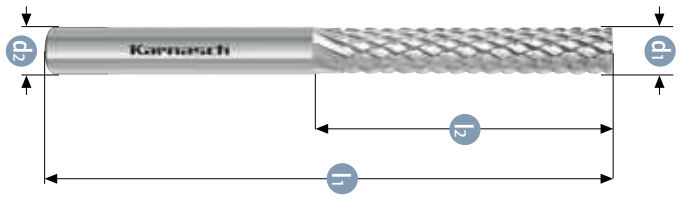


Conçu pour :
Suitable for :
Adecuado para :

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

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

Art. **11.4071**

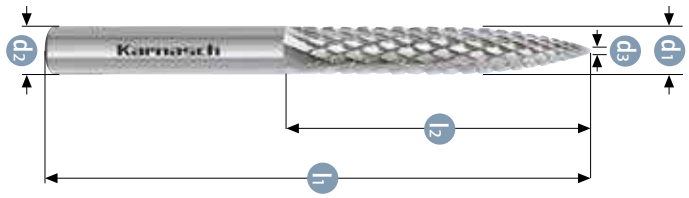


Conçu pour :
Suitable for :
Adecuado para :

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

Art.	D1	D3	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114071.100	**6**	–	35	6	65		✔

Art. **11.4072**

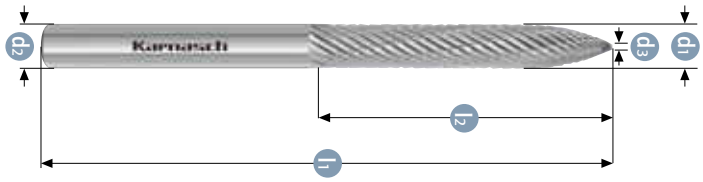


Conçu pour :
Suitable for :
Adecuado para :

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

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

Art. **11.4073**

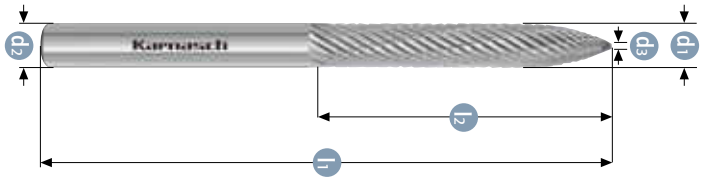


Conçu pour :
Suitable for :
Adecuado para :

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

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

Art. 11.4074

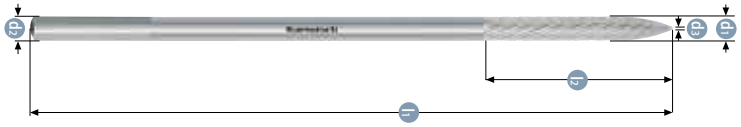


Conçu pour :
Suitable for :
Adecuado para :

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		✔

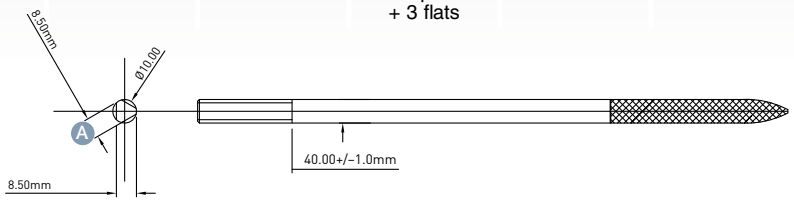
Art. 11.4075



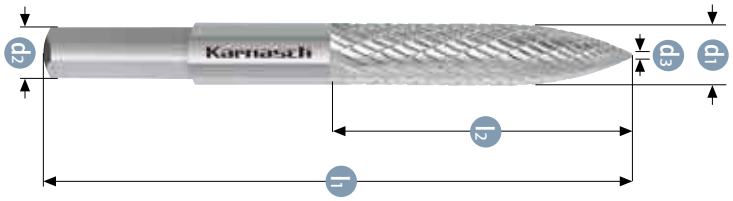
Conçu pour :
Suitable for :
Adecuado para :

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 + 3 plats + 3 flats	250	✔	



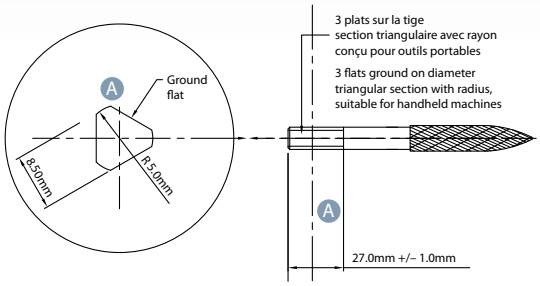
Art. 11.4076



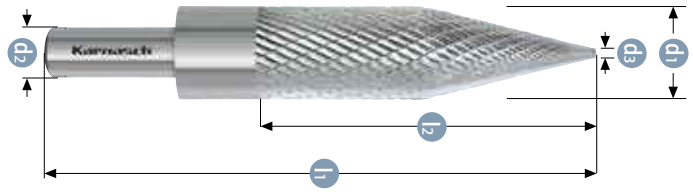
Conçu pour :
Suitable for :
Adecuado para :

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 + 3 plats + 3 flats	110	✔	



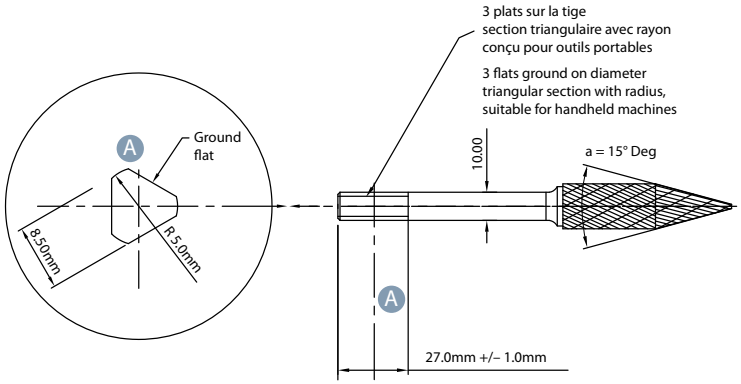
Art. 11.4077



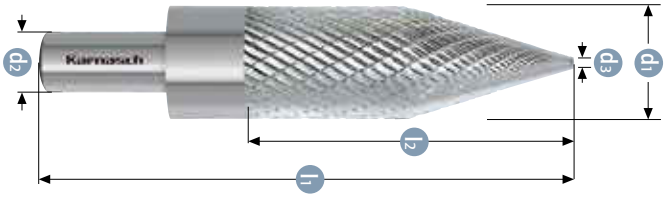
Conçu pour :
Suitable for :
Adecuado para :

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

Art.	D1	D3	L2	D2	L1	BRASÉ BRAZED	VHM SOLID
114077.100	**16**	1,5	60	10 + 3 plats + 3 flats	140	✔	



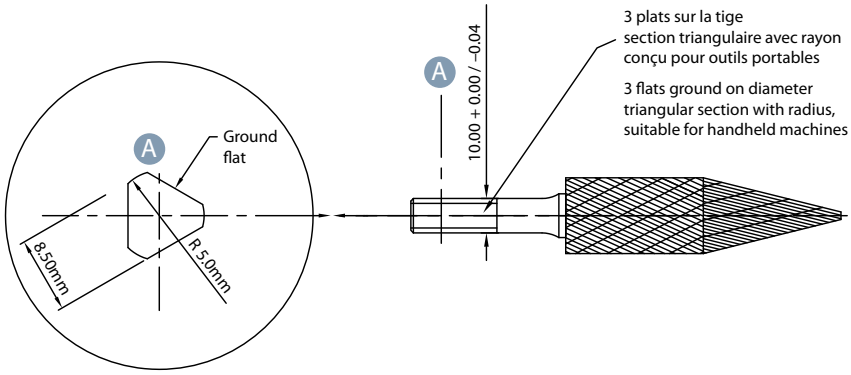
Art. 11.4078



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
114078.100	**22**	2,2	80	10 + 3 plats + 3 flats	125	✔	



Art. | 11.5031

Art. | 11.3031

Conçu pour :
Suitable for :
Adecuado para :

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

BLUETEC REVÊTU COATED RECUBRIMIENTO

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

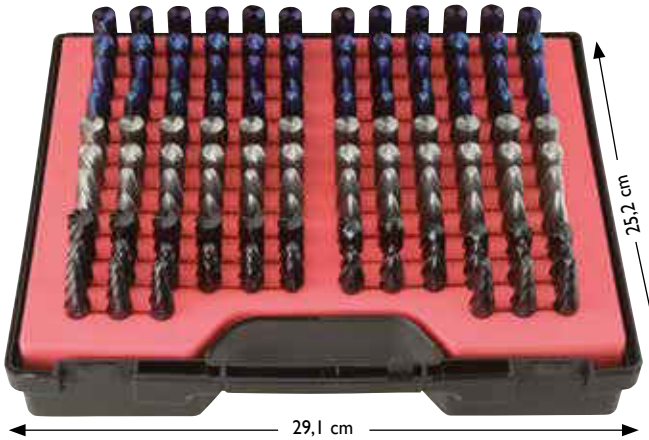
VOUS SOUHAITEZ EN CHOISIR VOUS MÊME LE CONTENU ?
Pas de problème ! Contactez-nous et nous composerons le coffret ou le présentoir de votre choix.

WOULD YOU LIKE TO SELECT YOUR OWN CONTENTS ?
No problem ! Contact us and we can create your individual set or display !

¿USTED PREFIERE 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.

COFFRET-PRÉSENTOIR (138 PIÈCES)
CASE DISPLAY (138 PIECES) · EXPOSITOR (138 PIEZAS)

Art. **11.4954**



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 puede tropezar 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 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**

Présentoir vérouillable 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)

Art. **11.4853 U**

BLUETEC REVÊTU COATED RECUBRIMIENTO

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.

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.

¿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.

PRÉSENTOIRS (64 PIÈCES)
DISPLAYS (64 PIECES) · DISPLAYS (64 PIEZAS)

Art. | 11.4855

- Présentoir vérouillable 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)

Art. | 11.4855 U

BLUETEC REVÊTU COATED RECUBRIMIENTO

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

Universelle / Universal HP-3

Coupe
Cut
Dentado

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.

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.

¿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.

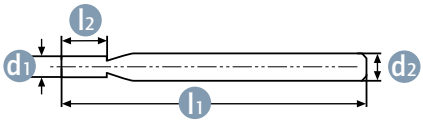
ENSEMBLES DE MINI-FRAISES Ø1 + 1,5 MM, TIGE DE 3 MM
MINI BURR KITS Ø 1 + 1.5 MM, SHANK 3 MM
KITS DE MINI FRESAS Ø 1 + 1,5 MM, MANGO DE 3 MM

Karnasch

Art. 11.4805

Art. 11.4805 U

10 pièces
10 pieces
10 piezas



BLUETEC REVÊTU COATED RECUBRIMIENTO

Universelle / Universal HP-3

Coupe
Cut
Dentado

Art.	D1	L2	D2	L1	Forme Shape	DIN 8033	Contenu | Contents | Contenuti	Art.	D1	L2	D2	L1
115006.005	1	4	3	38	A	ZYA	1x Cylindrique sans coupe en bout Cylinder without end cut	113006.005	1	4	3	38
115006.010	1,5	4	3	38	A	ZYA	1x Cylindrique sans coupe en bout Cylinder without end cut	113006.010	1,5	4	3	38
115026.005	1	4	3	38	C	WRC	1x Cylindrique bout rond Ball nosed cylinder	113026.005	1	4	3	38
115026.010	1,5	4	3	38	C	WRC	1x Cylindrique bout rond Ball nosed cylinder	113026.010	1,5	4	3	38
115036.005	1	1	3	38	D	KUD	1x Boule Ball	113036.005	1	1	3	38
115036.010	1,5	1	3	38	D	KUD	1x Boule Ball	113036.010	1,5	1	3	38
115046.005	1,5	4	3	38	E	TRE	1x Ovale Oval	113046.005	1,5	4	3	38
115056.005	1,5	4	3	38	F	RBF	1x Ogive bout rond Ball nosed tree	113056.005	1,5	4	3	38
115066.005	1,5	4	3	38	G	SPG	1x Ogive pointue Tree	113066.005	1,5	4	3	38
115196.005	1,5	4	3	38	M	SKM	1x Conique bout pointu Cone	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.

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

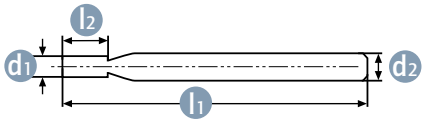
¿Desea otro contenido de mini-fresas? ¡Ningún problema! Seleccione su conjunto requerido en el programa de mini-fresas que se encuentra en la página 64.

ENSEMBLES DE MINI-FRAISES Ø 1 + 1,5 MM, TIGE 3 MM
MINI-BURR KITS Ø 1 + 1.5 MM, SHANK 3 MM
KITS DE MINI-FRESAS Ø 1 + 1,5 MM, MANGO DE 3 MM

Art. | 11.4820

Art. | 11.4820 U

50 pièces
50 pieces
50 piezas



BLUETEC REVÊTU COATED RECUBRIMIENTO

Universelle / Universal HP-3

Coupe
Cut
Dentado

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 | Contenuti	
A	ZYA	5x	Cylindrique sans coupe en bout Cylinder without end cut
A	ZYA	5x	Cylindrique sans coupe en bout Cylinder without end cut
A	ZYA	3x	Cylindrique sans coupe en bout Cylinder without end cut
C	WRC	5x	Cylindrique bout rond Ball nosed cylinder
C	WRC	5x	Cylindrique bout rond Ball nosed cylinder
C	WRC	3x	Cylindrique bout rond Ball nosed cylinder
D	KUD	5x	Boule Ball
D	KUD	5x	Boule Ball
D	KUD	2x	Boule Ball
E	TRE	3x	Ovale Oval
F	RBF	3x	Ogive bout rond Ball nosed tree
G	SPG	3x	Ogive pointue Tree
M	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.

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.

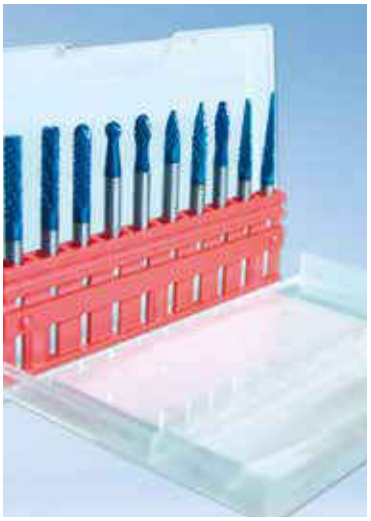
¿Desea otro contenido de mini-fresas? ¡Ningún problema! Seleccione su conjunto requerido en el programa de mini-fresas que se encuentra en la página 64.

ENSEMBLE DE FRAISES Ø 3 MM, TIGE 3 MM
BURR KITS Ø 3 MM, SHANK 3 MM
KITS DE FRESAS Ø 3 MM, MANGO DE 3 MM

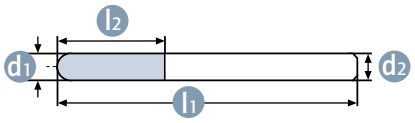
Karnasch

Art. | 11.4904

Art. | 11.4904 U



10 pièces
10 pieces
10 piezas



BLUETEC
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RECUBRIMIENTO

Universelle / Universal HP-3

Coupe
Cut
Dentado

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

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.

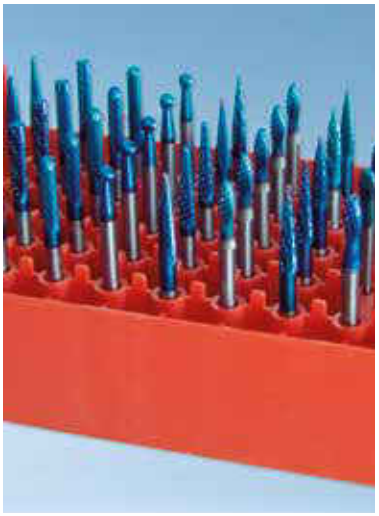
¿Desea otro contenido? ¡Ningún problema! Seleccione los mangos de 3,0 mm en el programa de productos. Observe el largo máximo de 38 mm.

MASCOUTECH

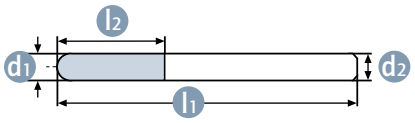
ENSEMBLES DE FRAISES Ø 3 MM, TIGE 3 MM
BURR KITS Ø 3 MM, SHANK 3 MM
KITS DE FRESAS Ø 3 MM, MANGO DE 3 MM

Art. | 11.4837

Art. | 11.4837 U



50 pièces
50 pieces
50 piezas



BLUETEC
REVÊTU
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RECUBRIMIENTO

Universelle / Universal HP-3

Coupe
Cut
Dentado

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.

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.

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

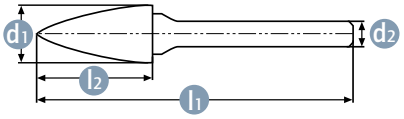
ENSEMBLES DE FRAISES Ø 10 MM, TIGE 6 MM
BURR KITS Ø 10 MM, SHANK 6 MM
KITS DE FRESAS Ø 10 MM, MANGO DE 6 MM

Karnasch

Art. | 11.4918

Art. | 11.4918 U

5 pièces
5 pieces
5 piezas



BLUETEC REVÊTU COATED RECUBRIMIENTO

Universelle / Universal HP-3

Coupe
Cut
Dentado

Art.	D1	L2	D2	L1	Forme Shape	DIN 8033	Contenu | Contents | Contenuti	Art.	D1	L2	D2	L1
115011.085	**10**	20	6	65	B	**ZYB**	1x Cylindrique avec coupe en bout Cylinder with end cut	113011.085	**10**	20	6	65
115021.085	**10**	20	6	65	C	**WRC**	1x Cylindrique bout rond Ball nosed cylinder	113021.085	**10**	20	6	65
115051.040	**10**	20	6	65	F	**RBF**	1x Ogive bout rond Ball nosed tree	113051.040	**10**	20	6	65
115061.045	**10**	20	6	65	G	**SPG**	1x Ogive pointue Tree	113061.045	**10**	20	6	65
115081.035	**10**	20	6	75	L	**KEL**	1x Conique bout arrondi Ball nosed cone	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.

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.

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

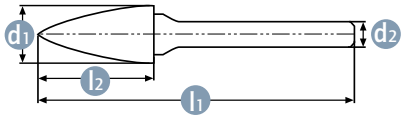
MASCOUTECH

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

Art. | 11.4926

Art. | 11.4926 U

- 5 pièces
- 5 pieces
- 5 piezas



BLUETEC REVÊTU COATED RECUBRIMIENTO

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	
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
113011.100	**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

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.

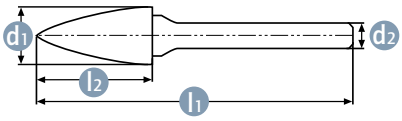
ENSEMBLES DE FRAISES Ø 10 +12 MM, TIGE 6 MM
BURR KITS Ø 10 +12 MM, SHANK 6 MM
KITS DE FRESAS Ø 10 +12 MM, MANGO DE 6 MM

Karnasch

Art. | 11.4934

Art. | 11.4934 U

10 pièces
10 pieces
10 piezas



BLUETEC REVÊTU COATED RECUBRIMIENTO

Universelle / Universal HP-3

Coupe
Cut
Dentado

Art.	D1	L2	D2	L1	Forme Shape	DIN 8033	Contenu | Contents | Contenuti	Art.	D1	L2	D2	L1
115011.085	**10**	20	6	65	B	**ZYB**	1x Cylindrique avec coupe en bout Cylinder with end cut	113011.085	**10**	20	6	65
115021.085	**10**	20	6	65	C	**WRC**	1x Cylindrique bout rond Ball nosed cylinder	113021.085	**10**	20	6	65
115051.040	**10**	20	6	65	F	**RBF**	1x Ogive bout rond Ball nosed tree	113051.040	**10**	20	6	65
115061.045	**10**	20	6	65	G	**SPG**	1x Ogive pointue Tree	113061.045	**10**	20	6	65
115081.035	**10**	30	6	75	L	**KEL**	1x Conique bout arrondi Ball nosed cone	113081.035	**10**	30	6	75
115011.100	**12**	25	6	70	B	**ZYB**	1x Cylindrique avec coupe en bout Cylinder with end cut	113011.100	**12**	25	6	70
115021.105	**12**	25	6	70	C	**WRC**	1x Cylindrique bout rond Ball nosed cylinder	113021.105	**12**	25	6	70
115051.050	**12**	25	6	70	F	**RBF**	1x Ogive bout rond Ball nosed tree	113051.050	**12**	25	6	70
115061.060	**12**	25	6	70	G	**SPG**	1x Ogive pointue Tree	113061.060	**12**	25	6	70
115081.045	**12**	32	6	77	L	**KEL**	1x Conique bout arrondi Ball nosed cone	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

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.

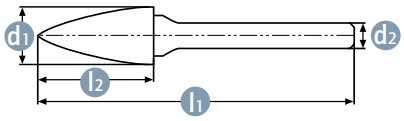
¿Desea otro contenido? ¡Ningún problema! Seleccione los mangos de 6,0 mm en el programa de productos. Observe el largo máximo de 86 mm.

MASCOUTECH

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

Art. **11.4942**

10 pièces
10 pieces
10 piezas



Art. **11.4942 U**

BLUETEC REVÊTU COATED RECUBRIMIENTO

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 programmed'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.

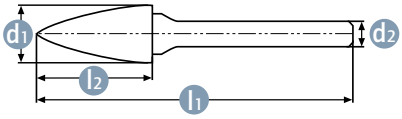
ENSEMBLES DE FRAISES NORMALISÉES DIN12 MM,TIGE 6 MM
DIN STANDARD BURR KITS 12 MM, SHANK 6 MM
KITS DE FRESAS NORMALIZADAS SEGÚN DIN DE 12 MM, MANGO 6 MM

Karnasch

Art. 11.4907

DIN

5 pièces
5 pieces
5 piezas



Art. 11.4907 U

DIN

BLUETEC REVÊTU COATED RECUBRIMIENTO

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.

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.

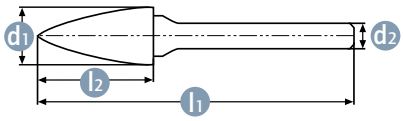
MASCOUTECH

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. | 11.4911

DIN

10 pièces
10 pieces
10 piezas



Art. | 11.4911 U

DIN

BLUETEC REVÊTU COATED RECUBRIMIENTO

Universelle / Universal HP-3

Coupe
Cut
Dentado

Art.	D1	L2	D2	L1	Forme Shape	DIN 8033	Contenu | Contents | Contenuti
115001.107	12,0 DIN	25	6	70	A	ZYA	1x Cylindrique sans coupe en bout / Cylinder without end cut
115011.103	12,0 DIN	25	6	70	B	ZYB	1x Cylindrique avec coupe en bout / Cylinder with end cut
115021.107	12,0 DIN	25	6	70	C	WRC	1x Cylindrique bout rond / Ball nosed cylinder
115031083	12,0 DIN	11,4	6	65	D	KUD	1x Boule / Ball
115041.037	12,0 DIN	22	6	66	E	TRE	1x Ovale / Oval
115051.053	12,0 DIN	25	6	70	F	RBF	1x Ogive bout rond / Ball nosed tree
115061.063	12,0 DIN	25	6	70	G	SPG	1x Ogive pointue / Tree
115071.027	12,0 DIN	32	6	70	H	–	1x Flamme / Flame
115081.047	12,0 DIN	32	6	70	L	KEL	1x Conique bout arrondi / Ball nosed cone
115091.047	12,0 DIN	25	6	70	M	SKM	1x Conique bout pointu / Cone

Art.	D1	L2	D2	L1
113001.107	12,0 DIN	25	6	70
113011.103	12,0 DIN	25	6	70
113021.107	12,0 DIN	25	6	70
113031.083	12,0 DIN	11,4	6	65
113041.037	12,0 DIN	22	6	66
113051.053	12,0 DIN	25	6	70
113061.063	12,0 DIN	25	6	70
113071.027	12,0 DIN	32	6	70
113081.047	12,0 DIN	32	6	70
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

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.

- 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 péripherie.

- 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.

- Puede que sea necesario ajustar las velocidades indicadas para obtner un optimo rendimiento.
- Los materiales mas duros necestian velocidades mas lentas.
- Las fresas mas pequenas necestian velocidades mas rapidas.
- Las fresas de serie extra largas (>150mm serie larga) necestian velocidades mas lentas.
  Aplique un movimiento constante y una ligera precion al utilizarla.
  El fucionamiento debajo de la velocidad optima provocara stillas.
  El fucionamiento por encima de la velocidad optima provocara el degaste del diente
- El permitir que la herramienta se caliente demasiado puede hacer que la union se derrita y separe el cabezal del eje.
- Al utilizar herrammientas y pinzas portapiezas desgastadas se provocaran astillas.
- No hunda la fresa mas de un terico de su periferia.

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	70.000 100.000 Maximum 120.000	60.000 80.000 Maximum 100.000	45.000 60.000 Maximum 65.000	30.000 40.000 Maximum 55.000	22.000 30.000 Maximum 35.000	18.000 0.000 Maximum 25.000	15.000 17.000 Maximum 20.000	10.000 13.000 Maximum 15.000
Hardened steel Acier trempé Acero cementado	70.000 90.000 Maximum 110.000	60.000 80.000 Maximum 10.000	30.000 45.000 Maximum 65.000	19.000 30.000 Maximum 55.000	15.000 22.000 Maximum 35.000	12.000 18.000 Maximum 25.000	10.000 15.000 Maximum 20.000	7.000 11.000 Maximum 15.000
Stainless steel Acier inoxydable Acero inoxidable	70.000 90.000 Maximum 110.000	60.000 80.000 Maximum 10.000	30.000 45.000 Maximum 65.000	19.000 30.000 Maximum 55.000	15.000 22.000 Maximum 35.000	12.000 18.000 Maximum 25.000	10.000 15.000 Maximum 20.000	7.000 11.000 Maximum 15.000
Cast iron Fonte Hierro fundido	60.000 100.000 Maximum 120.000	45.000 80.000 Maximum 100.000	22.000 60.000 Maximum 65.000	15.000 40.000 Maximum 55.000	11.000 30.000 Maximum 35.000	9.000 20.000 Maximum 25.000	8.000 17.000 Maximum 20.000	6.000 13.000 Maximum 15.000
Titanium Titane Titanio	70.000 90.000 Maximum 110.000	60.000 80.000 Maximum 10.000	30.000 45.000 Maximum 65.000	19.000 30.000 Maximum 55.000	15.000 22.000 Maximum 35.000	12.000 18.000 Maximum 25.000	10.000 15.000 Maximum 20.000	7.000 11.000 Maximum 15.000
Aluminium, Plastics Aluminium, Plastiques Aluminio, Plásticos	70.000 100.000 Maximum 120.000	60.000 80.000 Maximum 100.000	15.000 60.000 Maximum 65.000	10.000 50.000 Maximum 55.000	7.000 30.000 Maximum 35.000	6.000 20.000 Maximum 25.000	5.000 17.000 Maximum 20.000	4.000 13.000 Maximum 15.000
Copper, brass, bronze Cuivre, laiton, bronze Cobre, latón, bronce	60.000 100.000 Maximum 110.000	45.000 80.000 Maximum 100.000	22.000 60.000 Maximum 65.000	15.000 40.000 Maximum 55.000	11.000 30.000 Maximum 35.000	9.000 20.000 Maximum 25.000	8.000 17.000 Maximum 20.000	6.000 13.000 Maximum 15.000
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 68.000 Maximum 85.000	35.000 50.000 Maximum 75.000	27.000 48.000 Maximum 60.000	18.000 35.000 Maximum 45.000	11.000 28.000 Maximum 38.000	7.000 18.000 Maximum 28.000	5.000 14.000 Maximum 20.000	3.000 10.000 Maximum 15.000
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 inoxidables, como titanio, Inconel, Hastelloy, Waspaloy, Duplex, Amanox etc.	70.000 90.000 Maximum 110.000	60.000 80.000 Maximum 100.000	30.000 45.000 Maximum 65.000	19.000 30.000 Maximum 55.000	15.000 22.000 Maximum 35.000	12.000 18.000 Maximum 25.000	10.000 15.000 Maximum 20.000	7.000 11.000 Maximum 15.000

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